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**Agrément
Certificate
No 02/3967**

Designated by Government
to issue
European Technical
Approvals

RUBBERBOND WATERPROOFING SYSTEMS

Système d'étanchéité
Dachabdichtungen

Product

BEFORE


AFTER

• *THIS CERTIFICATE RELATES TO RUBBERBOND WATERPROOFING SYSTEMS, ROOF WATERPROOFING MEMBRANES.*

• *Installation must be carried out by trained and approved operatives.*

These Front Sheets must be read in conjunction with the accompanying Detail Sheets, which provide information specific for the membranes.

Regulations — Detail Sheet 1**1 The Building Regulations 2000 (as amended) (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, RubberBond Waterproofing Systems, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: **B4(2)**

External fire spread

Comment:

Data obtained on tests to BS 476-3 : 1958 indicate that on suitable substructures the use of the systems will enable a roof to be unrestricted under the requirements of this Regulation. See section 5 of the appropriate Detail Sheet.

Requirement: **C4**

Resistance to weather and ground moisture

Comment:

Tests for water resistance on the membranes, including joints, indicate that the systems meet this Requirement. See sections 6.1 and 6.2 of these Front Sheets.

Requirement: **Regulation 7**

Materials and workmanship

Comment:

The systems comprise acceptable materials. See section 6 of the appropriate Detail Sheet.

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



In the opinion of the BBA, RubberBond Waterproofing Systems, 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.

Regulation:	10	Fitness of materials and workmanship
Standards:	B2.1 and B2.2	Selection and use of materials, fittings, and components, and workmanship
Comment:		The systems comply with these Standards. See section 6 of the appropriate Detail Sheet.
Regulation:	12	Structural fire precautions
Standard:	D9.1	Fire spread from adjoining buildings
Comment:		Data obtained from tests to BS 476-3 : 1958 indicate that on suitable substructures the use of the systems will enable a roof to be unrestricted under the requirements of this Standard. See section 5 of the appropriate Detail Sheet.
Regulation:	17	Resistance to moisture
Standard:	G3.1	Resistance to precipitation
Comment:		Tests for water resistance of the membranes, including joints, indicate that the use of the systems will enable a roof to satisfy the requirements of this Standard. See sections 6.1 and 6.2 of these Front Sheets.

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, RubberBond Waterproofing Systems, if used in accordance with the provisions of this Certificate, will contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The systems comprise acceptable materials. See section 6 of the appropriate Detail Sheet.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		Tests for water resistance of the membranes, including joints, indicate that the use of the systems will enable a roof to satisfy the requirements of this Regulation. See sections 6.1 and 6.2 of these Front Sheets.
Regulation:	E5	External fire spread
Comment:		Data obtained from tests to BS 476-3 : 1958 indicate that on suitable substructures the use of the systems will enable a roof to be unrestricted under the requirements of this Regulation. See section 5 of each Detail Sheet.

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 sections: 1 *Description* (1.2) and 2 *Delivery and site handling* (2.2 and 2.3) of the relevant Detail Sheet.

Design Data

5 General

5.1 Limited access roofs are defined for the purpose of this Detail Sheet 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.

5.2 Flat roofs are defined for the purpose of this Detail Sheet 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, etc. Pitched roofs are defined for the purpose of this Certificate as those having a fall in excess of 1:6.

5.3 Decks to which the membrane is to be applied must comply with the relevant requirements of BS 6229 : 1982, BS 8217 : 1994 and, where appropriate, NHBC Standards chapter 7.1 or Zurich Building Guarantees Technical Standards, Section 5, clause 5.9.3.19.

5.4 Insulation systems or materials used in conjunction with the product must be approved by the marketing company and 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.

5.5 If rigid glass-fibre or mineral wool roof insulation products are used they must be overlaid with 13 mm thick fibreboard unless otherwise authorised by the marketing company.

5.6 Contact with low-grade bitumen, coal tar and oil-based products should be avoided. If contact with such products is likely, a separating layer should be interposed before installing the waterproof sheet. If the compatibility with other products is in doubt, the advice of the marketing company should be sought.

6 Weathertightness



6.1 Tests 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 the national Building Regulations:

England and Wales

Approved Document C, Requirement C4, Section 5.1.

Scotland

Standard G3.1, Regulation 17.

Northern Ireland

Regulation C4.

6.2 The membranes are 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.

7 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, a layer of 8 mm thick SBR Walkway sheeting should be considered, and the advice of the marketing company should be sought. Reasonable care should be taken, however, to avoid puncture by sharp objects or concentrated loads.

8 Maintenance

8.1 Roofs covered with the systems should be the subject of annual inspections, as is good practice with all waterproofing systems to ensure continued security and performance.

8.2 In the event of accidental damage, repairs can be carried out by cleaning the area around the damage and applying a patch of the relevant membrane (see section 8 of the relevant Detail Sheet).

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

BS 6229 : 1982 *Code of practice for flat roofs with continuously supported coverings*

BS 8217 : 1994 *Code of practice for built-up felt roofing*

Conditions of Certification

9 Conditions

9.1 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.

9.2 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.

9.3 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.

9.4 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.

9.5 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, RubberBond Waterproofing Systems are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 02/3967 is accordingly awarded to Flex-R Ltd.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'P. C. Hewitt'.

Date of issue: 29th October 2002

Chief Executive



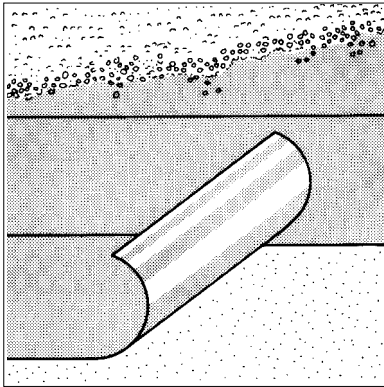
Flex-R Ltd

Certificate No 02/3967

RUBBERBOND NON-REINFORCED EPDM ROOF WATERPROOFING SYSTEMS

DETAIL SHEET 2

Product



• THIS DETAIL SHEET RELATES TO RUBBERBOND NON-REINFORCED EPDM ROOF WATERPROOFING SYSTEMS.

• The product is for use as:

- (a) a single layer waterproof covering for flat roofs with limited access, which is loose-laid and ballasted, and mechanically fixed at edges and upstands
- (b) a fully adhered, single layer waterproof covering for flat and pitched roofs with limited access
- (c) a loose-laid single layer waterproof covering in roof specification to the inverted roof concept.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information relating to the product, and the Conditions of Certification, respectively.

