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**Agrément  
Certificate  
No 04/4120**

Designated by Government  
to issue  
European Technical  
Approvals

## THERMOPLAN T SINGLE PLY FPO ROOF WATERPROOFING MEMBRANES

Membrane d'étanchéité  
Wasserdichtungsmittel

### Product



Typical installations


• THIS CERTIFICATE RELATES TO THERMOPLAN T SINGLE PLY FPO ROOF WATERPROOFING MEMBRANES.

- The membranes are for use:
  - in mechanically-fastened or fully adhered roof waterproofing on flat and pitched roofs with limited access
  - in loose-laid and ballasted roof waterproofing applications on flat roofs with limited access
  - as a waterproofing in green roofs and roof gardens where the finished fall of the roof bearing the drainage layer is between 1:60 and 1:20. These falls are provided by either the roof decking or cut-to-falls insulation.

continued

### 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, ThermoPlan T Single Ply FPO Roof Waterproofing Membranes 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 from tests to BS 476-3 : 1958 indicate that on suitable non-combustible substructures the use of the membranes will enable a roof to be unrestricted under this Requirement. See the tinted areas of the <i>Properties in relation to fire</i> section of the accompanying Detail Sheet.
Requirement: C4	Resistance to weather and ground moisture
Comment:	Data for water resistance on the membranes, including joints, indicate that the systems meet this Requirement. See the tinted area of the <i>Weathertightness</i> section of the accompanying Detail Sheet.
Requirement: Regulation 7	Materials and workmanship
Comment:	The membranes are acceptable materials. See the tinted area of the <i>Durability</i> section of the accompanying Detail Sheet.

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continued

- The membranes are manufactured in Germany by Bauder Thermoplast GmbH, and marketed in the United Kingdom by the Certificate holder.
- Installation must be carried out only by trained and approved contractors.

These Front Sheets must be read in conjunction with the accompanying Detail Sheet which provides information specific to particular membranes.

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



In the opinion of the BBA, Thermoplan T Single Ply FPO Roof Waterproofing Membranes, 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 the accompanying Detail Sheet.
Standard:	B2.2	Selection and use of materials, fittings, and components, and workmanship
Comment:		The membranes comply with this Standard. See the tinted area of the <i>Durability</i> section of the accompanying Detail Sheet.
Regulation:	12	Structural fire precautions
Standard:	D9.1	Fire spread from an adjoining building
Comment:		Test data to BS 476-3 : 1958 indicate that on suitable non-combustible substructures the use of the membranes will be unrestricted by the requirements of this Standard. See tinted areas of the <i>Properties in relation to fire</i> section of the accompanying Detail Sheet.
Regulation:	17	Resistance to moisture
Standard:	G3.1	Resistance to precipitation — Resistance to precipitation
Comment:		Data examined for water resistance on the membranes, including joints, indicate that the use of the systems can enable a roof to satisfy the requirements of this Standard. See the tinted area of the <i>Weathertightness</i> section of the accompanying Detail Sheet.

## 3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Thermoplan T Single Ply FPO Roof Waterproofing Membranes, 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 membranes are acceptable materials. See the tinted area of the <i>Durability</i> section of the accompanying Detail Sheet.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		Data for water resistance on the membranes, including joints, indicate that the use of the systems can enable a roof to satisfy the requirements of this Regulation. See the tinted area of the <i>Weathertightness</i> section of the accompanying Detail Sheet.
Regulation:	E5	External fire spread
Comment:		Test data to BS 476-3 : 1958 indicate that on suitable non-combustible substructures the use of the membranes will be unrestricted by the requirements of this Regulation. See the tinted areas of the <i>Properties in relation to fire</i> section of the accompanying Detail Sheets.

## 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: 5 *Description* (5.2) and 6 *Delivery and site handling* (6.3).

### 5 General

5.1 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.

5.2 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 for the purpose of this Certificate as those having a fall in excess of 1:6. 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.

5.3 Decks to which the Thermoplan T Single Ply FPO Roof Waterproofing Membranes are to be applied 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 Manual, page 234.

5.4 Insulation materials used in conjunction with the systems must be either:

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

5.5 Installation must be carried out only by installers trained and approved by the marketing company.

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

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

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

## Conditions of Certification

### 6 Conditions

6.1 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.

