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Construction

Sikaplan® WP 1100-20HL

(Sikaplan®-14.6 gelb/schwarz)

Sheet waterproofing membrane – Tunnel

Product Description	Sikaplan® WP 1100-20HL is a homogenous sheet waterproofing membrane, based on polyvinyl chloride (PVC-P) with a signal layer.
Uses	Sheet waterproofing membrane for use in tunnels and other underground structures.
Characteristics / Advantages	■ Highly resistant to ageing ■ High tensile strength and elongation ■ High resistance to mechanical impact ■ High dimensional stability ■ Resistant to root penetration and micro-organism ■ Resistant to all natural aggressive mediums in ground water and soil ■ Suitable for contact with soft water (aggressive to concrete) ■ High water vapour transmission ability ■ High flexibility in cold temperatures ■ Hot air weldable ■ Can be installed on damp and wet substrates

Tests

Approval / Standards	Product Declaration EN 13491 – Geosynthetic barriers – Characteristics required for use as a fluid barrier in the construction of tunnels and underground structures. CE-Approval No. 1349-CPD. Reaction to fire according to SIA V280-12, class 4.1

Product Data

Form

Appearance / Colours	Surface:	smooth
	Colours:	Top layer: yellow (signal layer) Bottom layer: dark grey
Packaging	Roll size:	2.20 m (roll width) x roll length (on request)
	Unit weight:	2.60 kg/m^2

Storage

Storage Conditions / Shelf-Life	Rolls must be stored in their original package, in horizontal position and in cool and dry conditions. They must be protected from direct sunlight, rain, snow and ice, etc. Product does not expire if correctly stored.

Technical Data

Product Declaration	EN 13491(2006) Mandatory for European countries	1349-CPD
Thickness	2.0 (-5/+10%) mm	EN 1849-2
Mass per Unit Area	2.600 (-5/+10%) kg/m²	EN 1849-2
Thermal Expansion	$190x10^{-6}(\pm 50x10^{-6})$ 1/K	ASTM D 696-91
Water Permeability	(liquid tightness) $< 10^{-7}$ m³ x m^{-2} x d^{-1}	prEN 14150:2001

Mechanical / Physical Properties

Tensile Strength	Machine: 17.0 (± 2.0) N/mm²	ISO 527 – 1/3/5
	Cross: 17.0 (± 2.0) N/mm²	ISO 527 – 1/3/5
Tear Strength	Machine: ≥ 42 kN/m	ISO 34 Method B; V=50 mm/min
	Cross: ≥ 42 kN/m	ISO 34 Method B; V=50 mm/min
Elongation	Machine: ≥ 300 %	ISO 527 – 1/3/5
	Cross: ≥ 280 %	ISO 527 – 1/3/5
Burst Strength	≥ 50 %	prEN 14151 D=1,0 m
Behaviour under Hydrostatic Pressure	*5bar/72h (10bar/24h)* No leakage Not CE relevant.	EN 1928 (DIN 16726-5.11)
Thermal Ageing	*(70d/70ºC)* Change of weight: ≤ 2.0 % Change of tensile strength: ≤ 20 % Change of elongation: ≤ 20 % Not CE relevant.	EN 1296 (SIA V280-8)
Static Puncture	2.35 (± 0.25) kN	EN ISO 12236
Elastic Modulus E_{1-2}	Machine and cross direction: ≤ 20 N/mm² Not CE relevant.	ISO 527-1/3
Heat Distortion Dimensional Stability	*6h/80ºC* Machine and cross direction: ≤ 2.0 % Behaviour after heat exposure: No blisters Not CE relevant.	EN 1107-2 (SIA V280-4; DIN 16726-5.13)
Low Temperature Behaviour	≤ - 20°C	EN 495-5
Weathering	Remaining tensile strength and elongation: ≥ 75 %	EN 12224, 350 MJ/m² ; ISO 527-3/5/100
Micro Organism	Change of tensile strength: ≤ 15 %	EN 12225; ISO 527-3/5
	Change in elongation: ≤ 15 %	EN 12225; ISO 527-3/5

