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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
06/4329
Product Sheet 1

RESITRIX ROOF WATERPROOFING SYSTEMS

RESITRIX CLASSIC, MB AND SK PARTIAL BOND WATERPROOFING MEMBRANES

This Agrément Certificate Product Sheet[1] relates to Resitrix Classic, MB and SK Partial Bond Waterproofing Membranes, a range of multi-laminate glass-reinforced thermoplastic elastomer/EPDM membranes for waterproofing flat and pitched roofs with limited access in mechanically-fastened, loose-laid and ballasted, partially-adhered and fully-adhered applications. Resitrix SK has been approved for waterproofing zero fall roofs.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

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

KEY FACTORS ASSESSED

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

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

Resistance to wind uplift — when correctly specified, the products will resist the effects of any wind suction likely to occur in practice (see section 8).

Resistance to foot traffic — the products will accept, without damage, the limited foot traffic and loads associated with installation and maintenance (see section 9).

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

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 5 December 2014

Originally certificated on 27 July 2006

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

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

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Regulations

In the opinion of the BBA, Resitrix Classic, MB and SK Partial Bond Waterproofing Membranes, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

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

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

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The products can contribute to a construction meeting this Regulation. See sections 10 and 11 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		The products, when applied to a non-combustible substrate, can be regarded as having low vulnerability under clause 2.8.1[1][2] of this Standard. See section 7 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Tests for water resistance of the products indicate that they will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1[1][2] and 3.10.7[1][2]. See section 6.1 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The products can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for these products under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1[1][2] and Schedule 6[1][2].

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012

Regulation:	23(a)(i)(iii)b(i)	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 11 and the *Installation* part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		Tests for water resistance of the products, including joints, indicate that they will enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		On suitable substructures, the use of the products will enable a roof to be unrestricted under the requirements of this Regulation. See section 7 of this Certificate.

Construction (Design and Management) Regulations 2007

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

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

See sections: 1 *Description* (1.4) and 3 *Delivery and site handling* (3.3) of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of Resitrix Classic, MB and SK Partial Bond Waterproofing Membranes, provided they are installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards,* Chapter 7.1 *Flat roofs and balconies.*

CE marking

The Certificate holder has taken the responsibility of CE marking the Resitrix Classic and Resitrix MB membranes in accordance with Common Understanding of Assessment Procedure (CUAP) 06.05/22 *Composite waterproofing kit of rubber for roofs and construction works* and the Restrix SK Partial Bond membrane in accordance with EN 13956 : 2005. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Resitrix Classic is a multi-laminate membrane consisting of a top layer of thermoplastic elastomer, a second layer of EPDM with a glass reinforcement, a third layer of thermoplastic elastomer and a fourth layer of SBS-modified bitumen with a fine sand finish. The membrane is for use in mechanically-fastened, loose-laid and ballasted, partially-adhered and fully-adhered applications.

1.2 Resitrix MB is a multi-laminate membrane incorporating the same first, second and third layers as Restrix Classic but with a polyethylene separating film instead of a fine sand finish, for use in mechanically-fastened and loose-laid and ballasted applications.

1.3 Resitrix SK Partial Bond membrane is a multi-laminate membrane incorporating the same first, second and third layers as Restrix Classic but with a fourth layer of self-adhesive, polymer-modified bitumen with a release film and 60 mm selvedge with a thermofusible polyethylene film for heat welding of the joint. The membrane is for use in partially-bonded applications[1].

(1) Resitrix SK can also be used in green roof specifications, but this application is outside the scope of this Certificate.

1.4 The nominal characteristics of the membranes are given in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Resitrix Classic/MB	Resitrix SK Partial Bond
Thickness* (mm)	3.1	2.5
Length* (m)	10	10
Width* (m)[1]	1	1
Mass per unit area* ($kg \cdot m^{-2}$)	3.50	2.75
Roll weight (kg)	35.0	27.5
Flexibility at low temperature* (°C)	–30	–30
Dimensional stability* (%)	≤ 0.5	≤ 0.5
Resistance to static loading (kg)		
most compressible substrate	10	10
least compressible substrate	20	20

(1) Also available in widths of 250 mm, 333 mm, 500 mm and 666 mm.

1.5 Ancillary items necessary for installation of these products and included in this assessment are:

- FG 35 Surface Primer — a synthetic rubber and resin, low viscosity solvent-based primer, for use in priming all surfaces prior to application of Resitrix SK
- Resitrix patches — a range of Resitrix membrane patches with a heat-activated adhesive on the lower face, for use in producing corner details
- PU-LMF-98 Polyurethane — a single-component, solvent-free adhesive, for use with Resitrix Classic on flat roof areas
- G 2000 Contact Adhesive — a medium-viscosity adhesive, for use with Resitrix Classic for perimeter flashings.

1.6 G 500 Thinner, a blend of organic solvents for use in thinning G 2000 Contact Adhesive, degreasing metal surfaces and cleaning tools/equipment, may be used with the membranes but is outside the scope of this Certificate.

