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Agrément Certificate

09/4620

Product Sheet 1

HENKEL POLYMERIC ROOF WATERPROOFING MEMBRANES

TECTOFIN RV ROOF WATERPROOFING MEMBRANES

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Tectofin RV Roof Waterproofing Membranes, for use on limited access roofs.

AGRÉMENT 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 joints in the system, when completely sealed and consolidated, will resist the passage of moisture to the interior of the building (see section 5).

Properties in relation to fire — tests indicate that the products will enable a roof to be unrestricted under Building Regulations (see section 6).

Resistance to wind uplift — the products will resist the effects of any wind suction likely to occur in practice (see section 7).

Resistance to foot traffic — the products will accept the limited foot traffic and loads associated with installation and maintenance of the system without damage (see section 8).

Durability — under normal service conditions the products will provide a durable waterproof roof covering with a service life of at least 25 years (see section 10).



The BBA has awarded this Agrément Certificate to the company named above for the products described herein. This 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

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

Date of First issue: 10 February 2009

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, Tectofin RV Roof Waterproofing Membranes if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	B4(2)	External fire spread
Comment:		Test data to BS 476-3 : 2004 indicate that on suitable non-combustible substructures the use of the products will enable a roof to be unrestricted under this Requirement. See sections 6.1 to 6.6 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Data for water resistance on the membranes, including joints, indicate that the products meet this Requirement. See section 5.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable. See section 10 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship.
Comment:		The use of the products satisfies the requirements of this Regulation. See sections 9.1, 9.2, 10 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		Test data to BS 476-3 : 2004 indicate that on suitable non-combustible substructures the use of the products will be unrestricted by the requirements of clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 6.1 to 6.6 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Data examined for water resistance on the membranes, including joints, indicate that the use of the products can enable a roof to satisfy the requirements of clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ of this Standard. See section 5.1 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for the products under Regulation 9, 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) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 10 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The products are acceptable. See sections 9.1 and 9.2 of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		Data for water resistance on the membranes, including joints, indicate that the use of the products can enable a roof to satisfy the requirements of this Regulation. See section 5.1 of this Certificate.
Regulation:	E5(b)	External fire spread
Comment:		Test data to BS 476-3 : 2004 indicate that on suitable non-combustible substructures the use of the products will be unrestricted by the requirements of this Regulation. See sections 6.1 to 6.6 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* (1.2) and 2 *Delivery and site handling* (2.2).

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of Tectofin RV Roof Waterproofing Membranes, when installed and used in accordance with this Certificate, as meeting Technical Requirement R3 in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, Tectofin RV Roof Waterproofing Membranes, when installed and used in accordance with this Certificate, satisfy the requirements of the *Zurich Building Guarantee Technical Manual, Section 4, Superstructure, Sub-section Flat roofs*.

General

This Certificate relates to Tectofin RV Roof Waterproofing Membranes for use on limited access roofs.

The products are installed only by contractors trained and approved by the Certificate holder.

Technical Specification

1 Description

Tectofin RV is a range of acrylic rubber/PVC based roof waterproofing membranes incorporating a polyester fleece backing. The membranes are manufactured with a 50 mm fabric-free selvedge to allow welding longitudinal seams by hot air or solvent.

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

Table 1 Nominal characteristics

Characteristics (units)	Tectofin RV (2.2 mm)	Tectofin RV (2.5 mm)
Mass per unit area ⁽¹⁾ (kgm ⁻²)	≥1.69	≥2.07
Width (m)	1.1/1.62	1.1/1.62
Length (m)	20	15
Tensile strength/elongation (N per 50 mm)/(%)	>600	≥600
Colour	white or grey	white or grey

(1) Includes polyester fleece backing.

