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Agrément Certificate

04/4120

Product Sheet 1

THERMOPLAN SINGLE PLY FPO ROOF WATERPROOFING MEMBRANES

THERMOPLAN T WATERPROOFING MEMBRANES

This Agrément Certificate Product Sheet⁽¹⁾ relates to Thermoplan T Waterproofing Membranes, a range of flexible polyolefin (FPO) membranes with synthetic fibre reinforcement, for use as single-ply roof waterproofing membranes in mechanically fastened and fully adhered systems on flat and pitched roofs, and loose-laid and ballasted roof gardens and green roofs on flat 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, including joints, will resist the passage of moisture to the interior of a building (see section 6).

Properties in relation to fire — the products, when used in a suitable specification, may enable a roof to be unrestricted under the national Building Regulations (see section 7).

Resistance to wind uplift — the products will resist the effects of any likely wind suction acting on the roof (see section 8).

Resistance to resistance to mechanical damage — the products will accept, without damage, the limited foot traffic and loads associated with installation and maintenance and minor structural movements occurring in service (see section 9).

Resistance to penetration of roots — products 1.5 mm and thicker will adequately resist plant root penetration (see section 10).

Durability — under normal service conditions, the products will provide a durable roof waterproofing with a service life in excess of 30 years (see section 12).

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 Fifth issue: 11 November 2022

Originally certificated on 1 September 2004

Hardy Giesler
Chief Executive Officer



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 MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

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Regulations

In the opinion of the BBA, Thermoplan T 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(1)	External fire spread
Comment:	The products are restricted by this Requirement in some circumstances. See section 7.4 of this Certificate.	
Requirement:	B4(2)	External fire spread
Comment:	On a suitable substructure, the use of the products may enable a roof to be unrestricted under this Requirement. See sections 7.1 to 7.3 of this Certificate.	
Requirement:	C2(b)	Resistance to moisture
Comment:	The products, including joints, will enable a roof to satisfy this Requirement. See section 6 of this Certificate.	
Regulation:	7(1)	Materials and workmanship
Comment:	The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.	



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:	The use of the products satisfies the requirements of this Regulation. See sections 11.1 and 12 and the <i>Installation</i> part of this Certificate.	
Regulation:	9	Building standards applicable to construction
Standard:	2.6	Spread to neighbouring buildings
Comment:	The system is restricted under clause 2.6.4 ⁽¹⁾⁽²⁾ of this Standard in some circumstances. See section 7.5 of this Certificate.	
Standard:	2.8	Spread from neighbouring buildings
Comment:	The products, when applied to a suitable substructure, may enable a roof to be unrestricted by clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 7.1 to 7.3 of this Certificate.	
Standard:	3.10	Precipitation
Comment:	The products, including joints, 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 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:	Comments in relation to the 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 (as amended)

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The products, including joints, can enable a roof to satisfy the requirements of this Regulation. See section 6 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The systems are restricted by this Regulation in some circumstances. See section 7.4 of this Certificate
Regulation:	36(b)	External fire spread
Comment:		On suitable non-combustible substructures, the use of the products may enable a roof to be unrestricted under the requirements of this Regulation. See sections 7.1 to 7.3 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 1 *Description* (1.2) and 3 *Delivery and site handling* (3.3) of this Certificate.

Additional Information

NHBC Standards 2022

In the opinion of the BBA, Thermoplan T Waterproofing Membranes, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs, terraces and balconies*.

The NHBC Standards do not cover the use of the products in the refurbishment of existing roofs.

UKCA marking

The Certificate holder has taken the responsibility of UKCA marking the products, in accordance with UK Designated Standard BS EN 13956 : 2012.

Technical Specification

1 Description

1.1 Thermoplan T Waterproofing Membranes are a range of polyester reinforced, flexible polyolefin (FPO) single-ply membranes, incorporating UV stabiliser and flame retardant additives. The 1.5 mm membrane is available in a fleece-backed version.