Technical Specification

1 Description

1.1 RubberBond Non-reinforced EPDM roof waterproofing sheet is manufactured by blending EPDM (ethylene-propylene diene monomer), processing oils and other additives. The sheets are produced by calendaring or extruding, then vulcanising.

1.2 The nominal characteristics of the membranes are:

thickness (mm)	1.14 (loose-laid applications) 1.52 (fully-bonded applications)
width (m)	1.37, 3.05, 6.10, 9.15 12.20, and 15.25
length (m)	15.25, 30.50, 38.10, 45.72 or 61.00 ⁽¹⁾
weight (kgm ²)	1.14 mm thick : 1.2 1.52 mm thick : 1.8
colour	grey/black

(1) Only available in 1.14 mm thick membrane.

1.3 Brite-ply is a white version of RubberBond Non-reinforced EPDM in which the top laminate is coloured white. It is manufactured to the same specifications and has the same nominal properties as the black version.

1.4 Ancillary items for use with these systems are:

RubberBond EPDM Elastoflex and Brite-ply Flashing — non-vulcanised (uncured) EPDM 1.5 mm thick with a polythene backing, available in widths from 150 mm to 450 mm.

Bonding adhesive 90.8.30A — a solvent-based contact cement, based on polychloroprene (Neoprene) for bonding the EPDM sheet to the substrate.

Pressure sensitive products — a range of detailing products (flashings, corners) with a pressure adhesive incorporated.

Splicing Cement EP95 — a cement based on solvent, butyl rubber and other synthetic resins which is cold-applied to bond laps between EPDM sheets and/or EPDM flashing.

Secur Tape — a synthetic rubber-based tape for use in lap jointing.

In-seam Sealant — a rubber-based sealant applied within lap joints made using EP95 Splicing Cement only.

HP-250 Primer — a primer for use with Splicing Cement, Secur Tape or pressure-sensitive products in preparation of membrane surface.

LV-600 Primer — an alternative primer for use with Splicing Cement, Secur Tape or pressure sensitive products in preparation of membrane surface.

Splice Cleaner — a synthetic rubber/resin solution for cleaning EPDM prior to bonding laps, except when splice tape is used.

Lap Sealant — an EPDM mastic to form a feathered edge along lap edges at flashings and details and at field splices when EP-95 Splicing Cement is used.

Water Cut-off Mastic — a synthetic rubber/resin sealing mastic to act as a sealing agent between the EPDM or flashing sheets and accessories.

Walkway sheeting — a special 8 mm thick styrene butadiene rubber (SBR) sheet, to give additional protection in areas of high accessibility.

Colour coating — an acrylic, elastic roof coating to provide optional roof colours.

Brite-Ply accessories — Brite-Ply splicing cement, Brite-Ply Splice Cleaner and Brite-Ply Lap Sealant are used with Brite-Ply and serve the same purpose as their counterparts.

Pourable sealer — a two-component, solvent-free, polyurethane-based sealant, for use in areas where flashing is difficult to apply.

RUSS strip — a reinforced EPDM membrane strip which is fastened to the substrate. The membrane is adhered to this at the roof perimeter and penetrations.

Fasteners and fastening plates — for use in mechanically fixed applications.

Termination bars — for fixing membrane at roof perimeters.

1.5 Quality control checks are carried out during production and on the finished product.

2 Delivery and site handling

2.1 The membranes are delivered to site in rolls wrapped in polyethylene. Provision may be required for load spreading and handling at roof level when large area sheets are used. The wrapper bears the product name, identification and the BBA identification mark incorporating the number of this Certificate.

2.2 The accessories are normally delivered in the following quantities:

Splicing Cement EP95 and HP-250 Primer	3.8 litre or 9.5 litre cans
Splice Cleaner, bonding adhesive and colour coating	3.8 litre or 18.9 litre cans
Lap Sealant	25-tube cartons
Water Cut-off Mastic and In-seam Sealant	10-tube cartons
LV-600 Primer	3.8 litre cans

2.3 Ancillary items classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3) are given in Table 1 along with flashpoints. These products bear the appropriate hazard warning.

Table 1 Flashpoint and hazard classification

Materials	Flashpoint (°C)	Classification
Bonding Adhesive 90.8.30A ⁽¹⁾	20.0	Extremely Flammable, Harmful
Splicing Cement EP95 ⁽¹⁾	4.0	Highly Flammable, Harmful
Lap Sealant ⁽¹⁾	4.4	Highly Flammable, Harmful
In-seam Sealant ⁽¹⁾	4.4	Highly Flammable, Harmful
Water Cut-off Mastic ⁽¹⁾	11.0	Highly Flammable
HP-250 Primer ⁽¹⁾	4.4	Highly Flammable, Harmful
LV-600 Primer	93.0	Harmful
Splice Cleaner ⁽¹⁾	13.0	Extremely Flammable

(1) These components should be stored in accordance with the Highly Flammable Liquids and Petroleum Gases Regulations 1997.

2.4 EPDM membranes have no particular storage conditions but EPDM flashing rolls should be stored in a clean, dry position and in temperatures between 5°C and 25°C. The flashing cures gradually and should not be stored for more than six to nine months. As it cures it will become less flexible and although this does not affect its waterproofing characteristics it does become more difficult to form at details.

2.5 Bonding adhesive, Splicing Cement EP95, lap sealant, in-seam sealant, water cut-off mastic and colour coating should be stored in a dry place in temperatures between 5°C and 25°C. Site storage of these products should not exceed six months.

Design Data

3 General

RubberBond Non-reinforced EPDM Roof Waterproofing Systems are satisfactory for use as:

- a loose-laid and ballasted waterproofing layer, mechanically fixed at edges and upstands, on flat roofs up to a maximum fall of 1:6 with limited access
- a fully-adhered waterproofing layer, mechanically fixed at edges and upstands, on flat and pitched roofs with limited access
- a loose-laid system to the inverted roof concept, on flat roofs with limited access.

4 Adhesion

4.1 The adhesion of a fully-adhered system to the substrate will normally be limited by the cohesive strength of the substrate. On substrates with high cohesive strength, the adhesion of the membrane with Sureseal 90-8-30A Bonding Adhesive is

sufficient to resist the effect of wind suction, thermal cycling or minor structural movements occurring in practice. Where doubts exist regarding suitability of substrate, the advice of the marketing company should be sought.

4.2 In areas of high wind exposure, as defined in BS 6399-2 : 1997, the use of concrete slabs placed on suitable paving supports should be considered in loose-laid specifications. Advice on additional protection is available from the manufacturer.

5 Properties in relation to fire



5.1 When tested in accordance with BS 476-3 : 1958:

(a) A system comprising a single layer of RubberBond Non-reinforced EPDM (1.14 mm thick) on a 19 mm thick chipboard substrate, protected by a nominal 25 mm layer of stone chippings, achieved an EXT.F.AA rating.