6.2 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.

6.3 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.

6.4 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.

6.5 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, Thermoplan T Single Ply FPO Roof Waterproofing Membranes are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 04/4120 is accordingly awarded to Bauder Limited.

On behalf of the British Board of Agrément

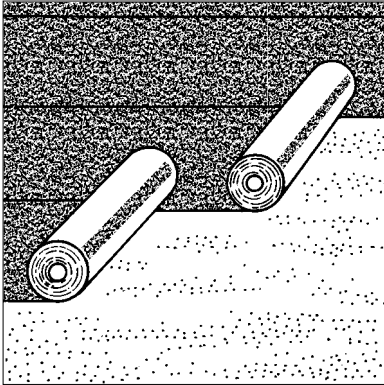
A handwritten signature in black ink, appearing to read 'P. Q. Newson', is written over a white background.

Date of issue: 1st September 2004

Chief Executive



**THERMOPLAN T SINGLE PLY FPO  
ROOF WATERPROOFING MEMBRANES  
(BBA CERTIFICATE No 04/4120)  
IRISH BUILDING REGULATIONS STATEMENT**



- *THIS STATEMENT RELATES TO THERMOPLAN T SINGLE PLY FPO ROOF WATERPROOFING MEMBRANES AND SETS OUT THE OPINION OF THE BBA ON THE POSITION OF THE PRODUCT UNDER THE BUILDING REGULATIONS IN THE REPUBLIC OF IRELAND.*
- *It must be read in conjunction with the Front Sheets and the accompanying Detail Sheet of BBA Certificate No 04/4120.*
- *It will remain valid provided BBA Certificate No 04/4120 is valid.*

## The Building Regulations 19972002 (Ireland)

In the opinion of the BBA, ThermoPlan T Single Ply FPO Roof Waterproofing Membranes, if used in accordance with the provisions of Certificate No 04/4120, will satisfy or contribute to satisfying the relevant requirements.

Requirement:	B4	External fire spread
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 this Requirement. See the tinted areas in the <i>Properties in relation to fire</i> section of the accompanying Detail Sheet to BBA Certificate No 04/4120. The designation of other roof types should be confirmed by test or assessment.
Requirement:	C4	Resistance to weather and ground moisture
Comment:		Tests for weather resistance indicate that the product will contribute towards a roof meeting this Requirement. See the tinted area in the <i>Weathertightness</i> section of the accompanying Detail Sheet to BBA Certificate No 04/4120.
Requirement:	D1	Materials and workmanship
Comment:		The products are proper materials. See the tinted area in the <i>Durability</i> section of the accompanying Detail Sheet to BBA Certificate No 04/4120.

On behalf of the British Board of Agrément

Date of issue: 26th January 2005

Chief Executive

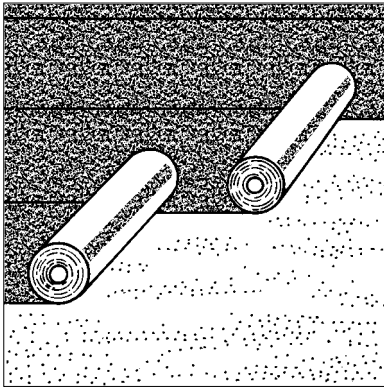


Bauder Limited

Certificate No 04/4120

**DETAIL SHEET 2**
**THERMOPLAN T-SV**

## Product



• THIS DETAIL SHEET RELATES TO THERMOPLAN T-SV SINGLE PLY FPO ROOF WATERPROOFING MEMBRANE.

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 Thermoplan T-SV single ply membranes are a range of flexible polyolefin (FPO) membranes, reinforced with a synthetic fibre reinforcement, including a fleece-backed version.

1.2 The membranes are in pearl white colour and manufactured to the nominal characteristics given in Table 1.

Table 1 Nominal characteristics — Thermoplan T-SV

Parameter (units)	Membrane type				
	SV12	SV15	SV18	SV20	SV15FB <sup>(1)</sup>
Thickness (mm)	1.2	1.5	1.8	2.0	1.5
Width (m)	1.5	1.5	1.5	1.5	1.5
Roll length (m)	25	20	20	20	20
Weight per unit area (kgm <sup>-2</sup> )	1.2	1.5	1.8	2.0	1.8
Roll weight (kg)	45	45	54	60	54

(1) Fleece-backed version.