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

Table 1 Nominal characteristics

Characteristic (unit)	Membrane type				
	T12	T15	T18	T20	T15 V ⁽¹⁾
Thickness (mm)	1.2	1.5	1.8	2.0	1.5 ⁽²⁾
Width (m)	1.5	1.5	1.5	1.5	1.5
Length (m)	25	20	20	20	20
Mass per unit area (kg·m ⁻²)	1.5	1.8	2.2	2.4	2.1
Tensile strength (N per 50 mm)	≥1100	≥1200	≥1200	≥1200	≥1200 ⁽²⁾
Elongation at break (%)	≥19	≥19	≥19	≥19	≥19 ⁽²⁾
Tear strength (N)	>320	>350	>350	>400	>550
Dynamic indentation (mm)					
hard substrate	>550	>700	>900	>900	>800
soft substrate	>800	>950	>1250	>1250	>1250
Static indentation (kg)					
hard substrate	≥20	≥20	≥20	≥20	≥20
soft substrate	≥20	≥20	≥20	≥20	≥20
Dimensional stability (%)	<0.3	<0.3	<0.3	<0.3	<0.3
Low temperature foldability (°C)	<-30	<-30	<-30	<-30	<-30

(1) Fleece-backed version.

(2) Membrane excluding fleece.

1.3 All of the membranes are available in pearl white, with the T15 and T15V membranes also available in silver grey.

1.4 Ancillary items for use with the membranes include:

- BauderFPO T TL— a 1.8 mm thick, unreinforced FPO membrane for use in areas of complex detailing
- BauderFPO VBL 14 — a 0.6 mm thick hot-dip galvanized steel plate, laminated on one side with a 0.8 mm thick layer of Thermoplan FPO, for use in creating flashings and detailing
- BauderFPO IE & AE preformed corners— shaped profiles for creating corner features
- BauderFPO RG cleaner activator — for cleaning and weld preparation
- Bauder Fleece Backed Membrane Adhesive — for bonding Thermoplan T15 V to substrates
- Linear Fixing Bars — for use in bar mechanically-fastened specifications
- fixings and fixing plates
- a range of outlets and pipe accessories.

1.5 The Certificate holder recommends the following ancillary items for use with the products, but these materials have not been assessed by the BBA and are outside the scope of this Certificate:

- BauderSYN DB-PE 100 and 200 — 0.16 and 0.25 mm thick polyethylene AVCL's
- BauderSYN VK-T 38 – tape 03 for sealing the seams of DB-PE 100 & 200
- BauderSYN BU-T 15 – tape 20 for sealing the DB-PE 100 & 200 AVCL's to upstands
- Bauder Tec KSD Foil and Tec DBR 06 self-adhesive bituminous air and vapour control layers
- BauderActivator Primer — adhesive for bonding Thermoplan T Waterproofing Membranes to a variety of substrates
- BauderSYN PF300 Protection Fleece 300g·m⁻² — to separate and protect membrane when overlaying existing bituminous roofing or under ballasted/green roof systems
- Bauder Insulation — for use in warm roof applications
 - BauderPIR FA rigid insulation boards
 - BauderPIR FA G16 tapered insulation boards
 - BauderVIP TE 60 vacuum insulation panels
- BauderGREEN XF301 lightweight sedum system – including accessory components
- BauderFPO RDS 100 cord – 4mm diameter cord used to form peel stop detailing at perimeters
- BauderGREEN KFL AL 100/80 drainage trim used in ballasted roof specifications
- BauderFPO WWB 2mm embossed walkway membrane.

2 Manufacture

2.1 The membranes are manufactured from an FPO compound by extrusion and lamination with a synthetic reinforcement and, in the case of the backed product, a polyester fleece.

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 the manufacturer has been assessed and registered as meeting the requirements of DIN EN ISO 9001 : 2015 by ESC Cert GmbH (Certificate 70499/03-21_a).

2.4 The membranes are manufactured in Germany by Paul Bauder GmbH.

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls, shrink-wrapped in plastic, on pallets. Labels on the rolls bear the Certificate holder's name, product name, dimensions, product code, batch number, date of manufacture and the BBA logo incorporating the number of this Certificate.

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

3.3 The Certificate holder has taken the responsibility of classifying and labelling the products under the *CLP Regulation (EC) No 1272 / 2008 on the classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Thermoplan T Waterproofing Membranes.

Design Considerations

4 General

4.1 Thermoplan T Waterproofing Membranes are satisfactory for use as a waterproofing layer in:

- mechanically fastened systems on flat and pitched roofs with limited access
- fully adhered systems on flat and pitched roofs with limited access
- loose-laid and ballasted waterproofing for flat roofs with limited access
- roof garden and green roof specifications on flat roofs with limited or pedestrian access (1.5 mm thick membrane and above).