(b) A system comprising a single layer of RubberBond Non-reinforced EPDM (1.52 mm thick) adhered, using Bonding adhesive 90.8.30A, to a 38 mm thickness of polyisocyanurate foam on a profiled steel substrate, achieved an EXT.F.AB rating.

5.2 When used in a loose-laid and ballasted specification including a minimum surface finish of 50 mm of aggregate, the membranes shall be deemed to satisfy BS 476-3 : 1958 designation EXT.F.AA.

5.3 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

Tests to confirm to Standard D9.1.

Northern Ireland

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

6 Durability



Accelerated weathering tests and evidence from use in the USA and Europe confirm that satisfactory retention of physical properties is achieved. All evidence available suggests that RubberBond Non-reinforced EPDM Roof Waterproofing Systems should have a life in excess of 20 years.

7 General

7.1 The installation of RubberBond Non-reinforced EPDM Roof Waterproofing Systems must be carried out by trained installers, in accordance with the manufacturer's instructions and this Detail Sheet.

7.2 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.

7.3 When the product is to be laid on a rough deck, a loose-laid, non-woven polyester fleece (minimum 150 gm²) should be laid first.

7.4 Installation should not be carried out during wet or damp weather (eg rain, fog, and snow) nor when the temperature is below 5°C, unless suitable precautions are taken.

7.5 Where contact with low-grade bitumen, coal tar or oil-based products is likely, an isolating layer should be interposed between the product and the substrate. If compatibility with other products is in doubt, the advice of the marketing company should be sought.

7.6 The membrane must be mechanically fixed around the perimeter of the roof and around any penetration of the sheet, using fastening plates or reinforced universal securement strip (RUSS).

7.7 When using a loose-laid specification, account should be taken in the design of the deck of the extra dead loading due to the weight of the aggregate.

8 Procedure

Loose-laid and ballasted application

8.1 The 1.1 mm thick EPDM membranes may be used for the loose-laid application, but only on roofs with a fall of between 1:80 and 1:6.

8.2 The membrane is mechanically fixed around the perimeter and penetrations (see section 7.6). Lap jointing and flashing is carried out as detailed in sections 9.1 to 9.7 (seaming procedure), and sections 9.8 to 9.10 (flashing).

8.3 Loose-laid applications should be covered by at least 50 mm of river-washed, well-rounded gravel. If crushed stone ballast is used, a protective sheet 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.

8.4 An alternative method of ballasting is to use concrete paving, maximum size 600 mm by

600 mm. A protective sheet (minimum 150 gm²) must be laid between the EPDM and the supports.

8.5 When the membrane is to be laid directly onto a concrete deck, a protective sheet must be laid first. 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 protective sheet must be laid between the concrete deck and the membrane.

Fully bonded application

8.6 The 1.52 mm thick membrane is used for fully bonded applications on roofs with a minimum finished fall in excess of 1:80.

8.7 All insulation boards are attached to the structural deck by bitumen bond, adhesives, or mechanical fasteners 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.

8.8 When used as a fully bonded system, the resistance to wind uplift will be limited by the cohesive strength of the insulation and the method of attachment. These factors should be taken into account when selecting the insulation material. Polyurethane insulation boards must be mechanically fixed or bitumen bonded to prevent bowing.

8.9 The fully bonded application may not be used directly onto insulation materials (eg polystyrene) which would be adversely affected by the solvent in the adhesive, or onto bituminous materials, without consulting the manufacturer.

8.10 A layer of bonding adhesive is applied to both the substrate and the membrane by means of a roller at an application rate of 0.75 litres per m². When the adhesive has reached its tacky point the membrane is applied to the substrate and rolled to ensure a full bond and that no air has been trapped beneath the membrane.

8.11 The membrane is then mechanically fixed around the perimeter and penetrations (see section 7.6). The laps are sealed and the flashing installed (see sections 9.1 to 9.7 and sections 9.8 to 9.10).

9 Details

Seaming procedure (splicing cement)

9.1 At laps, the top sheet should be folded back by about 300 mm and both surfaces of the lap cleaned with Splice Cleaner, HP-250 Primer or LV-600 Primer. Splicing Cement is applied to both surfaces by roller to give an even coverage, and must be allowed to dry until tacky. A continuous 4 mm bead of In-seam Sealant is applied 12 mm in from the back edge of the splice. The top sheet

is rolled back down towards the bottom sheet and mated firmly by applying hand pressure.

9.2 The lap should be rolled with a steel or silicone roller, applying positive pressure, towards the outer edge of the lap. The edge should be cleaned using Splice Cleaner. After checking that a good seal has been achieved, a bead of lap sealant is applied to the exposed edge of the lap.

Seaming procedure (Secur Tape)

9.3 Dirt and excess dust is cleaned from the area of the splice in accordance with the marketing company's instructions. The area is then cleaned using either HP-250 or LV-600 Primer, and allowed to dry.

9.4 The bottom sheet is marked 13 mm from the edge of the top sheet along the entire length of the splice. The tape is aligned with the marked line and pressed down using firm, even hand pressure, leaving the top release liner in place.

9.5 The minimum splice width should be 50 mm, with a minimum of 3 mm of tape extending beyond the splice edge.

9.6 The top release liner is removed and the top sheet is allowed to fall freely onto the exposed tape. The top sheet is pressed onto the tape using firm, even hand pressure across the splice towards the outer edge of the lap.

9.7 The lap should be rolled with either a steel or silicone roller, applying positive pressure, towards the outer edge of the lap, and not parallel to it. For lap joints at details the edge should be cleaned using Splice Cleaner, and a bead of Lap Sealant is applied to the exposed edge of the lap.

Flashing

9.8 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, according to the procedure in sections 9.1 to 9.7, with minimum lap widths of 75 mm. A continuation of the deck membrane may be used for flashing, as is the practice when RUSS strip is used.

9.9 The flashing should be bonded to the vertical surface of the wall (see section 8.11) using bonding adhesive or, alternatively, using the pressure sensitive flashings.

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

9.11 Advice for specific flashing requirements is available from the manufacturer.

Technical Investigations

The following is a summary of the technical investigations carried out on the RubberBond Non-reinforced EPDM Roof Waterproofing Systems.

10 Tests

Test data from an independent NATLAS approved source, the UBAtc and the BBA were examined and evaluated. Details of the tests carried out, which show typical results for the materials, are summarised in Tables 2 to 4.