1.3 Ancillary materials available for use include:

- Tectofin R — a 1.5 mm thick, acrylic/PVC membrane without a fleece backing for welding over transverse joints and detailing work. Tectofin R is available in 20 m long rolls and in widths of 1.1 m and 0.15 m in white and grey colours
- Cold Welding Agent — a tetrahydrofuran-based solvent for making cold welded joints in Tectofin RV and Tectofin R membranes. The product is available in 1, 5 and 30 litre tins
- Terokal 3958 — a solvent-based synthetic rubber adhesive for use in fully bonded applications. The adhesive is available in 9.5 and 5.4 kg cans
- Mechanical fixings (SFS Intec IR 82/40 plate and IR2) — 4.8 screw or equivalent approved fixings for mechanically fixing the membranes
- Terokal 914 — a contact adhesive for bonding Tectofin membranes in detail work
- Prefabricated corner elements — preformed internal and external corner pieces
- Tectofin RA duo — a 1.5 mm thick, internally reinforced membrane used for detailing, available in 20 m by 1.1 m rolls
- Tectofin RV 2R Connecting Membrane — a nominal 2.5 mm thick membrane, lined centrally with a non-woven fabric. The membrane has a 50 mm fabric free selvedge on both edges for use as a connecting membrane. Available in 15 m by 1.14 m rolls
- Tectofin Liquid — a solution of Tectofin R compound for use as a sealant at exposed edges. Available in 0.85 kg cans in white or grey colours
- Tectofin composite sheet plate — Tectofin R coated (0.8 mm) galvanized steel (0.6 mm) for forming protection at roof edges. Available in 1 m by 2 m sheets or 1 m by 30 m rolls and in a range of profiles for use around perimeters.

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

Delivery and site handling

2.1 The membranes are delivered to site on pallets as rolls with cardboard cores, wrapped in a polyethylene sleeve. Each roll bears a label that includes product identification and a cumulative roll number and pallet number traceable to the manufacturing records.

2.2 Materials that are classified under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3)*, are given in Table 2. The material safety data sheets for these materials should be consulted prior to use.

Table 2 Flashpoint and hazard classification

Product	Container size	Flashpoint (°C)	Classification
Cold welding agent	1, 5 and 30 litres	-17	Highly flammable, Irritant
Terokal 3958	9.5 kg	-18	Highly flammable, Irritant, Dangerous for the environment
Tectofin Liquid	0.85 kg	-15	Highly flammable, Irritant,
Terokal 914	10 kg	-11	Highly flammable, Irritant
Cleaning solvent	5 litres	-4	Highly flammable, Irritant

(1) These components should be stored in accordance with the *Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972*.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Tectofin RV Roof Waterproofing Membranes.

Design Considerations

3 General

3.1 Tectofin RV Roof Waterproofing Membranes are satisfactory for use as:

- fully-adhered waterproofing layer, mechanically fixed at perimeters and upstands, on flat and pitched roofs with limited access
- mechanically-fixed waterproof layer, on flat roofs with limited access
- loose-laid roof covering on flat roofs with limited access, mechanically fixed at perimeters and upstands, ballasted with gravel or any other material such as paving slabs on paving supports approved by the manufacturer on flat roofs with limited access, ie inverted roofs and roof gardens.

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

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

3.4 Decks to which the products are to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards 2008 Chapter 7.1 Flat roofs and balconies* or the *Zurich Building Guarantee Technical Manual 2007, Section 4, Superstructure, Sub-section Flat roofs* pages 268 to 270.

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

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

3.6 Dead loads on garden roofs can dramatically increase if roof-drains become partially or completely clogged, causing waterlogging of the drainage soil layers. Gravel guards should be used on rainwater outlets and these should be inspected annually.

3.7 Where contact with low-grade bitumens, coal tar and other oil-based products is likely the advice of the Certificate holder should be sought.

4 Practicability of installation

Installation of Tectofin RV Roof Waterproofing Membranes must only be carried out by installers trained and approved by the Certificate holder.

Weathertightness

5.1 Data confirm that the membranes and joints in the products, 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 (see section 1.5, Tables for *Physical properties — general* and *Physical properties — joints*):

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

Scotland — Mandatory Standard 3.10, clauses 3.10.1⁽¹⁾⁽²⁾ and 3.10.7⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Regulation C4(b).

