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**Agrément  
Certificate  
No 02/3922**  
Second issue\*



Designated by Government  
to issue  
European Technical  
Approvals

## RHEPANOL FK ROOF COVERING SYSTEM

Revêtement d'étanchéité  
Dachabdichtungen

## Product



• THIS CERTIFICATE RELATES TO THE RHEPANOL FK ROOF COVERING SYSTEM, A PIB (POLYISOBUTYLENE) ROOFING SHEET WITH A LAMINATED POLYESTER FLEECE BACKING.

• The membrane is suitable for use as a:

- mechanically-fixed (using the Gripfix System) waterproofing layer on flat and pitched roofs
- loose-laid and ballasted waterproofing layer for flat roofs
- partially bonded waterproofing layer on flat and pitched roofs with limited access.

• The system is installed only by trained and approved contractors.

## Regulations

### 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, Rhepanol fk Roof Covering System, 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 to BS 476-3 : 1958 indicate that the use of the system will be unrestricted by this Requirement. 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 and 11.2 of this Certificate.

Requirement: C2(b)(c)

Resistance to moisture

Comment:

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

Materials and workmanship

Comment:

The system comprises acceptable materials. See section 13 of this Certificate.

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continued

- The product is resistant to tearing during installation and flexible at low ambient temperatures.
- The membrane is manufactured in Germany by Flachdach Technologie GmbH & Co KG.

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



In the opinion of the BBA, Rhepanol flk Roof Covering System, 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
Standard:	B2.1	Selection and use of materials, fittings, and components, and workmanship
Comment:		The product can contribute to a construction meeting this Standard. See the <i>Installation</i> part of this Certificate.
Standard:	B2.2	Selection and use of materials, fittings, and components, and workmanship
Comment:		The product is an acceptable material. See section 13 of this Certificate.
Regulation:	12	Structural fire precautions
Standard:	D9.1	Fire spread from an adjoining building
Comment:		Data obtained from tests to BS 476-3 : 1958 indicate that on suitable substructures the use of the system will enable a roof to be unrestricted under the requirements of this Standard. See sections 11.1 and 11.2 of this Certificate.
Regulation:	17	Resistance to moisture
Standard:	G3.1	Resistance to precipitation — Resistance to precipitation
Comment:		Tests for water resistance of the system, including joints, indicate that the use of the system will enable a roof to satisfy the requirements of this Standard. See section 8.1 of this Certificate.

## 3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Rhepanol flk Roof Covering System, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

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

## 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.

### 5 Description

5.1 The Rhepanol fk Roof Covering System consists of a smooth finished, extruded polyisobutylene membrane, with a polyester fleece backing, in roll form. The sheet incorporates a 50 mm wide self-sealing edge, protected by a release paper.

5.2 Rhepanol fk roofing sheet is available in the following nominal characteristics:

thickness (mm)	— 2.5 (comprises 1.5 PIB, 1.00 fleece)
width (m)	— 0.25, 0.35, 0.52, 0.65 and 1.05
roll length (m)	— 15
roll weight (kg)	— 45
colour	— white, grey, black

5.3 Other components of the system are:

- Rhepanol f — PIB membrane without fleece backing
- Rhepanol fk double-sealing edge — available in widths (in metres) of 0.25, 0.35, 0.52, 0.65, and 1.05
- Gripfix — 125 mm wide, velcro fixing strips and approved fixings
- Rhepanol sealing tape
- Rhepanol cover tape — for use at cross-joints, T-joints, pipe flashings, penetrations in conjunction with Rhepanol sealing tape
- Rhepanol solvent welding agent — for welding Rhepanol to strips and collars
- Rhepanol 9 adhesive — for bonding to plywood or chipboard
- Rhepanol 90 contact adhesive — for bonding onto bitumen membranes (without PE foil) coverings, timber aerated concrete and concrete
- Rhepanol 11 adhesive — for bonding to wall and parapet surfaces
- Rhepanol paste — used to prevent the ingress of water through capillary action
- Rhepanol copper and zinc coatings to mimic long strip metal roofs
- decorative profiles
- stainless steel gravel stop system.

5.4 Rhepanol fk is manufactured by homogenising the raw materials in a stamping kneader and forming into blanks, which are then extruded in the sheet form. The synthetic fleece is bonded to the back of the PIB leaving a 50 mm selvedge to which the self-adhesive sealing edge is applied. The finished product is rolled onto cardboard tubes.