Table 2 Tests on physical properties

Test performed on 1.52 mm nominal thickness membrane		
Test (units)	Method ⁽¹⁾	Mean result
Water vapour permeability (gm ² day ⁻¹)	BS 3177	0.3
Water vapour resistance (MNsg ⁻¹)	BS 3177	683
Tensile strength (MPa)	BS 903-A2	
control		11.3
heat aged ⁽²⁾		11.6
Elongation (%)	BS 903-A2	
control		450
heat aged ⁽²⁾		280
Modulus at 300% elongation (MPa)	BS 903-A2	7.9
Tear resistance (nail) (Nmm ²)	MOAT 27 : 5.4.1	45
Tear strength (Nmm ⁻¹)	BS 903-A3	
control		39.9
heat aged ⁽²⁾		39.4
Low temperature flexibility (C) (10 mm diameter mandrel)	BS 903-A25	40
Dimensional stability (%)	<i>ad hoc</i> ⁽²⁾	
longitudinal		-0.3
transverse		-0.6
Ozone resistance × 7 magnification	BS 903-A43	no cracks
UV resistance 4000 hours at 80C	ASTM G-26 Xenon arc	no cracks or crazing

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

(2) Heat aged for 28 days at 116C.

Table 3 Tests on service performance

Test	Method ⁽¹⁾	Mean results	
		1.14 mm thickness	1.52 mm thickness
Static loading	MOAT 27 : 5.1.9		
concrete substrate		L ₄	L ₄
perlite substrate		L ₄	L ₄
Dynamic impact	MOAT 27 : 5.1.10		
concrete substrate		I ₃	—
perlite substrate		I ₄	—
Fatigue resistance	MOAT 27 : 5.1.8	—	pass

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

— = not tested

Table 4 Joints

Test (units)	Method ⁽¹⁾	Mean result
Tensile strength of joints (N per 50 mm)	MOAT 27 : 5.2.2/3/4	
Splicing Cement		
control		328
heat aged ⁽²⁾		357
Secur Tape (HP-250) ⁽³⁾		
control		279
heat aged ⁽²⁾		311
water soak ⁽⁴⁾		286
Secur Tape (LV-600) ⁽³⁾		
control		310
T-peel (Nmm ⁻¹)	MOAT 46 : 6P	
HP-250		1.87
LV-600		1.90

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

(2) Heat aged 28 days at 80C.

(3) Primer used in preparation of joints.

(4) Water soak 7 days at 60C.

11 Investigations

11.1 Existing data on fire performance of the membrane were examined.

11.2 The test results and data given in the assessment leading to the issue of a previous Certificate were assessed in the context of UK roofing practice and current building regulations.

11.3 A user survey was performed to examine the performance of the membrane in the UK.

11.4 Test data on the jointing system by UBAtc were examined.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

BS 903-A2 : 1971 *Physical testing of rubber — Determination of tensile stress-strain properties*

BS 903-A3 : 1982 *Physical testing of rubber — Determination of tear strength (trouser, angle and crescent test pieces)*

BS 903-A25 : 1968 *Physical testing of rubber — Determination of impact brittleness temperature*

BS 903-A43 : 1982 *Physical testing of rubber — Determination of resistance to ozone cracking (static strain test)*

BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*

BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

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*

ASTM G-26 *Recommended practice for operation of light-exposure equipment (Xenon) with and without water, for exposure of non-metallic materials*



On behalf of the British Board of Agrément

Date of issue: 29th October 2002

Chief Executive

Electronic Copy

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For additional information about the Certificate, tel: 01923 665300.
For information about Agrément Certificate validity and scope, tel: Hotline 01923 665400, or check the BBA website.



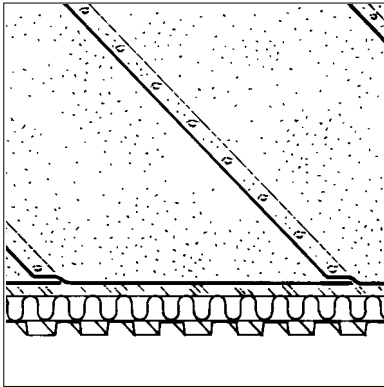
Flex-R Ltd

RUBBERBOND REINFORCED FR EPDM
MECHANICALLY FIXED
ROOF WATERPROOFING SYSTEM

Certificate No 02/3967

DETAIL SHEET 3

Product



• THIS DETAIL SHEET RELATES TO RUBBERBOND REINFORCED FR EPDM MECHANICALLY FIXED ROOF WATERPROOFING SYSTEM BASED UPON A POLYESTER REINFORCED EPDM MEMBRANE.

• The product is suitable for use as a waterproofing layer on flat and pitched roofs with limited access.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information relating to the product, and the Conditions of Certification, respectively.

Technical Specification

1 Description

1.1 RubberBond Reinforced FR EPDM roof waterproofing sheet is manufactured by blending EPDM (ethylene-propylene diene monomer), processing oils and other additives. The sheets are produced by laminating the EPDM and the polyester reinforcing fabric, calendaring or extruding, then vulcanising.

1.2 The nominal characteristics of the membrane are:

thickness (mm)	1.14
width (m)	1.37, 2.13, 3.05
length (m)	30.5, 61.0
weight (kgm ²)	1.38
colour	black

1.3 Ancillary items for use with this system are:

RubberBond EPDM Elastoform Flashing — non-vulcanised (uncured) EPDM 1.5 mm thick with a polythene backing, available in widths from 150 mm to 450 mm.

Bonding Adhesive 90.8.30A — a solvent-based contact cement, based on polychloroprene (Neoprene) for bonding the EPDM sheet to the substrate.

Pressure sensitive products — a range of detailing products (flashings, corners) with a pressure adhesive incorporated.

Splicing Cement EP95 — a cement based on solvent, butyl rubber and other synthetic resins which is cold-applied to bond laps between EPDM sheets and/or EPDM flashing.

Secur Tape — a synthetic rubber-based tape for use in lap jointing.

In-seam sealant — a rubber-based sealant applied within lap joints made using EP95 Splicing Cement only.

HP-250 Primer — a primer for use with Splicing Cement, Secur Tape or pressure-sensitive products in preparation of surface membrane.

LV-600 Primer — an alternative primer for use with Splicing Cement, Secur Tape or pressure sensitive products in preparation of membrane surface.

Splice Cleaner — a synthetic rubber/resin solution for cleaning EPDM prior to bonding laps.

Lap Sealant — an EPDM mastic to form a feathered edge along lap edges of the EPDM sheet or flashing.

Water Cut-off Mastic — a synthetic rubber/resin sealing mastic to act as a sealing agent between the EPDM or flashing sheets and accessories.

Walkway sheeting — a special 8 mm thick styrene butadiene rubber (SBR) sheet, to give additional protection in areas of high accessibility.