4.2 Decks to which the membranes are to be applied must comply with the relevant requirements of BS 6229 : 2018, BS 8217 : 2005 and, where appropriate, *NHBC Standards 2022*, Chapter 7.1.

4.3 The following terms are defined for the purpose of this Certificate as:

- roof garden (intensive) — a roof with a substantial layer of growing medium with planting that can include shrubs and trees, generally accessible to pedestrians
- green roof (extensive) — a roof with a shallow layer of growing medium planted with low-maintenance plants such as mosses, sedums, grasses and some wildflower species.

4.4 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, additional protection to the membrane must be provided (see section 9).

4.5 Pedestrian access roofs are defined for the purpose of this Certificate as those roofs allowing unrestricted foot traffic but not subject to vehicular traffic.

4.6 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80⁽¹⁾. 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.

(1) *NHBC Standards 2022* require a minimum fall of 1:60 for green roofs and roof gardens.

4.7 Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6.

4.8 The falls for green roofs and roof garden specifications are provided by either the roof decking or cut-to-falls insulation.

4.9 Recommendations for the design of green roofs and roof garden specifications are available within the latest edition of *The GRO Green Roof Code - Green Roof Code of Best Practice*, issued by The Green Roof Organisation (GRO).

4.10 Structural decks for loose-laid and ballasted roofs, green roofs and roof gardens must be suitable to transmit the dead and imposed loads experienced in service. Allowance needs to be made for loading deflections to ensure that the free drainage of water is maintained.

4.11 Imposed loads, dead loading and wind loads specifications are calculated, by a suitable experienced and competent individual, in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003 and BS EN 1991-1-4 : 2005, and their UK National Annexes.

4.12 The drainage systems for loose-laid and ballasted roofs, green roofs or roof gardens must be correctly designed, and the following points should be addressed:

- provision made for access for maintenance purposes
- dead loads for green roof and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

4.13 In loose-laid and ballasted roof specifications, the ballast requirements should be calculated, by a suitably experienced and competent individual, in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex.

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

- as described in the relevant clauses of BS 6229 : 2018, or
- the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that Certificate.

4.15 The NHBC requires that the waterproofing membranes, once installed, are inspected in accordance with *NHBC Standards 2022*, Chapter 7.1, Clause 7.1.12, and undergo an appropriate integrity test, where required. Any damage to the membrane is repaired in accordance with section 17 of this Certificate and reinspected.

5 Practicability of installation

Installation of the products must only be carried out by installers trained and approved by the Certificate holder.

6 Weathertightness



The products, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture into the interior of a building and so enable a roof to comply with the requirements of the national Building Regulations.

7 Properties in relation to fire



7.1 When tested to DD CEN/TS 1187 : 2012, Test 4, and classified in accordance with BS EN 13501-5 : 2016, the following systems achieved Class B_{ROOF}(t4) when tested flat and so are unrestricted in terms of proximity to a boundary by the documents supporting the national Building Regulations:

- 18 mm thick OSB3 board, 0.16 mm thick DB100 AVCL, a 60 mm thick polyisocyanurate (PIR) insulation board with aluminium foil facing, mechanically fastened and Thermoplan T15 membrane mechanically fastened⁽¹⁾
- 18 mm thick OSB3 board, 0.16 mm thick DB100 AVCL, a 140 mm thick polyisocyanurate (PIR) insulation board with aluminium foil facing, mechanically fastened and Thermoplan T15 membrane mechanically fastened⁽²⁾.

(1) Fire test and classification reports reference Q100740-1004 and Q100740-1005 respectively conducted by BRE Global. Reports available from the Certificate holder

(2) Fire test and classification reports reference Q100909-1002 and Q100909-1003 respectively conducted by BRE Global. Reports available from the Certificate holder.

7.2 A roof incorporating the products will also be unrestricted under the national Building Regulations in the following circumstances:

- protected or inverted roof specifications, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC,
- a roof garden covered with a drainage layer of gravel 100 mm thick and a soil layer 300 mm thick,
- irrigated roof gardens and green roofs.