5.5 Quality control checks are carried out on the raw materials during production and on the finished product.

### 6 Delivery and site handling

6.1 The roofing sheet is generally delivered to site in rolls, wrapped in polyethylene bags and packed in cardboard boxes. Each roll is labelled to indicate length, width, weight and carries the BBA identification mark incorporating the number of this Certificate. The sheets are marked on one edge to show the date, shift and production batch number.

6.2 All components of the system should be stored under cover on a smooth substrate. Rolls must be stacked horizontally, not more than three high and parallel to each other. Accessories must be stored away from heat and the liquids must be kept away from naked flames.

6.3 Materials that are classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3) are given in Table 1 along with flashpoints where relevant. These products bear the appropriate hazard warning.

Table 1 Flashpoint and hazard classification

Material	Flashpoint (°C)	Classification
Rhepanol 11 adhesive	-25	Extremely flammable
Rhepanol 90 contact adhesive	-20	Extremely flammable
Rhepanol solvent welding agent	-21	Extremely flammable
Rhepanol paste	10.5	Highly flammable
Rhepanol paint	10.5	Highly flammable

## Design Data

### 7 General

7.1 The Rhepanol fk Roof Covering System is satisfactory for use as:

- a mechanically-fixed roof waterproofing layer on flat roofs with limited access
- a loose-laid roof waterproof covering, ballasted with aggregate or tiles to prevent wind uplift, on parapeted flat roofs with limited access
- a partially bonded (30–50% of the surface) waterproof covering, with or without underlayers, on flat roofs with limited access.

7.2 Limited access roofs are defined for the purpose of this Certificate as those roofs that are 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. The Certificate holder's advice must be sought for information on a range of options for protective coverings and walkway systems.

7.3 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. Pitched roofs are defined as those having falls greater than 1:6. For design purposes twice the minimum finished fall should be

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assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls.

7.4 Decks to be applied with this system must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 1994 and, where appropriate, NHBC Standards, Chapter 7.1 or the Zurich Building Guarantees Technical Standards, page 234.

7.5 Insulation systems or materials used in conjunction with the system must be either subject to approval of the Certificate holder:

- as described in the relevant clauses of BS 8217 : 1994, or
- the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that Certificate.

7.6 Rhepanol is compatible with bitumen and highly resistant to a wide range of chemicals eg hydrocarbons. Where doubt arises when considering design, the advice of the Certificate holder should be sought.

## 8 Weathertightness



8.1 Test data confirms 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:

### *England and Wales*

Approved Document C, Requirement C2, Section 5.1.

### *Scotland*

Standard G3.1, Regulation 17.

### *Northern Ireland*

Regulation C4.

8.2 The system is impervious to water and when used as described will give a weathertight roof covering capable of accepting minor structural movement without damage.

## 9 Resistance to wind uplift

9.1 Resistance to wind uplift of Rhepanol fk mechanically fixed using the Gripfix System is provided by attachment of the membrane to the strip, which is secured to the deck by approved fasteners. The number and position of the strips and the number of fixings and washers will depend on many factors, including:

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

9.2 The adhesion of Rhepanol fk 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 Rhepanol fk is sufficient to resist the effects of wind suction, thermal cycling or minor structural movements occurring in practice.

9.3 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.

## 10 Resistance to foot traffic

10.1 Data indicate that the system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance operations. However, reasonable care should be taken to avoid puncture by sharp objects or concentrated loads.

10.2 In any situation where regular traffic is envisaged, eg maintenance of lift equipment, a walkway must be provided using concrete slabs supported on suitable bearing pads, or a protective layer (some types of bearing pads, in addition, will require the use of a protective sheet laid between the roof covering and the pads).

## 11 Properties in relation to fire



11.1 When tested in accordance with BS 476-3 : 1958 a system comprising a 0.7 mm thick profiled metal decking, 0.2 mm thick vapour control layer and 65 mm mineral wool insulation using Gripfix fixing strips are mechanically fastened with a layer of Rhepanol fk membrane attached, achieved a rating of EXT.F.AA.

11.2 The designation of other specifications, for example, when used on combustible substrates, should be confirmed by:

### *England and Wales*

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

### *Scotland*

To conform to Standard D9.1

### *Northern Ireland*

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

## 12 Maintenance

In the event of damage, repair should be carried out by applying a patch of the membrane extending at least 50 mm beyond the defect. The joint should be cleaned back to unweathered material and patched using Rhepanol f or with self-adhesive cover tape.