1.3 Ancillary items for use with the membranes include:

- Thermoplan T TL — a 1.5 mm thick, un-reinforced FPO membrane for use in areas of complex detailing
- Thermoplan FB14 Coated Metal Sheet — a 0.6 mm thick, hot-dip galvanized steel plate, laminated on one side with 0.8 mm thick layer of Thermoplan FPO, for use in creating flashings and detailing
- Thermoplan Vapour Barrier 25 and 40 — 0.25 mm and 0.40 mm thick, polyethylene films to act as vapour control layers
- Thermoplan K35 Vapour Barrier — a foam-backed vapour control layer for isolating rough deck surfaces
- Thermoplan Adhesive Tape 03 — for sealing the seams of vapour control layers
- Thermoplan Adhesive Tape 20 — for sealing vapour control layers to walls
- Thermoplan Preformed Corners — shaped profiles for creating corner features

- Thermoplan FPO Cleaner/Activator — for cleaning and weld preparation
- Thermoplan Contact Adhesive — for bonding Thermoplan T membranes to concrete, metal and timber
- Thermoplan Contact Adhesive Thinner — used to thin Thermoplan Contact Adhesive and remove waste glue on unwanted areas
- Thermoplan 300 gm<sup>-2</sup> Protection Fleece — to separate and protect membrane when overlaying existing bituminous roofing or under ballasted/green roof systems
- Thermoplan DR 300 gm<sup>-2</sup> Protection Fleece — for use when mechanically fastening concrete decks
- Thermotech PIR Insulation — for use in warm roof applications
- Xerofloor Sedum Blanket System — including accessory components
- Thermoplan 4 mm diameter peel stop cord — used to form peel stop detailing at perimeters
- Thermoplan AL 80/100 Ballast Edge Trim — a drainage trim used in ballasted roof specifications
- Thermoplan Linear Fixing Bars — for use in bar mechanically fastened specifications
- A range of outlets and pipe accessories
- Thermoplan Walkway — a 2.0 mm un-reinforced, anti-slip membrane.

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

- thickness
- tensile strength
- elongation at break
- shrinkage.

### 2 Delivery and site handling

2.1 The membranes are delivered to site in rolls, on pallets and protected from the weather with plastic shrink-wrapping. Labels on the rolls bear the marketing company's name, product name, dimensions, product

code, batch number, date of manufacture and the BBA identification mark incorporating the number of this Certificate.

2.2 Rolls should be stored horizontally on a clean, dry, level surface and kept under cover.

2.3 The Thermoplan Contact Adhesive has a flashpoint of  $-17^{\circ}\text{C}$  and is classified as 'Highly Flammable' and 'Irritant' under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3) and should be stored in accordance with the Highly Flammable Liquids and Petroleum Gases Regulations 1997.

## Design Data

### 3 Weathertightness



3.1 Test data confirm that the Thermoplan T-SV membranes, and joints in the membranes, 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*

Regulation 17, Standard G3.1

#### *Northern Ireland*

Regulation C4.

3.2 The systems are impervious to water and, will adequately resist penetration of roots, and when used as described, will give a weathertight roof capable of accepting minor structural movement without damage.

### 4 Resistance to wind uplift

4.1 The resistance to wind uplift of a mechanically-fixed 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 many factors, including:

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

4.2 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 0.4 kN per fixing.

4.3 The precise ballast requirements for loose-laid and ballasted systems should be calculated in accordance with the relevant parts of BS 6399-2 : 1997, but should 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. The soil used in green roofs and garden roofs should not be of a type that will be removed, or become localised due to wind scour experienced on site.

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

4.5 The adhesion of the membrane will be limited by the cohesive strength of the substrate.

4.6 On substrates with high-cohesive strength, the adhesion of the fleece-backed membrane is sufficient to

resist the effect of wind suction, thermal cycling or minor structural movements occurring in practice.

### 5 Resistance to foot traffic

5.1 Data indicate that the systems can accept, without damage, the limited foot traffic and light concentrated loads associated with the installation and maintenance operations. Reasonable care should be taken, however, to avoid sharp objects or concentrated loads. Anywhere regular traffic is envisaged, ie maintenance of lift equipment, a walkway should be provided using concrete slabs supported on bearing pads.

