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Agrément Certificate

09/4668

Product Sheet 4

SIKA WATERPROOFING MEMBRANES

SIKAPLAN G AND VG MECHANICALLY FASTENED MEMBRANES

This Agrément Certificate Product Sheet⁽¹⁾ relates to Sikaplan G and VG Mechanically Fastened Membranes, PVC sheets for use as waterproofing layers on pitched, flat and curved roofs with limited access.

(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 will resist the passage of moisture into the interior of the building (see section 6).

Properties in relation to fire — the products can 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 wind suction likely to occur in practice (see section 8).

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

Durability — under normal service conditions, the products will provide a durable roof waterproofing with a service life in excess of 35 years (see section 11).



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

On behalf of the British Board of Agrément

John Albon
Chief Scientific Officer

Claire Curtis-Thomas
Chief Executive

Date of Fifth issue: 22 July 2019

Originally certificated on 3 June 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.
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, Sikaplan G and VG Mechanically Fastened Membranes, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



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

Requirement:	B4(2)	External fire spread
Comment:		On suitable substructures, the use of the products can enable a roof to be unrestricted under this Requirement. See section 7 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The products, including joints, will enable a roof to satisfy this Requirement. See section 6.1 of this Certificate.
Regulation:	7	Materials and workmanship (applicable to Wales only)
Regulation:	7(1)	Materials and workmanship (applicable to England only)
Comment:		The products are acceptable. See section 11 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 10 and 11 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		On suitable non-combustible substructures, the use of the products can be regarded as having a low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See section 7 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 6.1 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The products can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		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 11 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 satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		On suitable substructures, the use of the products can enable a roof to be unrestricted under the Requirement. See section 7 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* (1.1) and 3 *Delivery and site handling* (3.2 and 3.4) of this Certificate.

Additional Information

NHBC Standards 2019

In the opinion of the BBA, Sikaplan G and VG Mechanically Fastened 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 and balconies*.

CE marking

The Certificate holder has taken the responsibility of CE marking the products, in accordance with harmonised European Standard EN 13956 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Registered Contractors Scheme⁽¹⁾

The Certificate holder operates a Registered Contractors Scheme for the products under which contractors are trained, registered and regularly reviewed by the Certificate holder to demonstrate that they are competent to carry out installation in accordance with this Certificate. Details of Registered Contractors are available from the Certificate holder. Registered Contractors are responsible for each installation of the products they undertake.

(1) The Certificate holder's records relating to the Registered Contractors Scheme will be audited annually by the BBA as part of its programme of surveillance.

Technical Specification

1 Description

1.1 Sikaplan G and VG Mechanically Fastened Membranes are PVC roof waterproofing membranes reinforced with polyester. The membranes are manufactured to the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Sikaplan G		Sikaplan VG
Thickness (mm)	1.2	1.5	1.5
Mass per unit area (g·m ⁻²)	1.6	1.9	1.9
Roll length (m)	15	15	15
Roll width (m)	2.0	2.0	2.0
Colour			
upper	light grey	light grey	light grey, slate grey
lower	medium grey	medium grey	medium grey
Tensile strength* (N·50 mm ⁻¹)			
longitudinal	≥ 1000	≥ 1000	≥ 1000
transverse	≥ 900	≥ 900	≥ 900
Elongation* (%)			
longitudinal	≥15	≥ 15	≥ 15
transverse	15	≥ 15	≥ 15
Tear resistance* (N·50 mm ⁻¹)			
longitudinal	≥150	≥150	≥150
transverse	≥150	≥150	≥150
Watertightness*	pass	pass	pass
Low temperature foldability* (°C)	≤ -25	≤ -25	≤ -25

1.2 Ancillary items for use with the products include:

- proprietary pressure plates — manufactured from either plastic or galvanized steel, used to secure the membranes against wind uplift forces, by positioning the fixing along the edge of the sheet through the membrane, insulation and into the decking. Provision has been made for the use of thermally broken types of fastener
- proprietary pressure plate systems with their appropriate fasteners — for mechanical fixing of the products
- Sarnacol 2170 — contact adhesive for use in installation at details and upstands, in accordance with the Certificate holder’s instructions
- Sika THF Welding Agent — tetrahydrofuran (THF) for the cold welding of laps between individual sheets and for securing the discs to the underside of the membrane
- Sika PVC Solution — plasticised PVC dissolved in tetrahydrofuran, used for sealing lap joints
- Sika-L100 Cleaning —Agent — ethyl acetate-based solution for the cleaning of heavily-soiled membrane prior to welding
- Metal Sheets — 0.6 mm thick galvanized steel sheets, the upper side coated with a 0.8 mm thick layer of plasticised PVC, coloured light grey and slate grey, used to produce profiles for perimeter flashings, connections and fixings.