5.2 The products are impervious to water and when used as described can form a weathertight roof covering capable of accepting minor structural movement without damage.

6 Properties in relation to fire



6.1 When tested in accordance with BS 476-3 : 2004 a system comprising:

- Tectofin RV grey (2.5 mm) mechanically fixed to 100 mm Recticel powerdeck insulation, achieved an EXT.F.AB rating
- Tectofin RV grey (2.5 mm) fully adhered to 100 mm Recticel powerdeck insulation using Terokal 3958 adhesive, achieved an EXT.F.AB rating.

6.2 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 : 2004 designation EXT.F.AA.

6.3 In the opinion of the BBA, a roof garden incorporating the products covered with a drainage layer of gravel 100 mm thick and a soil layer of minimum 300 mm thick will be designated EXT.F.AA.

6.4 In the opinion of the BBA, when used in irrigated roof gardens, the use of the products will be unrestricted under the national requirements:

England and Wales — Requirement B4(2)

Scotland — Mandatory Standard 2.8, clause 2.8.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Regulation E5(b).

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

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

Scotland — Test to conform to Mandatory Standard 2.8, clause 2.8.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

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

6.6 If allowed to dry, plants may allow flame spread across the roof and this situation should be taken into consideration when selecting the plants for the garden. Appropriate planting, irrigation and/or protection should be applied to ensure the overall fire-rating of the roof is not compromised by its use.

7 Resistance to wind uplift

7.1 Tests indicate that when fully bonded to a concrete substrate, the adhesion of the membranes is sufficient to resist the effect of wind suction and minor structural movements likely to occur in practice. However, in areas of high wind exposure, consideration should be given regarding the use of additional protection.

7.2 Where the membrane is fully adhered to insulation boards, the resistance to wind uplift will be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This should be taken into account when the insulation material is selected.

7.3 In mechanically fixed applications, the resistance to wind uplift of the membrane is provided by mechanical fasteners passing through the membrane and secured into the deck. The number of fixings will depend on a number of factors, including:

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

7.4 The number of fixings used should be established by reference to the wind uplift forces calculated in accordance with BS 6399-2 : 1997 on the basis of maximum permissible loads of 0.6 kN per fixing.

7.5 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, but should be a minimum of 50 mm (20 to 40 mm grade gravel). The use of concrete slabs on suitable supports should be considered in areas of high-wind exposure and the advice of the Certificate holder should be sought.

7.6 The soil used in roof gardens should not be of a type that will be removed, or become localised due to wind scour experienced on site.

7.7 It should be recognised that the type of plants used could significantly affect the expected wind loads experienced in service.

8 Resistance to foot traffic

8.1 Data indicate that the membranes can withstand, without damage, the limited foot traffic and light concentrated loads associated with the installation and maintenance operations. Where traffic in excess of this is envisaged, the use of additional protection should be considered, and the advice of the Certificate holder should be sought. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads (see section 15, Table for *Physical properties general*).

8.2 Once the roof garden is installed, it can be regarded as a suitable protection for the membrane in use.

9 Maintenance



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

9.2 It is imperative that the drainage system of a roof garden is designed correctly, and provision is made for access for maintenance purposes. Inspection of the drains should be carried out regularly to avoid waterlogging of the garden and the subsequent increase in dead weight load.

10 Durability



Tectofin RV Roof Waterproofing Membranes have been in use since 2007 in Germany. Accelerated weathering tests and performance in use confirm that satisfactory retention of physical properties is achieved. All available evidence indicates that the membranes should have a service life of at least 25 years (see section 15, Tables for *Physical properties – General*).

Installation

11 General

11.1 Installation of Tectofin RV Roof Waterproofing Membranes should only be carried out by installers who have been trained and approved by the Certificate holder, BS 8000-4 : 1989 and this Certificate.

11.2 Conditions on site should be those for normal roof waterproofing work. Deck surfaces must be dry, clean and free from sharp projections.