7.3 The classification and permissible areas of use of other specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.



7.4 In England and Wales, the products, when used in pitches of greater than 70°, excluding upstands, should not be used on buildings that have a storey at least 18 m above ground level and contain: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools and additionally in Northern Ireland, nursing homes and places of lawful detention, and proximity to boundary restrictions apply in some cases.



7.5 In Scotland, the products, when used in pitches of greater than 70°, excluding upstands, should not be used on buildings that have a storey at least 11 m above ground level, and proximity to boundary restrictions apply in some cases.

7.6 If allowed to dry, plants used in a roof garden may allow flame spread across the roof. This should be taken into consideration when selecting the plants. Appropriate planting irrigation and/or protection must be applied to ensure the overall fire rating of the roof is not compromised.

8 Resistance to wind uplift

8.1 The resistance to wind uplift of a mechanically fastened waterproofing layer is provided by the fixing bar and fasteners passing through the membrane into the substrate. The number and position of fixings will depend on a number of factors including:

- wind uplift forces to be restrained
- pull-out strength of the fasteners
- tensile properties of the membrane
- appropriate calculation of safety factors.

8.2 The wind uplift forces must be calculated by a suitably experienced and competent individual in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. On this basis, the number of fixings required should be established using a maximum permissible load of 0.4 kN per fixing as a minimum value.

Project specific design values can be provided by the Certificate holder, which will take into consideration both the specific substrate (deck type) and fasteners being proposed. In the instance of concrete decks or refurbishment projects, this will also include a requirement for pull-out testing from the substrate in order to ensure that the assumed pull-out authoritative design values can be achieved. This design service is outside the scope of this Certificate.

8.3 The adhesion of adhered systems is sufficient to resist the effects of any wind suction, elevated temperatures, thermal shock or minor movement likely to occur in practice.

8.4 Where the membranes are bonded 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 must be taken into account when selecting a suitable insulation material.

8.5 The ballast requirements for loose-laid and ballasted systems should be calculated, by a suitably experienced and competent individual, in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. When gravel ballast is used, the system should always be loaded with a minimum depth of 50 mm of aggregate. In areas of high-wind exposure, the Certificate holder's advice should be sought. Alternatively, concrete slabs on suitable supports can be used.

8.6 The soil used in roof gardens and ballast on protected roofs must not be of a type that will be removed or become delocalised owing to wind scour experienced on the roof.

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

9 Resistance to mechanical damage

9.1 The products can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment, a walkway should be provided; for example, using concrete slabs supported on bearing pads.

9.2 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.

9.3 The products are capable of accepting minor structural movement while remaining weathertight.

10 Resistance to penetration of roots

Results of tests on the 1.5 mm product, indicate that it is resistant to root penetration. This and thicker products can be used in a roof waterproofing system for green roofs and roof gardens.

11 Maintenance



11.1 The roof system should be the subject of six monthly inspections and maintenance in accordance with the recommendations of BS 6229 : 2018, Chapter 7, and the Certificate holder's own maintenance requirements, where relevant, to ensure continued satisfactory performance.

11.2 Green roofs and roof gardens must be the subject of regular inspections, particularly in autumn after leaf fall and in spring, to ensure that unwanted vegetation and other debris are cleared from the roof and drainage outlets (see section 4.10). Guidance is available in the latest edition of *The GRO Green Roof Code - Green Roof Code of Best Practice*.

11.3 Where damage has occurred it should be repaired in accordance with section 17 and the Certificate holder's instructions.

12 Durability



Under normal service conditions, the products will provide a durable roof waterproofing with a service life in excess of 30 years.

13 Reuse and recyclability

The products comprise thermoplastic polyolefin and polyester, which can be recycled.

Installation

14 General

14.1 Installation of Thermoplan T Waterproofing Membranes must be carried out by trained and approved installers working in accordance with the relevant clauses of BS 8000-0 : 2014 and BS 8000-4 : 1989, the Single Ply Roofing Association (SPRA) Single Ply : *Design Guide*, the Certificate holder's instructions and this Certificate.

14.2 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 and concrete nibs. When used over a rough substrate, a suitable protection layer should be placed over the substrate.

14.3 Insulation boards should be fixed to the substrate in such a way as not to impair the performance of the waterproofing membrane.

14.4 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.

14.5 All flashings are formed in accordance with the Certificate holder's instructions.

14.6 Soil or other bulk material must not be stored on one area of the roof prior to installation, to ensure that localised overloading does not occur.