1.3 Other items which may be used with the products, but which are outside the scope of this Certificate, include:

- WBP — a 2.0 mm thick layer of embossed plasticised PVC walkway to clearly define the walkway routes
- Sika S-Vap 500E Vapour Check — a polyethylene sheet, providing resistance to the passage of water vapour into the roof construction from below
- S Vap HD SA — a self-adhered bituminous vapour control layer

2 Manufacture

2.1 Sikaplan G and VG Mechanically Fastened Membranes are manufactured by extrusion coating plasticised PVC into sheets. Two calendered sheets are thermally fused into one homogeneous sheet, sandwiching a polyester reinforcement. The sheets are cut to width and reeled onto cardboard cores.

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 Sika-Trocac GmbH Ltd has been assessed and registered as meeting the requirements of EN ISO 9001 : 2015 by SQS (Certificate 31982).

2.4 The products are manufactured in Switzerland and marketed in the UK by the Certificate holder.

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls on pallets either with a corrugated cardboard outer or wrapped in polythene film. The wrapper bears the Certificate holder's name, product identification, roll width and length, colour and the BBA logo incorporating the number of this Certificate.

3.2 Rolls should be stored horizontally under cover and on a clean, level surface in a dry environment. Pallets may be stacked to a maximum of three high.

3.3 Ancillary products should be stored in a similar environment.

3.4 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 Sikaplan G and VG Mechanically Fastened Membranes.

Design Considerations

4 Use

4.1 Sikaplan G and VG Mechanically Fastened Membranes are satisfactory for use as mechanically fixed roof waterproofing on pitched, flat and curved roofs of less than 20 m radius and with limited access.

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

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

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

4.5 Insulation materials used in conjunction with the products must satisfy the requirements stated by the Certificate holder and must be one of the following:

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

4.6 The products must not be laid directly onto certain materials, eg bituminous felts, certain insulation boards or timber substrates which have been impregnated with oil-based preservatives. If contact with such products is likely, a separating layer should be used. Where doubt arises, the advice of the Certificate holder should be sought.

5 Practicability of installation

The products must only be installed by installers who have been trained and approved by the Certificate holder. The records relating to this will be audited by the BBA as part of its programme of surveillance on the Certificate.

6 Weathertightness



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

6.2 The products are impervious to water and, when used in the system described, will achieve a weathertight roof capable of accepting minor structural movement without damage.

7 Properties in relation to fire



7.1 The following systems⁽¹⁾⁽²⁾ will be unrestricted under the national Building Regulations:

- an 18 mm thick plywood deck, Sika S-Vap 500E Vapour Check layer, a 100 mm thick, aluminium foil-faced polyisocyanurate insulation board, and mechanically fixed 2.0 mm Sikaplan G membrane
- an 18 mm thick plywood deck, one layer of Sika S-Vap 500E Vapour Check layer, a 100 mm thick foil-faced PIR insulation board, and mechanically fastened 1.5 mm thick Sikaplan VG membrane.

(1) Fire test report reference 238417 issued by BRE Testing. A copy of the report is available from the Certificate holder.

(2) Fire test report reference 288586-1 and 288585-2 and 288585-3 issued by BRE Global. A copy of the report is available from the Certificate holder.

7.2 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 – tests to confirm compliance with Mandatory Standard 2.8, clause 2.8.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

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

8 Resistance to wind uplift

8.1 When the products are mechanically fixed, the resistance to wind uplift is provided by mechanical fasteners secured to the deck and passing through the membranes. The number of fixings and their position will depend on:

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

8.2 The number of fixings used should be established by reference to the wind uplift forces calculated by a suitably competent and experienced individual in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex on the basis of maximum permissible loads of 0.40 kN per fixing.

9 Resistance to mechanical damage

The products can withstand, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance. Where traffic in excess of this is envisaged, such as for maintenance of roof-mounted plant or for regular access to plant rooms, walkways must be provided (eg using SikaPlan WBP), as recommended by the Certificate holder.

10 Maintenance



10.1 Roofs must be the subject of annual inspections and maintenance to ensure continued performance.

10.2 Maintenance should include checks and operations to ensure:

- exposed membrane is free from the build-up of silt and other debris
- integrity of the joints in the membranes
- integrity of the detailing.

11 Durability



Under normal conditions, the products will have a life in excess of 35 years.

12 Reuse and recyclability

The products comprise PVC and glass, which can be recycled.

Installation

13 General

13.1 Installation of Sikaplan G and VG Mechanically Fastened Membranes must be carried out by trained and licensed installers in accordance with the Certificate holder's instructions, the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005, and this Certificate.