11.3 Installation should not be carried out during wet weather (eg rain, fog, snow), or when the temperature is below 0°C. At temperatures below 5°C the membranes must be stored at room temperature prior to use.

11.4 The membrane must be mechanically fixed around the perimeter of the roof. The advice of the Certificate holder must be sought for suitable fixings

11.5 The membrane should be unrolled into position and allowed to relax prior to fixing and/or lap jointing. Care must be taken to avoid ripples or folds in the sheets.

11.6 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.

12 Procedure

Loose-laid and ballasted applications

12.1 The membrane is unrolled and loose-laid onto the substrate. Adjacent sheets should be laid ensuring at least 40 mm at side and end laps, and that the ends of the sheets are staggered.

12.2 Laps should be welded using hot-air welding or solvent welding as described in section 13.

12.3 The sealed membrane must be covered by at least 50 mm of 20 mm to 40 mm graded well-rounded, river washed, gravel. If crushed stone ballast is used, a protective fleece (minimum 300 gm⁻²) must be laid between the membrane and the aggregate.

12.4 An alternative method of ballasting is to use concrete paving, maximum size 600 mm by 600 mm and minimum thickness of 40 mm. A protective fleece (minimum 300 gm⁻²) must be laid between the membrane and the supports.

12.5 When the membrane is to be laid directly onto a concrete deck, a protective fleece must be laid first. This is not required if insulation 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 fleece must be laid between the concrete deck and the membrane.

Fully adhered applications

12.6 All insulation boards must be attached to the structural deck in accordance with the insulation board manufacturer's instructions. The method of attachment must be adequate to provide resistance to wind uplift forces as defined in BS 6399-2 : 1997.

12.7 When used as a fully-bonded system, the resistance to wind uplift can be limited by the cohesive strength of the insulation and method of attachment. These factors should be taken into account when selecting the insulation material and the method of fixing.

12.8 The fully-bonded method of application must not be used directly onto insulation materials that will be adversely affected by the solvent in the adhesive (eg polystyrene). The Certificate holder must be consulted for suitable insulation materials.

12.9 When used over expansion joints, un-bonded bridging strips should be installed over the joints. The Certificate holder should be consulted for suitable specifications.

12.10 When installing the membranes Terokal 3958 adhesive is applied to the substrate by means of a roller or spreader at an application rate of between 0.2 gm^{-2} to 0.25 gm^{-2} . The membrane should be applied to the substrate whilst the adhesive is still wet and rolled to ensure a full bond and that air has not been trapped beneath the membrane. The application rate on porous substrates and at edges and corner areas should be increased to between 0.25 gm^{-2} to 0.35 gm^{-2} .

12.11 Over-application of the adhesive should be avoided as this could have a detrimental effect on the adhesion of the membrane.

12.12 When contact bonding to vertical surfaces, the adhesive should be applied to both surfaces

12.13 Care must be taken to avoid contaminating selvages and other areas to be welded. Surplus adhesive must be removed from these areas prior to welding. Lap welding should be completed as described in section 13.

Mechanically fixed applications

12.14 The membrane should be unrolled over the substrate, taking care to avoid any folds or ripples. Edge overlaps to adjacent sheets must be a minimum of 100 mm. End laps for the membrane should be a minimum of 40 mm.

12.15 Adjacent sheets should be laid ensuring the ends of the sheets are staggered.

12.16 The position of the fixings, and the number required, will depend upon the type used, the type of deck and the wind uplift forces to be resisted. The Certificate holder should be consulted for detailed specifications.

12.17 The first sheet is fixed to the substrate with the fixing plates positioned a minimum of 20 mm from the sheet edge. The adjacent sheet should be laid over the first sheet and lap jointed by welding along the final 40 mm as described in section 13.

12.18 Perimeter fixings at sheet edges should be waterproofed using strips of Tectofin R welded to the membrane as described in section 13.

12.19 A range of prefabricated accessories is available from the Certificate holder and advice on the selection and use of these should be sought from the Certificate holder.