## 13 Durability



The product has been used in Germany and the United Kingdom since 1961 and 1973 respectively. Accelerated weathering tests and physical evidence confirm that satisfactory retention of physical properties is achieved. All available evidence indicates that the Rhepanol fk Roof Covering System should have a life of at least 30 years.

## Installation

### 14 General

14.1 Installation of Rhepanol fk must be in strict accordance with the Certificate holder's application instructions and should only be carried out by trained and approved contractors.

14.2 In all cases a vapour barrier should be used directly over the deck.

14.3 The membrane may be applied over glass tissue-faced insulation materials and fixed to the substructure in such a way as not to impair the performance of the waterproofing membrane. Other insulation materials suitable for use with the membrane are polystyrene, polyisocyanurate and mineral fibre.

14.4 Deck surfaces should be clean, dry, and free from sharp projections such as nail heads and concrete nibs.

14.5 The membrane may be laid in conditions normal to roofing work. To prevent the entrapment of moisture under the membrane it must not be laid in wet or damp weather conditions, or at temperatures below 5°C.

### 15 Procedure

#### Mechanically-fixed applications using the Gripfix System

15.1 Gripfix strips should run perpendicular to the direction of the Rhepanol fk membrane and perpendicular to the span direction of the corrugated steel or timber boarding.

15.2 The strips are rolled out and laid flat avoiding undue rippling at the designed spacing. The maximum distance between strips must not exceed 1.2 m.

15.3 Fixings with a maximum 50 mm diameter circular washer or 40 mm by 82 mm oval washer are selected in accordance with the Certificate holder's instructions. They are installed flush with the insulation at fixing centres in accordance with the wind uplift calculations.

15.4 The Rhepanol fk membrane is rolled out over the Gripfix strips. To assist laying the roofing membrane more accurately the first few strips may be temporarily covered eg, with unbacked

membrane or sheet metal, adjustment of the membrane is only possible between Gripfix strips.

15.5 Adjacent membranes are overlapped by at least 50 mm and end laps should be stepped by a minimum of 300 mm and secured with a Gripfix strip below the joint. Alternatively, end laps may be covered with 250 mm wide, double-sealing edge Rhepanol fk.

15.6 The lower membrane below the seam is cleaned with Rhepanol solvent welding agent using a cloth. The protective release paper is removed from the upper membranes sealing edge and the seam is rolled out with a heavy-duty roller. The Gripfix strips are thoroughly rolled to ensure flat contact between the membranes.

#### Loose-laid

15.7 Two rolls of Rhepanol fk are rolled out, with the sealing edge overlapping the next roll. The lower roll seam is cleaned with Rhepanol solvent welding agent, using a cloth or flat brush provided. The backing to the self-sealing strip is pulled out and the joint pressed down. The joint is then consolidated with the heavy-duty roller provided. End laps are sealed using Rhepanol cover tape.

#### Partially bonded

15.8 The deck is prepared and underlayers applied, using traditional techniques. Rhepanol fk is then laid partially bonded using Rhepanol 90 contact adhesive or hot bitumen, following normal procedures ensuring that Rhepanol 90 contact adhesive or the bitumen is kept well away from the lap joint. The lap joint is then sealed as described in section 15.5. On timber, Rhepanol 9 adhesive is used but is applied to the whole surface.

15.9 On inclined surfaces where the use of hot bitumen is impracticable, Rhepanol 11 contact adhesive is used in accordance with the Certificate holder's instructions. On sloping roofs with falls in excess of 1:3 the sheets must incorporate mechanical fixings. Decorative profiles are added by self-adhesive method of attachment.

#### Miscellaneous

15.10 The solvent materials used in the system have a low flashpoint and care must be taken to avoid naked flames.

15.11 The area of roofing sheets, flashing to be jointed must be clean, dust-free and dry. It is essential that a full even support is provided under the area for jointing and that the joint is correctly consolidated.

15.12 When using the loose-laid specification, the loading medium should be laid on the roof covering as soon as possible to avoid damage to the sheets or joints due to wind uplift.

15.13 Rainwater outlets should be fitted with guards to prevent the aggregate blocking them and also to stop any local loss of depth to the ballasting when using the loose-laid specification.