Colour coating — an acrylic, elastic roof coating to provide optional roof colours.

Pourable sealer — a two-component, solvent-free, polyurethane-based sealant, for use in areas where flashing is difficult to apply.

RUSS strip — a reinforced EPDM membrane strip which is fastened to the substrate. The membrane is adhered to this at the roof perimeter and penetrations.

Fasteners and fastening plates — for use in mechanically fixed applications.

Termination bars — for fixing membrane at roof perimeters.

1.4 Quality control checks are carried out during production and on the finished product.

2 Delivery and site handling

2.1 The membranes are delivered to site in rolls wrapped in polyethylene. Provisions may be required for load spreading and handling at roof level when large area sheets are used. The wrapper bears the

product name, identification and the BBA identification mark incorporating the number of this Certificate.

2.2 RubberBond accessories are normally delivered in the following quantities:

Splicing Cement EP95 and HP-250 Primer	3.8 litre or 9.5 litre cans
Splice Cleaner, bonding adhesive and colour coating	3.8 litre or 18.9 litre cans
Lap Sealant	25-tube cartons
Water Cut-off Mastic and In-seam Sealant	10-tube cartons
LV-600 Primer	3.8 litre cans

2.3 Ancillary items classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3) are given in Table 1 along with flashpoint. These products bear the appropriate hazard warning.

2.4 EPDM membranes have no particular storage conditions but EPDM flashing rolls should be stored in a clean, dry position and in temperatures between 5°C and 25°C. The flashing cures gradually and should not be stored for more than six to nine months. As it cures it will become less flexible and although this does not affect its waterproofing characteristics it does become more difficult to form at details.

2.5 Bonding adhesive, splicing cement EP95, lap sealant, in-seam sealant water cut-off mastic and colour coating should be stored in a dry place in temperatures between 5°C and 25°C. Site storage of these products should not exceed six months.

Table 1 Flashpoint and hazard classification		
Materials	Flashpoint (°C)	Classification
Bonding Adhesive 90.8.30A ⁽¹⁾	20.0	Extremely Flammable, Harmful
Splicing Cement EP95 ⁽¹⁾	4.0	Highly Flammable, Harmful
Lap Sealant ⁽¹⁾	4.4	Highly Flammable, Harmful
In-seam Sealant ⁽¹⁾	4.4	Highly Flammable, Harmful
Water Cut-off Mastic ⁽¹⁾	11.0	Highly Flammable
HP-250 Primer ⁽¹⁾	4.4	Highly Flammable, Harmful
LV-600 Primer	93.0	Harmful
Splice cleaner ⁽¹⁾	13.0	Extremely Flammable

(1) These components should be stored in accordance with the Highly Flammable Liquids and Petroleum Gases Regulations 1997.

Design Data

3 General

RubberBond Reinforced FR EPDM Mechanically Fixed Roof Waterproofing System is satisfactory for use as a mechanically-fixed waterproofing layer on flat and pitched roofs with limited access.

4 Resistance to wind uplift


4.1 The membrane is mechanically fastened to the deck by screws, each passing through a 50 mm diameter disc and the membrane. The number and position of these fixings will depend on many factors including:

- wind uplift forces to be resisted
- pull-out strength of screws
- elastic limit of the membrane
- appropriate safety factors.

4.2 The wind uplift forces to be resisted should be calculated in accordance with BS 6399-2 : 1997 to establish the number of fixings and the pattern in which they are to be employed.

4.3 When installing the system in areas of high wind loads the 2.13 m wide membrane should be used.

5 Properties in relation to fire

 5.1 When tested in accordance with BS 476-3 : 1958 a system comprising a profiled steel deck, a 250 µm polyethylene vapour barrier, one 40 mm thick layer of aluminium-faced polyurethane foam and one layer of 1.14 mm RubberBond Reinforced FR EPDM, mechanically fixed through the insulation and vapour barrier to the deck, achieved an EXT.F.AA fire rating.

5.2 The designation of other specifications should be confirmed by:

England and Wales

Test or assessment in accordance with Approved Document B, Appendix A, Clause A1.


Scotland

Test to confirm to Standard D9.1.

Northern Ireland

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

6 Durability

 Accelerated weathering tests and evidence from use in the USA confirm that satisfactory retention of physical properties is achieved. All evidence available suggests that RubberBond Reinforced FR EPDM should have a life in excess of 20 years.

Installation

7 General

7.1 The installation of RubberBond Reinforced FR EPDM Mechanically Fixed Roof Waterproofing System must be carried out by trained installers, in accordance with the manufacturer's instructions and this Detail Sheet.

7.2 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.

7.3 When the product is to be laid on a rough deck or existing roof coverings, a loose-laid, non-woven polyester fleece (minimum 150 gm²) or 13 mm thick fibreboard should be laid first.

7.4 Insulation boards should be mechanically fixed in accordance with the marketing company's instructions and the instructions of the insulation manufacturer.

7.5 Installation should not be carried out during wet or damp weather (eg rain, fog, snow) nor when the temperature is below 5°C, unless suitable precautions are taken.

7.6 Where contact with low-grade bitumen, coal tar or oil-based products is likely, an isolating layer should be interposed between the product and the substrate. If compatibility with other products is in doubt, the advice of the marketing company should be sought.

8 Procedure

8.1 The membrane is laid flat onto the deck or insulation, without folds or ripples, and fixed to the deck with screws passing through the discs and the membrane (and insulation board, where appropriate) at 300 mm maximum centres. Insulation boards must be independently attached with fasteners and discs at the rate recommended by insulation manufacturer's instructions.

8.2 The exact fixing pattern will depend on the expected wind loads and specification used. In all cases, the advice of the marketing company should be sought on width of membrane fixing pattern and perimeter details.

8.3 The fixings are waterproofed by lap jointing the adjacent sheet over the fixings to the first sheet. The lap should be a minimum of 150 mm wide, of which a minimum of 50 mm should be between the fixing discs and the waterproofing membrane edge.

8.4 The membrane is secured around perimeters of the roof and any penetration of the sheet, using fixing discs at 300 mm maximum centres. These fixings are waterproofed using EPDM flashing, extending over the fixings by at least 50 mm.

9 Details

Seaming procedure (Splicing Cement)

9.1 At laps, the top sheet should be folded back approximately 300 mm and both surfaces of the lap cleaned with Splice Cleaner, HP-250 Primer or LV-600 Primer. Splicing Cement is applied to both surfaces, by brush or roller to give an even coverage, and must be allowed to dry until tacky. While Splicing Cement is drying a continuous 4 mm bead of In-seam Sealant is applied along the centre line of the seam and around the outside edge of fixing discs. The top sheet is rolled forward until the cemented areas almost touch. It should then be allowed to fall freely into place to avoid stretching or wrinkling.