13 Details

Hot-air welding

13.1 Areas on both sheets to be welded must be clean and dry.

13.2 Hot-air welding should be carried out using automatic or hand-operated hot-air welding equipment in accordance with the manufacturer's instructions.

13.3 Care must be taken to avoid wrinkles or folds forming in the welded seam that can compromise the watertightness of a joint.

13.4 The welded seam must be a minimum width of 30 mm. When using a hand-held welding machine, the seam must be rolled immediately using a silicone rubber or steel seam roller, to ensure an even bond.

13.5 Transverse seams must be overlapped with a 150 mm wide strip of Tectofin R ensuring a minimum weld width of 30 mm on both sides of the seam.

13.6 Welded seams should be tested by running a metal probe along the weld to check for continuity. If any voids are found these should be welded closed.

13.7 The Certificate holder's installation instructions should be consulted in the correct use and forming welds with Tectofin composite sheet plate and/or profiles.

13.8 Tectofin RA Duo exposed edges must be sealed using Tectofin Liquid.

Solvent welding

13.9 At low temperatures below 8°C , hot-air welding should be used as described in sections 13.1 to 13.8.

13.10 Transverse seams should be welded using hot-air welding as described in section 13.5.

13.11 Seams to be solvent welded must be clean and dry.

13.12 Solvent welding using Tectofin Cold Welding Agent is carried out by applying the solvent between the sheets of membrane to be welded.

13.13 Pressure is then applied to the formed seam by means of a roller or sand-filled polyethylene sack.

13.14 The welded width of the seam should be a minimum of 40 mm.

13.15 The seam should be tested with a suitable metal probe, and any weakness repaired immediately.

Flashing

13.16 All flashing should be fully adhered in accordance with the Certificate holder's instructions.

13.17 Corner details should be completed with preformed Corners.

13.18 For specific flashing requirements, the advice of the Certificate holder should be sought.

14 Repair

In the event of accidental damage, repairs can be carried out by cleaning the area around the damage and applying a patch of Tectofin RV Roofing Membrane in accordance with the relevant parts of section 13.

Technical Investigations

15 Tests

15.1 Samples were obtained from the Certificate holder for testing. The results of the tests carried out by the BBA are summarised in Tables 3 to 5.

Table 3 Physical properties — directional⁽¹⁾

Test (units)	Mean result	Method ⁽²⁾
Tensile strength (N per 50 mm)		BS EN 12311-2
unaged		
longitudinal	848	
transverse	828	
heat aged ⁽³⁾		
longitudinal	872	
transverse	853	
Elongation (%)		BS EN 12311-2
unaged		
longitudinal	90	
transverse	134	
heat aged ⁽³⁾		
longitudinal	96.5	
transverse	139	
Resistance to nail tear (N)		BS EN 12310-1
longitudinal	596	
transverse	565	
Dimensional stability (%)		BS EN 1107-2
longitudinal	-0.3	
transverse	-0.1	

(1) 2.2 mm membrane tested.

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

(3) 84 days at 80°C in a ventilated oven.

Table 4 Physical properties — general⁽¹⁾

Test (units)	Mean result	Method ⁽²⁾
Water vapour transmission ⁽³⁾ (gm ⁻² day ⁻¹)	2.54	BS 3177
Water vapour resistance ⁽³⁾ (MNsg ⁻¹)	80.9	BS 3177
Water absorption (%)	0.7	MOAT 65 : 4.3.13
Resistance to 10 kPa water pressure	pass	BS EN 1928
Low temperature foldability (°C)		BS EN 495-5
unaged	-25	
UV aged ⁽⁴⁾	-25	
heat aged ⁽⁵⁾	-20	
Resistance to static loading		BS EN 12730
concrete substrate	L ₂₅	
EPS substrate	L ₂₅	
Resistance to impact		BS EN 12691
perlite substrate	L ₁₀	
EPS substrate	L ₁₀	
Peel adhesion (N) ⁽⁶⁾		MOAT 65 : 4.3.3
unaged	46	
heat aged ⁽⁷⁾	68	
Resistance to cyclic movement ⁽⁸⁾	pass	MOAT 65 : 4.3.7
Resistance to wind uplift (N) ⁽⁹⁾		ETAG 006
test load per fixing ⁽¹⁰⁾	1000	
admissible load per fixing	600	

(1) 2.2 mm membrane tested unless otherwise noted.

