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Agrément Certificate
15/5218
Product Sheet 1

SIKA WATERPROOFING MEMBRANES

SIKAPLAN WP 1100-21HL

This Agrément Certificate Product Sheet⁽¹⁾ relates to SikaPlan WP 1100-21HL⁽²⁾, for use as a damp-proofing and waterproofing membrane for solid concrete floors, tunnels and underground structures and for internally- and externally-applied tanking below ground.

(1) Hereinafter referred to as 'Certificate'.

(2) SikaPlan is a registered trademark.

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

Resistance to water and water vapour — the product, including joints, will resist the passage of moisture into a structure (see section 6).

Resistance to mechanical damage — the product will accept, without damage, the limited foot traffic and loads associated with installation and the effects of thermal or other minor movement likely to occur in practice (see section 7).

Durability — under normal service conditions the product will provide an effective barrier to the transmission of moisture for the life of the structure in which it is incorporated (see section 9).



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'Simon Wroe'.

Date of First issue: 22 May 2015

Simon Wroe
Head of Approvals — Engineering

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, SikaPlan WP 1100-21HL, 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:	C2(a)	Resistance to moisture
Comment:		The product, including joints, will enable a structure to satisfy this Requirement. See section 6.1 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The product is acceptable. See section 9 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The product satisfies the requirements of this Regulation. See section 9 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	3.4	Moisture from the ground
Comment:		The product will enable a floor to satisfy the requirements of this Standard, with reference to clauses 3.4.1 ⁽¹⁾⁽²⁾ , 3.4.2 ⁽¹⁾⁽²⁾ , 3.4.5 ⁽¹⁾⁽²⁾ and 3.4.7 ⁽¹⁾⁽²⁾ . See section 6.1 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The product 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:		All comments given for this product 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

Regulation:	23(a)(i)(iii)(b)(i)	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 9 and the <i>Installation</i> part of this Certificate.
Regulation:	28(a)	Resistance to moisture and weather
Comment:		The product will enable a floor to satisfy this Regulation. See section 6.1 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, Principal Designer/CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 1 *Description* (1.2) of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of SikaPlan WP 1100-21HL, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 5.1 *Substructure and ground bearing floors*, clauses M8 *Damp-proof membrane* (for use below the slab and in sandwich constructions) and M10 *Tanking materials* (for use as part of an external basement tanking system).

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13967 : 2012 and BS EN 13491 : 2004. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 SikaPlan WP 1100-21HL is a homogeneous polyvinyl chloride (PVC-P) sheet waterproofing membrane with a yellow top surface, a 0.6 mm thick signal layer, and a dark grey bottom surface.

1.2 The product has the following nominal characteristics:

Thickness (mm)	2.0
Length (m)	20.0
Mass per unit area (kg·m ⁻²)	2.6
Width (m)	2.2
Roll weight (kg)	114.4
Watertightness*	Pass
Tear resistance* (N)	≥ 500
Joint strength* (N per 50 mm)	≥ 1100
Resistance to impact* (mm)	≥ 750
Tensile strength* (N·mm ⁻¹)	
MD	≥ 15
CD	≥ 14
Resistance to static loading* (kg)	≥ 23.5

1.3 Ancillary items for use with the product but outside the scope of this Certificate include:

- SikaPlan WP laminated metal strip F 100 — for linear fixing of the membrane
- SikaPlan WP Disc 80/10 mm — for spot fixing of the membrane
- SikaPlan WP Protection Sheet — used to protect the membrane against mechanical damage
- geotextile (minimum 500 g·m⁻²) separation layer — for use on hard substrates
- Sarna Cleaner — solvent-based cleaner for preparation of the membrane surface prior to welding
- Sika-Trocal Cleaner 2000 — solvent-free cleaner for preparation of the membrane surface prior to welding.

2 Manufacture

2.1 The membrane is manufactured by conventional manufacturing processes of mixing, extrusion and calendaring.

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 BS EN ISO 9001 : 2008 by SQS (Certificate 31982).

3 Delivery and site handling

3.1 The product is delivered to site in rolls wrapped in polythene film with a self-adhesive label bearing the Certificate holder's name and traceability information. The rolls have a shelf life of 12 months from the date of production.

3.2 The rolls should be stored in a horizontal position, in dry conditions and at temperatures between 5°C and 25°C. They must be protected from direct sunlight, rain, snow and ice.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on SikaPlan WP 1100-21HL.

4 Use

4.1 SikaPlan WP 1100-21HL is satisfactory for use as a damp-proofing and waterproofing membrane for solid concrete floors, tunnels and underground structures and for internally- and externally-applied tanking below ground in accordance with the relevant clauses of CP 102 : 1973, Section 3, and all grades of basement constructions as defined in Table 2 of BS 8102 : 2009, provided they are fully supported and protected.