5.2 Once the green roof or roof garden is installed it can be regarded as a suitable protection for the membrane in use. However, it should be recognised that the membrane is taken up beyond the level of the soil (at least 150 mm) and is therefore vulnerable to damage in those areas.

### 6 Properties in relation to fire



6.1 When tested in accordance with BS 476-3 : 1958, a system comprising an 18 mm plywood deck, Bauder Thermoplan VB 25 polyethylene vapour barrier, a 50 mm Bauder Eurotherm UEF polyurethane insulation board mechanically fixed to the deck, and a layer of Thermoplan T-SV12 membrane, achieved a rating of EXT.F.AB.

6.2 When tested in accordance with BS 476-3 : 1958, a system comprising an 18 mm WBP plywood deck, Bauder KSD Duo Vapour Barrier, Bauder Thermotech 50 mm insulation and fleece-backed Thermoplan T-SV 15 membrane, fully adhered using Bauder Polyurethane membrane adhesive, achieved a rating of EXT.F.AB.

6.3 The membrane used in the loose-laid and ballasted specification, including a minimum depth of 50 mm of aggregate, shall be deemed to satisfy BS 476-3 : 1958.

6.4 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 confirm compliance with Standard D9.1

#### *Northern Ireland*

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

6.5 In the opinion of the BBA a roof garden or green roof incorporating the membrane covered with a drainage layer of gravel 100 mm thick and a soil layer of minimum 300 mm thick will be designated AA.

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

### 7 Maintenance

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

7.2 In the event of accidental damage, repairs can be carried out by cleaning the area around the damage and applying a patch as described in the manufacturer's instructions.

7.3 It is imperative that the drainage system of the green roof or 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.

## 8 Durability



Accelerated weathering tests confirm that satisfactory retention of physical properties is achieved. Available evidence indicates that the system should have a life in excess of 20 years.

## Installation

### 9 General

9.1 Installation of Thermoplan T-SV 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.

9.2 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 ribs. When used over a rough substrate, a suitable protection layer should be placed over the substrate.

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

9.4 All flashings should be formed in accordance with the Certificate holder's instructions.

### 10 Procedure

#### Loose-laid and ballasted system

10.1 The membrane should be laid out flat onto the substrate without folds or ripples, with 100 mm overlaps.

10.2 The membrane is mechanically fixed at perimeters and the laps welded together. Finally, the detailing work is carried out.

10.3 The membrane should be covered with a protective sheet prior to application of a 50 mm minimum thick layer of washed, well-rounded gravel. In areas of high-wind exposure, a heavier gravel may be used and/or the gravel may be bonded at the edges for the distance of one metre. Alternatively, concrete slabs on suitable supports can be used.

10.4 For green roof or garden roof applications, the Certificate holder's instructions should be strictly followed.

### Mechanically fastened

10.5 The membrane should be laid out flat onto the substrate without folds or ripples, with 100 mm overlaps, and secured against wind uplift prior to installation of fasteners by sandbags or other suitable means.

10.6 The membrane is fixed to the deck (through insulation boards, where appropriate) in the joint overlaps prior to welding of the joint. The fastener screw should be positioned 30 mm from edge of the membrane (10 mm from edge of plate). The fixings should be installed at centres calculated from the average wind force in that area.

### Fully-adhered system

10.7 The membrane is unrolled onto the substrate, without ripples, and rolled back to expose the underside.

10.8 A coat of the Bauder Polyurethane Membrane Adhesive is applied to the substrate, covering only the area where the membrane is to be laid.

10.9 The membrane should be rolled onto the adhesive before a skin has begun to form over the adhesive. After initial contact, the surface of the membrane should be rolled and pressed to ensure full contact. After 30 minutes, the surface of the bonded material should again be rolled and pressed to assist with the bonding process.

### 11 Jointing

#### Hot-air welding

11.1 The welding area should be dry and clean. If the membrane in the weld area has become contaminated, it must be cleaned in accordance with the Certificate holder's instructions.