13.2 The products may be laid in conditions normal to roofing work and should not be laid in wet or damp weather, nor at temperatures below 5°C, unless suitable precautions are taken.

13.3 Deck surfaces should be clean, dry and free from sharp projections such as nail heads and concrete nibs. The products are not compatible with bitumen, coal tar, pitch or oil-based products, and contact with such materials must be avoided. Where necessary, the appropriate separation layer must be interposed between the substrate and the membranes to avoid such contact. The requirement of a vapour control layer should be established in accordance with BS 6229 : 2018 and the Certificate holder's instructions.

13.4 The products may be applied over insulation boards, provided the insulation material has been fixed to the substructure by methods that will not impair the performance of the membranes. EPS/XPS insulation boards require a suitable isolating layer to prevent the risk of plasticiser migration. The boards must be firm, of uniform density and, where appropriate, capable of spanning the deck flute space under foot traffic.

14 Procedure

14.1 The products should be unrolled over the substrate, on top of any protective or isolating layer, taking care to remove any folds or ripples. The edge overlap with adjacent sheets must be 100 mm minimum.

14.2 The position of the fixing elements and the number of fixings required must be in accordance with the specifications and the Certificate holder's instructions.

14.3 When pressure plates are used, the products should be fixed in the joint overlaps. The plates must be installed with their longitudinal side parallel to the outer edge of the membrane sheet a minimum of 10 mm from the edge. The adjacent sheet is overlapped by a minimum of 100 mm width and jointed with a hot-air weld as recommended by the Certificate holder.

14.4 At the edges, the products should be fixed with mechanical fixings or solvent, or hot-air welding to laminated profiles and lap jointed as described in sections 14.6 to 14.14.

14.5 At upstands, the membranes should be welded to laminated profiles, mechanically fixed or bonded with Sarnacol 2170.

Solvent welding

14.6 Welding must be carried out using Sika THF Welding Agent. The THF chemical used in welding laps has a low flashpoint and, where it is to be used in enclosed spaces, adequate ventilation must be provided.

14.7 The lap joint areas on both sheets are cleaned to a minimum width of 50 mm and then dried.

14.8 Both surfaces are coated with Sika THF Welding Agent, to a minimum width of 30 mm and welded together. The welded laps are consolidated by the application of firm, even pressure to ensure a watertight seal.

14.9 All seams must be tested at least 15 minutes after welding using a metal probe drawn along the seam edge to confirm the integrity of the welded areas.

14.10 Finally, all laps have a bead of Sika PVC Solution applied to the exposed edge and injected into voids to close capillaries.

Hot-air welding

14.11 Welding can be carried out by automatic or hand-operated hot-air welding machines, with a temperature set in accordance with the Certificate holder's instructions.

14.12 Lap joint areas on both sheets must be cleaned, using a cleaner recommended by the Certificate holder, if the surface has become badly contaminated.

14.13 The welded area in the seam should not be less than 40 mm wide. When using a hand-held welding machine, the seam must be rolled immediately using a seam roller.

14.14 All seams must be tested, at least 15 minutes after welding, with a metal needle drawn along the seam edge to highlight poorly welded areas. These must be rectified immediately using hot-air welding techniques.

Flashing

14.15 A range of profiles and shapes can be fabricated from Metal Sheets for application to parapet, edge and gully details. These are mechanically fixed to the substructure and the membranes are continuously welded to them.

15 Repair

In the event of damage, repairs must be carried out in accordance with the Certificate holder's instructions. A patch of the relevant membrane is applied, extending at least 50 mm beyond the defect. The damaged area is cleaned back to the unweathered material and the patch is hot-air or solvent welded to the roofing sheet.

16 Tests

An assessment was made of data to EN 13956 : 2012 in relation to:

- dimensions and tolerances
- water vapour transmission
- tensile strength and elongation
- tear resistance
- low-temperature flexibility
- resistance to impact
- resistance to static loading
- joint strength
- watertightness
- dimensional stability.

17 Investigations

17.1 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.

17.2 Existing data on the fire performance of the membranes were examined.

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

17.4 Visits were made to existing sites to assess the products' performance in use.

17.5 Existing data on the mechanical fixings, and wind uplift testing on the mechanically fixed products, from WSP (Aachen), were assessed.

17.6 A survey of known users of Sikaplan G membrane was carried out to assess the products' performance in use.

Bibliography

BS 6229 : 2018 *Flat roofs with continuously supported coverings — Code of practice*

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

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

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

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*

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

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

18 Conditions

18.1 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.

18.2 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.

18.3 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.

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

18.5 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.

18.6 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.