4.2 The product is compatible with concrete, shotcrete, smooth brickwork and blockwork and screeded substrates, and is resistant to those chemicals likely to be present in normal service conditions. Care must be taken to prevent contact with hydrocarbons.

4.3 A geotextile (minimum $500 \text{ g}\cdot\text{m}^{-2}$) separation layer must always be used between the substrate and SikaPlan WP 1100-21HL.

4.4 The product must always be fully protected immediately after installation, in accordance with the Certificate holder's instructions.

5 Practicability of installation

The product should only be installed by installers who have been trained and approved by the Certificate holder.

6 Resistance to water and water vapour



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

6.2 The product is impervious to water and will provide a waterproof layer capable of accepting minor structural movements without damage.

7 Resistance to mechanical damage

7.1 When installed, the membrane is capable of accommodating the minor movements likely to occur under normal service conditions.

7.2 Results of tests indicate that the product can accept the limited foot traffic and light loads associated with installation and maintenance.

7.3 The membrane can be damaged by sharp objects, and care should be taken particularly when the membrane is exposed during construction and back filling or screeding operations.

7.4 Provided sufficient care is taken, the membrane will not be damaged by normal foot traffic during construction.

8 Maintenance

As the product is confined and has suitable durability, maintenance is not required. Any damage occurring during installation must be repaired in accordance with section 12 prior to concrete placement.

9 Durability



The product, when fully protected and subjected to normal service conditions, will provide an effective barrier to the transmission of water and water vapour for the life of the structure in which it is incorporated.

Installation

10 General

10.1 SikaPlan WP 1100-21HL must be installed in accordance with the relevant requirements of BS 8102 : 2009, BS 8000-4 : 1989, CP 102 : 1973, Section 3, this Certificate and the Certificate holder's instructions.

10.2 Concrete, shotcrete or screeded surfaces must have a smooth and uniform finish and be dry and free from loosely-adhering material, sharp protrusions, dust, oil and grease.

10.3 Vertical surfaces of brickwork, blockwork and, if necessary, masonry should be rendered to provide an even surface. Brickwork or blockwork not rendered must be flush pointed to give a smooth surface without sudden changes in level.

10.4 SikaPlan WP 1100-21HL is not resistant to permanent contact with materials including bitumen and plastics other than PVC, and will require a separation layer of non-woven geotextile (minimum $500 \text{ g}\cdot\text{m}^{-2}$).

10.5 The membrane is not UV stabilised and cannot be installed on structures permanently exposed to UV light and weathering.

10.6 Installation should not be carried out during inclement weather (eg rain, fog or snow). When the temperature is below 5°C , suitable precautions against surface condensation must be taken.

10.7 SikaPlan WP 100-21HL must be protected against hard substrates with a non-woven geotextile (minimum 500 g·m⁻²) separation layer.

10.8 The geotextile must be loose laid and mechanically fixed using SikaPlan WP laminated metal strip or disc, with overlaps of a minimum of 100 mm in accordance with the Certificate holder's instructions.

10.9 The membrane is spot heat welded to the SikaPlan WP laminated metal strip or disc.

10.10 All membrane overlaps must be welded by using an automatic heat welding machine with controlled welding temperatures, in accordance with the Certificate holder's instructions.

10.11 The integrity of the overlaps must be checked in accordance with the Certificate holder's instructions.

10.12 The watertightness of the structure must be tested and approved after completion of the membrane installation works according to the requirements of the client's specification.

10.13 SikaPlan WP Protection Sheet must be used to prevent damage to the membrane.

10.14 For all existing details, such as pipe penetrations, shaft connections, pits, pile heads, expansion joints and any other details, the Certificate holder's advice must be sought.

11 Procedure

Waterproofing termination details

11.1 The membrane must be terminated a minimum of 1.0 m above the maximum groundwater level and a minimum of 0.15 m above ground level. If the height of vertical waterproofing does not exceed 4.0 m, it may be linear-fixed at terminations at the top of loose-hanging membranes (with the exception of compartment systems with waterstops). Waterproofing which exceeds 4.0 m high requires intermediate linear or spot fixings at maximum vertical distances of 2.0 m.

Fixings on vertical areas with SikaPlan WP laminated metal strips

11.2 SikaPlan WP laminated metal strips (size 100 mm x 2000 mm with mounting holes of 5 mm diameter at 150 mm centres) must be fixed horizontally and at a vertical distance of maximum 2.0 m on the loose-hanging geotextile, leaving a gap of 5 mm between each strip. The strips must be fixed with countersunk screws (diameter 4.5 mm/length 20 mm, stainless steel) and dowels into reinforced concrete. The gaps between the profiles must be covered with 20 mm adhesive tapes. The profiles must not cross expansion joints.