9.2 The lap should be rolled with either a steel or silicone roller, applying positive pressure, towards the outer edge of the lap, and not parallel to it. The edge should be cleaned using splice cleaner, and

a bead of lap sealant is applied to the exposed edge of the lap.

Seaming procedure (Secur Tape)

9.3 Dirt and excess dust is cleaned from the area of the splice in accordance with the marketing company's instructions. The area is then cleaned using either HP-250 or LV-600 Primer, and allowed to dry.

9.4 The bottom sheet is marked 13 mm from the edge of the top sheet along the entire length of the splice. The tape is aligned with the marked line and pressed down using firm, even hand pressure, leaving the top release liner in place.

9.5 The minimum splice width should be 50 mm, with a minimum of 3 mm of tape extending beyond the splice edge.

9.6 The top release liner is removed and the top sheet is allowed to fall freely onto the exposed tape. The top sheet is pressed onto the tape using firm, even hand pressure across the splice towards the outer edge of the lap.

9.7 The lap should be rolled with a steel or silicone roller, applying positive pressure, towards the outer edge of the lap. For lap joints at details the edge should be cleaned using Splice Cleaner, a bead of lap sealant is applied to the exposed edge of the lap.

Flashing

9.8 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, according to the procedure in sections 9.1 and 9.2, with minimum lap widths of 150 mm. A continuation of the deck membrane may be used for flashing, as is the practice when the reinforced universal securement strip (RUSS) is used.

9.9 The flashing should be fully adhered to the vertical surface of the wall using bonding adhesive applied by roller at a rate of 0.75 litres per m². When the adhesive becomes tacky the flashing is applied to the substrate and rolled to ensure a full bond, with no air trapped beneath the membrane.

9.10 Advice for specific flashing requirements is available from the manufacturer.

Technical Investigations

The following is a summary of the technical investigations carried out on RubberBond Reinforced FR EPDM Mechanically Fixed Roof Waterproofing System.

10 Tests

Test data from an independent NATLAS approved source, the UBAtc and the BBA were examined and evaluated. Details of these tests, on both the reinforced and unreinforced membranes, which show typical results for the material, are given in Tables 2 and 3.

Table 2 Tests on physical properties

Test (units)	Method ⁽¹⁾	Result
Water vapour permeability (gm ² day ⁻¹) ⁽²⁾	BS 3177	0.3
Water vapour resistance (MNs ^g) ⁽²⁾	BS 3177	683
Tensile strength (N per 50 mm)	BS 3424-4, 6	
control		1240
heat aged ⁽³⁾		1200
Elongation (%)	BS 3424-4, 6	
control		27
heat aged ⁽³⁾		27
Tear strength (N)	BS 3424-5, 7B	150
Low temperature flexibility (C) (10 mm diameter mandrel)	BS 903-A25	≤40
Ozone resistance	BS 903-A43	no cracks
UV resistance ⁽²⁾	ASTM G-26	no cracks
4000 hours at 80C	Xenon arc	or crazing
Dimensional stability	<i>ad hoc</i> ⁽³⁾	
longitudinal		-0.4
transverse		-0.8

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

(2) Tests performed on 1.52 mm thick unreinforced membrane.

(3) Heat aged 28 days at 116C.

Table 3 Tests on service performance

Test (units)	Method ⁽¹⁾	Result
Static loading ⁽²⁾	MOAT 27 : 5.1.9	
concrete substrate		L ₄
perlite substrate		L ₄
Dynamic indentation ⁽²⁾	MOAT 27 : 5.1.10	
concrete substrate		I ₃
perlite substrate		I ₄
Peel strength of joints (N per 25 mm)	BS 5350 (C12)	69
Shear strength of joints (N per 25 mm)	BS 5350 (C5)	
unaged		285
30 minutes at 70C		151

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

(2) Test performed on 1.52 mm thick unreinforced membrane.

11 Investigations

11.1 Existing data on fire performance of the membrane were examined.

11.2 The test results and data given in the assessment which lead to the issue of the a previous Certificate, were assessed in the context of UK roofing practice and current building regulations.

11.3 A user survey was performed to examine the performance of the membranes in the UK.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

BS 903-A25 : 1968 *Physical testing of rubber — Determination of impact brittleness temperature*

BS 903-A43 : 1982 *Physical testing of rubber — Determination of resistance to ozone cracking (static strain test)*

BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*

BS 3424-4 : 1982 *Testing coated fabrics — Method 6. Method for determination of breaking strength and elongation at break*

BS 3424-5 : 1982 *Testing coated fabrics — Methods 7A, 7B and 7C. Methods for determination of tear strength*

BS 5350-C5 : 1976 *Methods of test of adhesives group C adhesive bonded joints — Mechanical test Part C5 — Determination of bond strength in longitudinal shear*

BS 5350-C12 : 1979 *Methods of test of adhesives group C adhesive bonded joints — Mechanical test Part C12 180 degree T' peel test for flexible-to-flexible assemblies*

BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*

ASTM G26 *Recommended practice for operation of light exposure equipment (Xenon) with and without water, for exposure of non-metallic material*



On behalf of the British Board of Agrément

Date of issue: 29th October 2002

Chief Executive

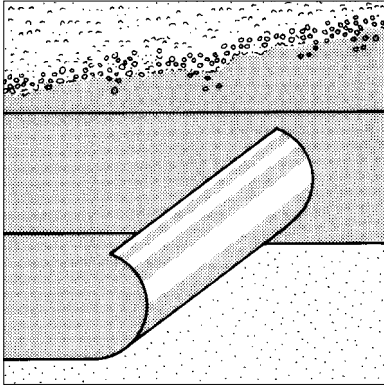


Flex-R Ltd

Certificate No 02/3967

**RUBBERBOND FLEECEBACK EPDM
ROOF WATERPROOFING SYSTEMS**
DETAIL SHEET 4

Product



• THIS DETAIL SHEET RELATES TO RUBBERBOND FLEECEBACK EPDM ROOF WATERPROOFING SYSTEMS.

• The product is suitable for use as a fully or partially adhered, single layer waterproof covering for flat and pitched roofs with limited access.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information relating to the product, and the Conditions of Certification, respectively.

Technical Specification

1 Description

1.1 RubberBond Fleeceback EPDM roof waterproofing sheet is manufactured by blending EPDM (ethylene-propylene diene monomer), processing oils and other additives. The sheets are produced by calendaring or extruding and laminating with a polyester fleece, then vulcanising.