15.14 After completion of the jointing process the lap should be tested for complete watertightness.

## 16 Details

The manufacturers supply a range of prefabricated Rhepanol fk shapes for the treatment of details, flashing.

## Technical Investigations

The following is a summary of the technical investigations carried out on the Rhepanol fk Roof Covering System.

## 17 Tests

17.1 Data from test carried out by various independent organisations including BAM, CSTB and UBAtc, were evaluated in the context of UK roofing practice. Additional data from tests carried out by the BBA were also assessed. The results of both sets of test data, which show typical results for the membrane are summarised in Tables 2 to 4.

Table 2 Physical properties — general

Test (units)	Method <sup>(1)</sup>	Mean result
Water vapour permeability (gm <sup>-2</sup> day <sup>-1</sup> )	BS 3177 (25°C/75% RH)	0.043
Water vapour resistance (MNs <sup>g</sup> -1)	BS 3177 (25°C/75% RH)	4770
Shore hardness	DIN 53505	65

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

Table 3 Physical properties — directional

Test (units)	Method <sup>(1)</sup>	Mean results	
		Long	Trans
Tensile strength (N per 50 mm) unaged heat aged <sup>(2)</sup> UV aged <sup>(3)</sup>	BS EN ISO 527-1		
		421	403
		418	397
		450	394
Elongation at break (%) unaged heat aged <sup>(2)</sup> UV aged <sup>(3)</sup>	BS EN ISO 527-3		
		529	552
		533	599
		524	526
Dimensional stability (%) heat aged <sup>(4)</sup>	DIN 16935	0.5	0.1

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

(2) 56 days at 80°.

(3) BS EN ISO 4892-3 : 2000, 4 hours UV at 50°C, 4 hours condensation at 50°C for 1000 light hours.

(4) 6 hours at 80°C.

Table 4 Service performance

Test (units)	Method <sup>(1)</sup>	Result
Dynamic indentation hard substrate soft substrate	MOAT 27 : 5.1.10	L <sub>4</sub>
		L <sub>4</sub>
Static indentation hard substrate soft substrate	MOAT 27 : 5.1.10	L <sub>4</sub>
		L <sub>4</sub>
Low temperature flexibility (°C)	MOAT 27 : 5.4.2	-30

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

17.2 Test data on the following properties were also examined:

- joint peel strength
- joint shear strength
- wind uplift
- resistance to nail tear
- resistance to water pressure.

## 18 Investigations

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

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

18.3 Visits were made to sites in progress to assess the methods of application.

18.4 Wind uplift data on mechanically-fixed system using Gripfix from WSP, Germany tested in accordance with MOAT No 55 : 1991, were examined.

18.5 An examination was made of a life cycle assessment of the roofing membrane Rhepanol fk from an ecological perspective.

18.6 An assessment of the systems' durability was made, based on data from existing sites and data resulting in the issue of previous BBA Certificate No 87/1858/C (BRAAS Rhepanol fk Roof Covering System).

18.7 A reassessment of the *Durability* statement was made based on a visit to an old existing site and on tests conducted on naturally-aged material.

## Bibliography

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

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

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

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

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

BS EN ISO 527-1 : 1996 *Plastics. Determination of tensile properties — General principles*

BS EN ISO 527-3 : 1996 *Plastics. Determination of tensile properties — Test conditions for films and sheets*

BS EN ISO 4892-3 : 2000 *Plastics — Methods of exposure of laboratory light sources — Fluorescent UV lamps*

DIN 16935 : 1986 *Polyisobutylene (PIB) Waterproofing sheet; requirements*

DIN 53505 : 2000 *Shore A and Shore D hardness testing of rubber*

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

MOAT No 55 : 1991 *UEAtc Supplementary guide for the assessment of mechanically fastened roof waterproofing*

## 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) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

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, are 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 fabrication including all related and relevant processes 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 as and when deemed appropriate by the BBA under arrangements that it will determine; and
- (c) are reviewed by the BBA as and when it considers appropriate.

19.4 In granting this Certificate, the BBA is not responsible for:

- (a) the presence or absence of any patent, intellectual property 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 actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

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 Rhepanol flk Roof Covering System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 02/3922 is accordingly awarded to FDT (UK) Ltd.

On behalf of the British Board of Agrément

Date of Second issue: 6th January 2005

Chief Executive

*\*This amended version includes reference to revised national Building Regulations, amended Durability statement and new Conditions of Certification.*

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