2 Manufacture

2.1 The polymer components are compounded, blended, calendered and laminated with the reinforcement. The semi-finished membranes are coated on the underside with the modified bitumen coating mass and a surface finish is applied.

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

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

2.3 The management system of Carlisle Construction Materials GmbH has been assessed and registered as meeting the requirements of EN ISO 9001 : 2008 and EN ISO 14001 : 2004 by DQS GmbH (Certificate 502001QM08UM).

2.4 The membranes are manufactured in Germany by Carlisle Construction Materials GmbH and marketed in the UK by Carlisle Construction Materials Ltd, Eleven Arches House, Leicester Road, Rugby, Warwickshire CV21 1FD, tel: 01788 551294.

3 Delivery and site handling

3.1 The membranes are delivered to site in individually wrapped rolls on a pallet, 20 rolls per pallet. The wrapper bears the product name, dimensions, weight, production code and the BBA logo incorporating the number of this Certificate.

3.2 Rolls must be stored vertically on a clean, dry, level surface and under cover.

3.3 Ancillary items classified under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009* (CHIP4)/*Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulations) 2009* are given in Table 2 along with flashpoints. These products bear the appropriate hazard warning.

Table 2 Flashpoint and hazard classification

Material	Flashpoint (°C)	Classification
FG 35 Surface Primer[1][2]	–20	Highly flammable
G 2000 Contact Adhesive[1]	–4	Highly flammable, Irritant
G 500 Thinner[1][2]	–15	Highly flammable, Harmful
PU-LMF-98	212	Harmful

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

(2) These components are harmful to aquatic organisms.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Resitrix Classic, MB and SK Partial Bond Waterproofing Membranes.

Design Considerations

4 General

4.1 Resitrix Classic and MB membranes are satisfactory for use as partially-adhered or fully-adhered mechanically-fastened waterproofing on flat and pitched roofs with limited access, and loose-laid and ballasted on flat roofs with limited access.

4.2 Resitrix SK Partial Bond membranes are satisfactory for use as partially-adhered waterproofing on flat, zero fall and pitched roofs with limited access.

4.3 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc. Where traffic in excess of this is envisaged, special precautions, such as additional protection to the membrane, must be taken.

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

4.5 Decks to which the membrane is to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards* 2014, Chapter 7.1.

4.6 Contact with low-grade bitumen, coal tar and oil-based products must be avoided. If contact with such products is likely, a separating layer is laid before installing the waterproof membrane. If compatibility with other products is in doubt, the advice of the Certificate holder must be sought.

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

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

4.8 If rigid glassfibre or mineral wool roof insulation products are used they must be overlaid with 13 mm thick fibreboard unless otherwise authorised by the Certificate holder.

5 Practicability of installation

The products are only installed by installers who have been trained and approved by the Certificate holder.

6 Weathertightness

6.1 The membranes and joints between them, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and so meet the relevant requirements of the national Building Regulations.

6.2 The products are impervious to water and, when used in accordance with this Certificate, will give a weathertight roof capable of accepting minor structural movement without damage.

7 Properties in relation to fire

7.1 When classified to BS EN 13501-5 : 2005, a system comprising an 18 mm thick primed marine plywood substrate, a self-adhesive bitumen/aluminium vapour control layer, an 80 mm thick polyisocyanurate insulation board, and a layer of Resitrix MB mechanically fastened, is designated as $B_{ROOF}(t4)$.

7.2 The membranes, when used in protected or inverted roof specifications, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, can be considered to be unrestricted under the national Requirements.

7.3 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 1

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

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

8 Resistance to wind uplift

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

• pull-out strength of fasteners • elastic limit of the membrane • appropriate safety factors.

8.2 The number of fixings used must be established by reference to the wind uplift forces calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex on the basis of maximum permissible loads of 0.5 kN per fixing.

8.3 The precise ballast requirements for loose-laid systems should be calculated in accordance with the relevant clauses of BS EN 1991-1-4 : 2005 and its UK National Annex, but must be a minimum thickness of 50 mm. In areas of high-wind exposure the gravel may be bonded at the edges for a distance of one metre. Alternatively, concrete slabs on suitable supports can be used.

8.4 The adhesion of the partially-adhered systems to the substrate will be limited by the cohesive strength of the substrate. Results of tests indicate that on substrates with a high cohesive strength the adhesion of systems is sufficient to resist the effects of wind suction, thermal cycling or minor structural movements occurring in practice.

8.5 Test data from wind uplift testing on mechanically-fastened systems are given in Table 3.

Table 3 Wind uplift

Wind uplift (N per fastener)	Mean results
failure load	
Isofast fastener	1000
Ejot fastener	900
corrected load	
Isofast fastener	633
Ejot fastener	570

9 Resistance to foot traffic

Results of test data indicate that the products can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care should be taken, however, to avoid sharp objects or concentrated loads. Wherever regular traffic is envisaged, eg for maintenance of lift equipment, a walkway should be provided using concrete slabs supported on bearing pads.