15 Procedure

Loose-laid and ballasted system

15.1 The membrane is laid out flat onto the substrate without folds or ripples, with 100 mm overlaps.

15.2 The membrane is mechanically fastened at perimeters, the side and end laps are welded together, and the detailing work is carried out.

15.3 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.

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

Mechanically fastened

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

15.6 The membranes are secured by corrosion resistant plates and mechanical fixings or thermally broken tubes and fixings manufactured by an SPRA Associate Fastener Member. The fastener tubes should be positioned a minimum of 10 mm from the edge of the lower membrane. The fixings should be installed at centres calculated from the average wind force in that location.

Fully adhered system

Thermoplan T

15.7 When using Bauder Activator Primer, the advice of the Certificate holder should be sought on the suitability of substrates.

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

15.9 A coat of Bauder Activator Primer is applied to the substrate and to the back of the membrane in a full and continuous coat. The adhesive should only be applied to cover the area over which the membrane is to be laid.

15.10 The membrane is rolled back onto the adhesive approximately 5 to 10 mins after application. After initial contact, the surface of the membrane is rolled and pressed to ensure full contact.

Thermoplan T15 V

15.11 When using Bauder Fleece Backed Membrane Adhesive, the advice of the Certificate holder should be sought on the suitability of substrates.

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

15.13 A coat of Bauder Fleece Backed Membrane Adhesive is applied to the substrate in a full and continuous coat.

15.14 The membrane is rolled onto the adhesive approximately 5 to 10 minutes after application. After initial contact, the surface of the membrane is rolled and pressed to ensure full contact. After 30 minutes, the surface of the bonded material is again rolled and pressed to assist with the bonding process.

16 Jointing

16.1 The welding area must 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.

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

16.3 The welded width of the joint must be 30 to 50 mm. Care must be taken that overheating of the membrane does not occur, as possible impairment of the membrane may result.

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

17 Repair

In the event of damage, repairs can be carried out by cleaning the area around the damage and applying a patch extending at least 50 mm beyond the defect of the products as described in the Certificate holder's instructions.

Technical Investigations

18 Tests

18.1 An assessment was made on data in relation to:

- thickness
- width
- mass per unit area
- flatness
- straightness
- watertightness
- effects of liquid chemicals
- peel resistance of joint
- shear resistance of joints
- water vapour resistance
- tensile force
- elongation at break
- dynamic indentation
- static indentation
- resistance to root penetration
- dimensional stability
- low temperature foldability
- effect of exposure to UV.

18.2 Tests were carried and the results evaluated to determine:

- nail tear resistance
- resistance to cyclic movement
- peel resistance from substrate
- wind uplift resistance (mechanically fastened system)
- effect of long term exposure to soil
- the effect of heat ageing.

18.3 Tests were carried out on samples taken from existing sites, further heat and UV aged, compared to results of unaged samples and the results evaluated to determine:

- low temperature foldability
- dynamic indentation.

19 Investigations

19.1 reaction to fire reports were evaluated.

19.2 Visits to sites in progress were carried out and installation instructions evaluated to assess the practicability of installation.

19.3 Visits to existing sites were carried out to assess performance in use.

19.4 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 : 2018 *Flat roofs with continuously supported flexible waterproof coverings — Code of practice*

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*

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 1991-1-1 : 2002 *Eurocode 1 : Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*

NA to BS EN 1991-1-1 : 2002 UK National Annex to *Eurocode 1 : Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*

BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 : Actions on structures — General actions — Snow loads*

NA to BS EN 1991-1-3 : 2003 + A1 : 2015 UK National Annex to *Eurocode 1 : Actions on structures — General actions — Snow loads*

BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 : Actions on structures — General actions — Wind actions*

NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to *Eurocode 1 : Actions on structures — General actions — Wind actions*

BS EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs tests*

DD CEN/TS 1187 : 2012 *Test methods for external fire exposure to roofs*

EN 13956 : 2012 *Flexible sheet for waterproofing — Plastic and rubber sheets for roof waterproofing — Definitions and characteristics*

EN ISO 9001 : 2015 *Quality management systems — Requirements*

20 Conditions

20.1 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.

20.2 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.

20.3 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.

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

20.5 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.

20.6 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.