1.2 The nominal characteristics of the membranes are:

thickness ⁽¹⁾ (mm)	2.54 2.92
width (m)	3.05
length (m)	15.25
weight (kgm ²)	2.54 mm thick : 1.51 2.92 mm thick : 2.11
colour	grey/black

(1) Includes fleece.

1.3 Brite-ply is a white version of RubberBond Fleeceback EPDM in which the top laminate is coloured white. It is manufactured to the same specifications and has the same nominal properties as the black version.

1.4 Ancillary items for use with these systems are:

RubberBond EPDM Elastoflex and Brite-ply Flashing — non-vulcanised (uncured) EPDM 1.5 mm thick with a polythene backing, available in widths from 150 mm to 450 mm.

RubberBond Deck Adhesive — a polyurethane adhesive for use in bonding membrane to substrate.

Pressure sensitive products — a range of detailing products (flashings, corners) with a pressure adhesive incorporated.

Splicing Cement EP95 — a cement based on solvent, butyl rubber and other synthetic resins which is cold-applied to bond laps between EPDM sheets and/or EPDM flashing.

Secur Tape — a synthetic rubber-based tape for use in lap jointing.

In-seam Sealant — a rubber-based sealant applied within lap joints made using EP95 Splicing Cement only.

HP-250 Primer — a primer for use with Splicing Cement, Secur Tape or pressure-sensitive products in preparation of membrane surface.

LV-600 Primer — an alternative primer for use with Splicing Cement, Secur Tape or pressure sensitive products in preparation of membrane surface.

Splice Cleaner — a synthetic rubber/resin solution for cleaning EPDM prior to bonding laps, except when splice tape is used.

Lap Sealant — an EPDM mastic to form a feathered edge along lap edges, at flashings and details, and at field splices when EP95 Splicing Cement is used.

Water Cut-off Mastic — a synthetic rubber/resin sealing mastic to act as a sealing agent between the EPDM or flashing sheets and accessories.

Walkway sheeting — a special 8 mm thick styrene butadiene rubber (SBR) sheet, to give additional protection in areas of high accessibility.

Colour coating — an acrylic, elastic roof coating to provide optional roof colours.

Brite-Ply accessories — Brite-Ply Splicing Cement, Brite-Ply Splice Cleaner and Brite-Ply Lap Sealant are used with Brite-Ply and serve the same purpose as their counterparts.

Pourable Sealer — a two-component, solvent-free, polyurethane-based sealant, for use in areas where flashing is difficult to apply.

Termination bars — for fixing membrane at roof perimeters.

1.5 Quality control checks are carried out during production and on the finished product.

2 Delivery and site handling

2.1 The membranes are delivered to site in rolls wrapped in polyethylene. The wrapper bears the product name, identification and the BBA identification mark incorporating the number of this Certificate.

2.2 RubberBond accessories are normally delivered in the following quantities:

Splicing Cement EP95 and HP-250 Primer	3.8 litre or 9.5 litre cans
Splice Cleaner and colour coating	3.8 litre or 18.9 litre cans
Lap Sealant	25-tube cartons
Water Cut-off Mastic and In-seam Sealant	10-tube cartons
RubberBond Deck Adhesive	10 litre can
LV-600 Primer	3.8 litre cans

2.3 Ancillary items classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3) are given in Table 1 along with flashpoints. These products bear the appropriate hazard warning.

Table 1 Flashpoint and hazard classification

Materials	Flashpoint (°C)	Classification
RubberBond Deck Adhesive ⁽¹⁾	-8	Extremely Flammable, Harmful
Splicing Cement EP95 ⁽¹⁾	4.0	Highly Flammable, Harmful
Lap Sealant	4.4	Highly Flammable, Harmful
In-seam Sealant ⁽¹⁾	4.4	Highly Flammable, Harmful
Water Cut-off Mastic ⁽¹⁾	11.0	Highly Flammable
HP-250 Primer ⁽¹⁾	4.4	Highly Flammable, Harmful
LV-600 Primer	93.0	Harmful
Splice Cleaner ⁽¹⁾	13.0	Extremely Flammable

(1) These components should be stored in accordance with the Highly Flammable Liquids and Petroleum Gases Regulations 1997.

2.4 EPDM membranes have no particular storage conditions but EPDM flashing rolls should be stored in a clean, dry position and in temperatures between 5°C and 25°C. The flashing cures gradually and should not be stored for more than six to nine months. As it cures it will become less flexible and although this does not affect its waterproofing characteristics it does become more difficult to form at details.

2.5 RuberBond Deck Adhesive, Splicing Cement EP95, Lap Sealant, In-seam Sealant, Water Cut-off Mastic and colour coating should be stored in a dry place in temperatures between 5°C and 25°C. Site storage of these products should not exceed six months.

3 General

RubberBond Fleeceback EPDM Roof Waterproofing Systems are satisfactory for use as a fully or partially-adhered waterproofing layer on flat and pitched roofs with limited access.

4 Adhesion

4.1 The adhesion of the fully-adhered system to the substrate will normally be limited by the cohesive strength of the substrate. On substrates with high cohesive strength, the adhesion of the membrane with RubberBond Deck Adhesive is sufficient to resist the effect of wind suction, thermal cycling or minor structural movements occurring in practice. Where doubts exist regarding suitability of substrate, the advice of the marketing company should be sought.

4.2 Test data on the wind uplift force of the partially adhered system shows that a maximum force of 5 kPa can be exerted without failure of the system.

5 Properties in relation to fire



5.1 When tested in accordance with BS 476-3 : 1958:

(a) A system comprising a 0.7 mm profiled galvanized steel deck, a 250 µm polyethylene vapour barrier, a 40 mm bitumen-faced polyurethane foam insulation board with 2.54 mm RubberBond Fleeceback bonded in FB Adhesive achieved a rating of EXT.F.AA.

(b) A system comprising a 0.7 mm profiled galvanized steel deck, a 250 µm polyethylene vapour barrier, a 40 mm aluminium-faced polyisocyanurate insulation board with 2.54 mm RubberBond Fleeceback bonded in FB Adhesive achieved a rating of EXT.F.AA.

5.2 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

Tests to confirm to Standard D6.7.

Northern Ireland

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

6 Durability



Accelerated weathering tests and evidence of use in the USA and Europe confirm that satisfactory retention of physical properties is achieved. All evidence available suggests that RubberBond Fleeceback EPDM Roof Waterproofing Systems should have a life in excess of 20 years.

7 General

7.1 The installation of RubberBond Fleeceback EPDM Roof Waterproofing Systems must be carried out by trained installers, in accordance with the manufacturer's instructions and this Detail Sheet.

7.2 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.