11.2 Welding is carried out either by hand or automatic welding machine.

11.3 The welded width of the joint must be a minimum of 50 mm. Care should be taken that overheating of the membrane does not occur, possible impairment of the membrane may result.

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

## Technical Investigations

The following is a summary of technical investigations carried out on Thermoplan T-SV.

### 12 Tests

Data from tests conducted by the BBA and BDA are summarised in Tables 2 and 3.

Table 2 Physical properties — directional

Test (units)	Method <sup>(1)</sup>	Mean results								
		1.2 mm		1.5 mm		1.8 mm		2.0 mm		
		long <sup>(2)</sup>	trans <sup>(3)</sup>	long <sup>(2)</sup>	trans <sup>(3)</sup>	long <sup>(2)</sup>	trans <sup>(3)</sup>	long <sup>(2)</sup>	trans <sup>(3)</sup>	
Tensile strength [N (50 mm) <sup>-1</sup> ]	MOAT 67 : 4.2.5 (100 mm min <sup>-1</sup> )	unaged	988	742	1098	888	1113	910	1224	941
		heat aged <sup>(4)</sup>	892	797	1167	845	1156	962	1282	981
Elongation (%)	MOAT 67 : 4.2.5 (100 mm min <sup>-1</sup> )	unaged	22	25	21	29	21	28	20	27
		heat aged <sup>(4)</sup>	21	25	22	25	20	28	20	27
Dimensional stability (%)	BS EN 1107-2	-0.6	+0.1	—	—	—	—	—	—	
Nail tear (N)	MOAT 67 : 5.4.1	720	780	—	—	—	—	—	—	

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

(2) Longitudinal direction.

(3) Transverse direction.

(4) Heat aged — 12 weeks at 80°C in a ventilated oven.

— not tested.

Table 3 Service performance

Test (units)	Method <sup>(1)</sup>	Mean results
		1.2 mm
Water vapour permeability (gm <sup>-2</sup> day <sup>-1</sup> )	BS 3177 (25°C/75% RH)	0.20
Vapour resistance (MNsg <sup>-1</sup> )	BS 3177 (25°C/75% RH)	1025
Low temperature flexibility (C)	MOAT 67 : 4.3.14	
unaged		≤-25
heat aged <sup>(2)</sup>		≤-25
Static indentation rigid	MOAT 67 : 4.3.8	
compressive		L <sub>20</sub> L <sub>25</sub>
Dynamic indentation	MOAT 67 : 4.3.9	I <sub>15</sub>
Resistance to cyclic movement unaged	MOAT 67 : 4.3.7	pass
Peel resistance concrete [N (50 mm) <sup>-1</sup> ]	MOAT 67 : 4.3.3	
unaged		135
heat aged <sup>(4)</sup>		127
Shear strength [N (50 mm) <sup>-1</sup> ]	BS EN 12317-2	
head lap		628
side lap		497
Peel strength of joints (N)	MOAT 67 : 4.3.18	
head lap		339
side lap		267
Wind uplift load per fixing (N)	MOAT 55 : 4.2.2	
using zahn ZKSK – WD100 fixings		1600
using zahn ZDBS fixings		800
Corrected load per fixing (N)	MOAT 55 : 4.2.2	
using zahn ZKSK – WD100		740
using zahn ZDBS		507

- (1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.  
 (2) Heat aged — 12 weeks at 80°C in ventilated oven.  
 (3) Thermoplan SV15 Fleece-backed membrane tested.  
 (4) WSP data.

## 13 Investigations

13.1 Existing data was examined on:

- fire performance to BS 476-3 : 1958
- resistance to root and sprout penetration<sup>(1)</sup>
- effect of soil
- effect of ultraviolet light on low-temperature flexibility
- resistance to ozone
- resistance to head of water.

- (1) Four-year roof penetration resistance test by FLL (Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau ev).

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

13.3 Visits to sites in progress were carried out to assess the practicability of installation.

## 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 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 EN 1107-2 : 2001 *Flexible sheets for waterproofing — Determination of dimension stability — 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*

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

MOAT No 67 : 1997 *UEAtc Technical Guide for the approval of reinforced and/or backed roof waterproofing systems made of plasticised PVC Sheeting incompatible with bitumen*



On behalf of the British Board of Agrément

Date of issue: 1st September 2004

Chief Executive