Spot fixing with SikaPlan WP Disc on shotcrete

11.3 The membrane and geotextile separation layer are fixed to shotcrete or concrete using SikaPlan WP Discs, with a nail gun (for shotcrete) or dowels inserted into pre-drilled holes (for concrete), using a minimum of two fixings per 2 m both horizontally and vertically.

Vertical waterproofing

11.4 Surfaces of geotextiles, mounted metal profiles etc must be checked for loose debris or sharp projections prior to membrane installation. The membrane is unrolled and installed vertically on walls according to the chosen fixing method, ie PVC-laminated metal strips/profiles, heat-welding on laminated metals, aluminium profiles or aluminium strips.

11.5 The membrane is cut to the approximate size required, with minimum overlaps of 80 mm, and fixed with the chosen fixing method at terminations and at intermediate fixing points on the wall. This is repeated with the next roll of membrane, and vertical overlaps are heat-welded from the bottom to the top. The installed membrane is welded at prepared details, eg penetrations.

Horizontal waterproofing

11.6 Surfaces of geotextiles and mounted metal profiles etc must be checked for loose debris and sharp projections prior to membrane installation.

11.7 The membrane is cut to the approximate size required, with allowance made for 80 mm overlaps. The cut section is unrolled, placed in position and temporarily ballasted, eg with sandbags, and the process is repeated with the next sheet.

Welding methods

11.8 Welding machine operators must be trained and experienced in heat-welding technology according to local regulations.

11.9 SikaPlan WP 100-21HL waterproofing membranes must be welded by using suitable heat-welding machines.

11.10 Seam overlaps of membrane must in all cases be at least 80 mm, and the width of the finished welded seam (single or double seam) must be at least 30 mm.

11.11 Before welding commences, the membrane surfaces must be dry, clean, and free from dust, oil, grease and other contaminants. If contaminated, the membrane can be cleaned using Sarna Cleaner or Sika-Trocal Cleaner 2000.

11.12 Prior to any heat-welding work a welding test must be conducted on a specimen of membrane, in order to adjust the welding temperature and speed of the machine.

Testing of welded seams

11.13 All welded seams must be tested for water-tightness. Testing methods depend on available testing equipment and/or the client's specification.

11.14 Correctly heat-welded single seams show a continuous welding 'rope' at seam edge. The finished seam should be checked by running a screwdriver head along the seam applying slight pressure, and visually checking for irregular or interrupted rope which can be the sign of voids or capillaries in the seam.

11.15 Any voids or capillaries must be rectified using a hand-held welding gun and 20 mm silicone roller at welding temperature.

11.16 All double seams must be tested with a compressed air testing kit, and any leaks repaired by heat welding a patch of membrane over the defective area, using a hand-held welding gun.

11.17 Any voids or capillaries must be rectified using a hand-held welding gun and 20 mm silicone roller at welding temperature.

Detailing and service penetrations

11.18 Consideration must be given to detailing and all service penetrations in tanking installations. The advice of the Certificate holder must be sought.

12 Repair

12.1 Any damage to the product can be sealed on the internal side of the membrane with heat-welded SikaPlan WP 1100-21HL, overlapped by at least 80 mm.

12.2 Any repairs to the product must be done prior to concrete placement. The advice of the Certificate holder must be sought.

Technical Investigations

13 Tests

13.1 Tests were carried out on the SikaPlan WP 1100-21HL membrane and the results assessed to determine:

- thickness and mass per unit area
- length, width and straightness
- visible defects
- watertightness*
- watertightness of joints
- resistance to impact*
- dimensional stability
- tear resistance*
- joint strength*
- water vapour transmission
- resistance to static loading*
- resistance to static puncture
- tensile strength* and elongation at break
- low temperature flexibility
- watertightness* after heat ageing at 70°C for 12 weeks, and after water exposure at 60°C for 7 days
- tear resistance* after heat ageing at 70°C for 12 weeks, and after exposure to alkali at 23°C for 28 days
- joint strength after heat ageing at 70°C for 12 weeks and after water exposure at 60°C for 7 days
- tensile strength* and elongation at break after heat ageing at 70°C for 70 days.

13.2 An evaluation of existing independent test data was carried out in relation to:

- water permeability*
- burst strength
- resistance to oxidation*
- resistance to environmental stress cracking.

14 Investigations

14.1 An evaluation of a site in progress was made to assess the practicability of installation.

14.2 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 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS 8102 : 2009 *Code of practice for protection of below ground structures against water from the ground*

BS EN 13491 : 2004 *Geosynthetic barriers — Characteristics required for use as a fluid barrier in the construction of tunnels and underground structures*

BS EN 13967 : 2012 *Flexible sheets for waterproofing — Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet — Definitions and characteristics*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

Conditions of Certification

15 Conditions

15.1 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.

15.2 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.

15.3 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.

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

15.5 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.

15.6 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.