Oxidation	Change of tensile strength: ≤ 25 % Change in elongation: ≤ 25 %	prEN 14575; ISO 527-3/5 prEN 14575; ISO 527-3/5
Environmental Stress Cracking	This method of testing is only suitable for flexible polyolefin (FPO) based materials.	ASTM D 5397-99 (EN 14576)
Impact Resistance	*(500 g)* No leakage at 750 mm Not CE relevant.	 EN 1107-2 (SIA V280-4; DIN 16726-5.12)
Long Term Compression Strength	No leakage at 7 N/mm^2 , (50h) Not CE relevant.	SIA V280-14

Resistance

Chemical Resistance	A (hydrolyses under acid conditions): Change in elongation: ≤ 10 % B (hydrolyses under alkaline conditions): Change in elongation: ≤ 10 % D (artificial disposal water): Change in elongation: ≤ 10 %	 EN 14414: 2004-08; ISO 527-3/5 EN 14414: 2004-08; ISO 527-3/5 EN 14414: 2004-08; ISO 527-3/5
Behaviour after Storage in Warm Water	*8mt/50ºC* Change of weight: ≤ 4.0 % Change of tensile strength: ≤ 20 % Change of elongation: ≤ 20 % Not CE relevant.	 EN 1296 (SIA V280-13)
Reaction to Fire	Class E	EN ISO 11925-2
Resistance to Root Penetration	Pass	prEN 14416:2002
Behaviour after Storage in Aqueous Solutions	*(28d/23ºC),* H_2SO_3(5%); $Ca(OH)_2$(sat.); NaCl(10%) Change of tensile strength: ≤ 15 % Change of elongation: ≤ 15 % Not CE relevant.	 EN 1847 (SIA V280-18; DIN 16726-5.18)
Behaviour of Welding	Tensile shearing test: Break outside the welding seam Short time welding factor: fz = ≥ 0.6 Peeling resistance: ≥ 6 N/mm Not CE relevant.	 EN 12317-2 EN 12316-2

System Information

System Structure	Ancillary products: - Sikaplan® WP Disc for fixing pieces - Sikaplan® W Felt PP - Sikaplan® W Tundrain Typ A - Sikaplan® WP Protection sheet - Sika® Waterbars WP, Types AR and DR for fixing pieces and waterproofing concrete joints

Application Details

Substrate Quality	In-situ concrete: Clean, sound and dry, homogeneous, free from oils and grease, dust and loose or friable particles. Shotcrete: The profile of the shotcrete surface must not exceed a ratio of length to depth of 5:1 and its min. radius must be 20 cm. The shotcrete surface must not contain broken aggregates. Any leaks shall be sealed with Sika® waterproof plugging mortar, or drained with Sika® FlexoDrain. Where necessary to achieve the desired profile/surface, apply a fine sprayed concrete layer on the shotcrete surface with a min. thickness of 5 cm and aggregate diameter not exceeding 4 mm. Steel (girders, reinforcement mesh, anchors, etc.) must also be covered with a minimum 5 cm of fine sprayed concrete. The surface of the shotcrete and fine sprayed concrete must be cleaned (no loose stones, nails, wires, etc.).

Application Conditions / Limitations

Substrate Temperature	0°C min. / +35°C max.
Ambient Temperature	+5°C min. / +35°C max. For installation below +5°C ambient temperature, special measures for safety requirements may be required in accordance with relevant national regulations.

Application Instructions

Application Method / Tools	Installation method: Loose laid and mechanically fastened in accordance with the Sika® application manual and installation instructions. All membrane overlaps must be welded i.e. using hand welding guns and pressure rollers or automatic heat welding machines, with individually adjustable and electronically controlled welding temperatures (such as the manual Leister Triac PID / automatic: Leister Twinny S / semi-automatic: Leister Triac Drive). Use Sika-Trocal® Cleaner 2000 for seam preparation and cleaning of slightly soiled membrane surface. Welding parameters, such as speed and temperature must be established with trials on site, prior to any welding works.
Notes on Application / Limitations	Installation works shall only be carried out by Sika® trained contractors, experienced in the lining of tunnels and underground structures. The water tightness of the structure must be approved after completion of the membrane installation works according to the requirements of the client's specifications. The membrane is not UV stabilised and must not be installed on structures where it is permanently exposed to UV-light and weathering.

Value Base

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

Local Restrictions

Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

Health and Safety Information

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Material Safety Data Sheet containing physical, ecological, toxicological and other safety-related data.

Legal Notes

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

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