10 Maintenance

Roofs covered with the products should be the subject of annual inspections, as is good practice with single-layer waterproofing systems, to ensure continued security and performance, especially unballasted roofs.

11 Durability

The membranes have been used in Europe since 1981 and have performed satisfactorily. Accelerated weathering tests and evidence from long-term existing sites confirm that satisfactory retention of physical properties is achieved. Available evidence indicates that the products will have a service life in excess of 30 years.

12 General

12.1 Installation of Resitrix Classic, MB and SK Partial Bond Waterproofing Membranes must be carried out by trained and approved installers working in accordance with the relevant clauses of the Certificate holder's instructions and BS 8000-4 : 1989.

12.2 Conditions on site should be those for normal roof waterproofing work. Deck surfaces must be dry, clean and free from sharp projections such as nail heads or concrete nibs. When used over a rough substrate, a suitable protection layer should be laid first.

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

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

13 Procedure

Mechanically fastened (MB and Classic)

13.1 The membrane is laid out flat onto the substrate without folds or ripples, with 100 mm overlaps (130 mm wide over polystyrene insulation).

13.2 The membrane is mechanically fastened to the deck (through the insulation boards, where appropriate) in the joint overlaps, prior to welding of the joint. The joint must be welded prior to the installation of the next line of fasteners on the other side of the sheet to avoid creasing of the membrane.

13.3 The fastener washers are positioned a minimum of 10 mm from the edge of the membrane. The fixings must be installed at centres calculated from the average wind force for that area, with a maximum of 330 mm centres and a minimum of 200 mm centres (see sections 8.1 and 8.2).

Loose-laid and ballasted (MB and Classic)

13.4 The membrane is laid out flat onto the substrate without folds or ripples, with 50 mm overlaps (80 mm over polystyrene insulation).

13.5 At roof perimeters the membrane is installed with minimum upstands of 50 mm. Details and perimeters are either mechanically fastened or fully adhered with adhesive.

13.6 The membrane is covered with a protective sheet prior to the application of a 50 mm minimum thick layer of washed, well-rounded gravel (between 16 mm and 32 mm in diameter). In areas of high-wind exposure, a heavier gravel may be used and/or the gravel bonded at the edges for a distance of one metre. Alternatively, concrete slabs on suitable supports (preferably 10 mm thick rubber supports) can be used.

Fully adhered (Classic)

13.7 Fully adhering the membranes is achieved by either softening or pour and roll bonding in bitumen.

Softening

13.8 New or existing bituminous substrate layers must contain 1 $kg \cdot m^{-2}$ of bitumen above the reinforcement. If necessary additional bitumen can be applied to achieve this figure.

13.9 The membrane is laid out flat onto the substrate without folds or ripples, with 50 mm overlaps.

13.10 Each end of the membrane is rolled back to the centre of the roll.

13.11 Before the membrane is rolled out, the bituminous underlayer is heated, using a gas torch, until it melts. The membrane is then rolled out over the molten bitumen. Care must be taken to ensure flames do not come into contact with the roll and in particular with the top layer.

Pour and roll

13.12 Bonding is carried out as for traditional bitumen roofing using 95/25 or 115/15 grade oxidised bitumen. Laps are 50 mm wide and must be kept free of bitumen.

Partially bonded (SK Partial Bond)

13.13 The substrate is primed using FG 35 Surface Primer at a rate of 100% coverage for a one-metre wide band around the roof perimeter and 50% coverage rate in the central zone of the roof.

13.14 When the primer is dry (a minimum of 60 minutes), the membrane is laid out flat onto the substrate without folds or ripples, with 50 mm overlaps.

13.15 The membrane is either rolled or folded back to the centre of the membrane and the release film is carefully scored with a knife along the centreline and removed.

13.16 The membrane is applied to the substrate and pressed down, ensuring a good bond between membrane and substrate. The operation is repeated for the other half of the sheet.

Joints

13.17 Joints are formed by heat welding in accordance with the Certificate holder's installation instructions.

Detailing

13.18 Details are formed in accordance with the Certificate holder's installation instructions. Corner details are reinforced using Resitrix patches.

14 Repair

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

Technical Investigations

15 Tests

Tests were carried out on samples of the membranes and the results assessed to determine:

- thickness
- width
- length
- mass per unit area
- straightness
- flatness
- water vapour transmission
- tensile strength
- elongation at break
- nail tear
- cold foldability
- dimensional stability
- static indentation
- dynamic impact
- fatigue cycling
- peel from substrate
- wind uplift (mechanically-fastened and partially-bonded)
- heat ageing.

16 Investigations

16.1 Existing data on fire performance were evaluated.

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

Bibliography

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

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

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

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

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

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

EN ISO 9001 : 2008 *Quality management systems — Requirements*

BS EN ISO 14001 : 2004 *Environmental Management systems — Requirements with guidance for use*

17 Conditions

17.1 This Certificate:

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

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

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

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

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

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

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

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

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