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

(3) Test conditions 25°C/0–75% RH.

(4) 4500 MJm⁻² total UV-A exposure at 50°C with 1 hr spray every 5 hrs.

(5) 84 days at 80°C.

(6) Concrete substrate using Terokal 3958 adhesive at a spread rate of 200 gm.

(7) 28 days at 80°C.

(8) 500 cycles at -10°C.

(9) System tested comprised 2.2 mm membrane over EPS on steel deck mechanically fixed using SFS Intec fixings (IR 82 by 40 stress plate/IR2 — 4.8 x 120 screws).

(10) Maximum load achieved during the test due to limitations of test equipment.

Table 5 Physical properties — joints⁽¹⁾

Test (units)	Mean result	Method ⁽²⁾
Peel resistance of joints (N per 50 mm)		BS EN 12316-2
solvent welded ⁽³⁾	179	
heat welded	338 ⁽⁴⁾	
Shear resistance of joints		BS EN 12317-2
solvent welded ⁽³⁾	698 ⁽⁴⁾	
heat welded	704 ⁽⁴⁾	
Resistance to leakage at joints		MOAT 27 (5.2.1)
solvent welded ⁽³⁾	No leakage	
heat welded	No leakage	

(1) 2.2 mm membrane tested unless otherwise noted.

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

(3) THF-based cold welding agent.

(4) Membrane ruptured.

15.2 Existing data for Tectofin RV 2.2 mm membrane was examined relating to:

- hail resistance to DIN EN 13583 : 2001
- resistance to roots — Test Report *Determination of resistance to root damage to flexible sheets and coatings for roof planting according to FLL-Method (2002)*.

16 Investigations

16.1 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.

16.2 Existing reports on the fire performance to BS 476-3 : 2004 were examined.

16.3 Visits were carried out to existing installations between 2–3 years old. The roofs were performing satisfactorily with no reports of any problems with either the installation or the in-service performance.

Bibliography

- BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*
- 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 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 495-5 : 2001 *Flexible sheets for waterproofing — Determination of foldability at low temperature — Plastic and rubbers sheets for roof waterproofing*
- BS EN 1107-2 : 2001 *Flexible sheets for waterproofing — Determination of dimension stability — Plastic and rubber sheets for roof waterproofing*
- BS EN 1928 : 2000 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of watertightness*
- BS EN 12310-1 : 2000 *Flexible sheets for waterproofing — Determination of resistance to tearing (nail shank)— Part 1 — Bitumen sheets for roof waterproofing*
- BS EN 12311-2 : 2000 *Flexible sheets for waterproofing — Determination of tensile properties — Part 2 — Plastic and rubber sheets for roof waterproofing*
- BS EN 12316-2 : 2000 *Flexible sheets for waterproofing — Determination of peel resistance of joints — Plastic and rubber sheets for roof waterproofing*
- BS EN 12317-2 : 2000 *Flexible sheets for waterproofing — Determination of shear resistance of joints — Plastic and rubber sheets for roof waterproofing*
- BS EN 12691 : 2001 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of resistance to impact*
- BS EN 12730 : 2001 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of resistance to static loading*
- DIN EN 13583-1 : 2001 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of hail resistance*
- MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*
- MOAT No 65 : 2001 *UEAtc Technical Guide for the Assessment of Non-Reinforced, Reinforced and/or Backed Roof Waterproofing Systems made of PVC*
- ETAG 006 : 2000 *Systems of Mechanically Fastened Flexible Roof Waterproofing Membranes*

17 Conditions

17.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

17.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

17.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does 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; 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. 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 manufacture, supply, installation, use and maintenance of this product/system.