7.3 Installation should not be carried out during wet or damp weather (eg rain, fog, snow) nor when the temperature is below 5°C, unless suitable precautions are taken.

8 Procedure

8.1 All insulation boards are attached to the structural deck by the appropriate method for 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.

8.2 Polyurethane insulation boards must be mechanically fixed or bitumen bonded to prevent bowing.

Fully adhered system

8.3 Adhesive is poured from the can onto the substrate and spread evenly using a squeegee at a rate of 0.25 kgm² (52 m² per can).

8.4 The membrane should be rolled out into the wet adhesive and pressed firmly using a broom or heavy roller. The adhesive has a work time of up to half an hour.

Partially adhered system

8.5 Holes are pierced in the bottom of the adhesive can at the indicated places. The adhesive is applied in strips or beads to the substrate at a rate of 0.15 kgm² (86 m² per can).

8.6 The membrane is then installed according to the procedure in section 8.4.

9 Details

Seaming procedure (Splicing cement)

9.1 At laps, the top sheet should be folded back by approximately 300 mm and both surfaces of the lap cleaned with Splice Cleaner, HP-250 Primer or LV-600 Primer. Splicing Cement is applied to both surfaces by roller to give an even coverage, and must be allowed to dry until tacky. A continuous 4 mm bead of In-seam Sealant is applied 12 mm in from the back edge of the splice. The top sheet is rolled back down towards the bottom sheet and mated firmly by applying hand pressure.

9.2 The lap should be rolled with a steel or silicone roller, applying positive pressure, towards the outer edge of the lap. The edge should be cleaned using Splice Cleaner. After checking that a good seal has been achieved, a bead of Lap Sealant is applied to the exposed edge of the lap.

Seaming procedure (Secur Tape)

9.3 Dirt and excess dust is cleaned from the area of the splice in accordance with installation instructions. The area is then cleaned using either HP-250 or LV-600 Primer, and allowed to dry.

9.4 The bottom sheet is marked 13 mm from the edge of the top sheet along the entire length of the splice. The tape is aligned with the marked line and pressed down using firm, even hand pressure, leaving the top release liner in place.

9.5 The minimum splice width should be 50 mm, with a minimum of 3 mm of tape extending beyond the splice edge.

9.6 The top release liner is removed and the top sheet is allowed to fall freely onto the exposed tape. The top sheet is pressed onto the tape using firm, even hand pressure across the splice towards the outer edge of the lap.

9.7 The lap should be rolled with either a steel or silicone roller, applying positive pressure, towards the outer edge of the lap, and not parallel to it. For lap joints at details the edge should be cleaned using Splice Cleaner, and a bead of Lap Sealant is applied to the exposed edge of the lap.

Flashing

9.8 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, according to the procedure in sections 9.1 to 9.7, with minimum lap widths of 75 mm. A continuation of the deck membrane may be used for flashing.

9.9 The flashing should be bonded to the vertical surface of the wall using bonding adhesive or, alternatively, using the pressure sensitive flashings.

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

9.11 Advice for specific flashing requirements is available from the manufacturer.

Technical Investigations

The following is a summary of the technical investigations carried out on the RubberBond Fleeceback EPDM Roof Waterproofing Systems.

10 Tests

Test data on RubberBond Non-reinforced EPDM or Fleeceback from an independent NATLAS approved source, UBAtc and BBA were examined and evaluated. Details of the tests carried out, which show typical results for the materials, are summarised in Tables 2, 3 and 4.

Table 2 Tests on physical properties

Test performed on 1.52 mm nominal thickness membrane		
Test (units)	Method ⁽¹⁾	Mean result
Water vapour permeability (gm ² day ⁻¹)	BS 3177	0.3
Water vapour resistance (MNsg ⁻¹)	BS 3177	683
Tensile strength (MPa)	BS 903-A2	
control		11.3
heat aged ⁽²⁾		11.6
Elongation (%)	BS 903-A2	
control		450
heat aged ⁽²⁾		280
Modulus at 300% elongation (MPa)	BS 903-A2	7.9
Tear resistance (nail) (Nmm ²)	MOAT 27 : 5.4.1	45
Tear strength (Nmm ⁻¹)	BS 903-A3	
control		39.9
heat aged ⁽²⁾		39.4
Low temperature flexibility (C) (10 mm diameter mandrel)	BS 903-A25	≤40
Dimensional stability (%)	<i>ad hoc</i> ⁽²⁾	
longitudinal		-0.3
transverse		-0.6
Ozone resistance × 7 magnification	BS 903-A43	no cracks
UV resistance	ASTM G-26	no cracks
4000 hours at 80C	Xenon arc	or crazing

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

(2) Heat aged for 28 days at 116C.

Table 3 Tests on service performance

Test (units)	Method ⁽¹⁾	Mean results	
		1.14 mm thickness	1.52 mm thickness
Static loading	MOAT 27 : 5.1.9		
concrete substrate		L ₄	L ₄
perlite substrate		L ₄	L ₄
Dynamic impact	MOAT 27 : 5.1.10		
concrete substrate		I ₃	—
perlite substrate		I ₄	—
Fatigue resistance	MOAT 27 : 5.1.8	—	satisfactory
Peel strength ⁽²⁾ (Nmm ⁻¹)	MOAT 27 : 5.1.3		
control		0.68	—
heat aged ⁽³⁾		0.69	—
watersoak ⁽⁴⁾		0.65	—

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

(2) Fleeceback membrane on concrete substrate used in test.

(3) Heat aged 56 days at 80C.

(4) Water soak 28 days at 30C.

— = not tested

Table 4 Joints

Test (units)	Method ⁽¹⁾	Mean result
Tensile strength of joints (N per 50 mm)	MOAT 27 : 5.2.2/3/4	
Splicing Cement		
control		328
heat aged ⁽²⁾		357
Secur Tape (HP-250)		
control		279
heat aged ⁽²⁾		311
water soak ⁽³⁾		286
Secur Tape (LV-600)		
control		310
T-peel (Nmm ⁻¹)	MOAT 46 : 6P	
HP-250		1.87
LV-600		1.90

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

(2) Heat aged 28 days at 80C.

(3) Water soak 7 days at 60C.

11 Investigations

11.1 Existing data on fire performance of the product were examined.

11.2 The test results and data given in the assessment leading to the issue of a previous Certificate, for the non-reinforced membrane were assessed in the context of UK roofing practice and current building regulations.

11.3 A user survey was performed to examine the product's performance in the UK.

11.4 Test data on the jointing system and wind uplift by UBAtc were examined.

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ASTM G-26 *Recommended practice for operation of light-exposure equipment (Xenon) with and without water, for exposure of non-metallic materials*



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