

SINTEF Technical Approval

TG 20810

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SINTEF confirms that

SikaShield® double-layer roof waterproofing membrane

has been found to be fit for use in Norway and to meet the provisions regarding product documentation given in the regulation relating to the marketing of products for construction works (DOK) and regulations on technical requirements for building works (TEK), with the properties, fields of application and conditions for use as stated in this document



1. Holder of the approval

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2. Product description

SikaShield® double-layer roof waterproofing membrane is a double layer bituminous roofing system where the top layer is fully torched to the underlay. The double layer system consists of:

- Underlay: SikaShield® E65 S 2,5 mm
- Top layer: SikaShield® E75 MG 4,5 mm

SikaShield® E75 MG 4,5 mm consists of SBS modified bitumen with a non-woven reinforcement of Spunbond polyester and has granules on the upper side. The underside has a thin plastic film that will melt away during torching. SikaShield® E75 MG 4,5 mm can be delivered in different colours. Standard colours are grey and black.

SikaShield® E65 S 2,5 mm is a SBS modified bituminous membrane with a non-woven Spunbond polyester reinforcement and sand finishing on the upper side. The underside has a thin plastic film that will melt away during torching.

Measures and tolerances for the two membranes are given in table 1.

Table 1

Measures and tolerances for SikaShield® E75 MG 4,5 mm and SikaShield® E65 S 2,5 mm according to EN 1848-1 and EN 1849-1

Property	SikaShield® E65 S 2,5 mm	SikaShield® E75 MG 4,5 mm	Unit	Tolerance
Thickness	2.5	4.5	mm	± 5 %
Area weight	3.0	5.3	kg/m ²	± 10 %
Width	1	1	m	± 1 %
Length of roll	10	8	m	- 0 / + 2 %
Weight of reinforcement	ca. 150	ca. 180	g/m ²	-

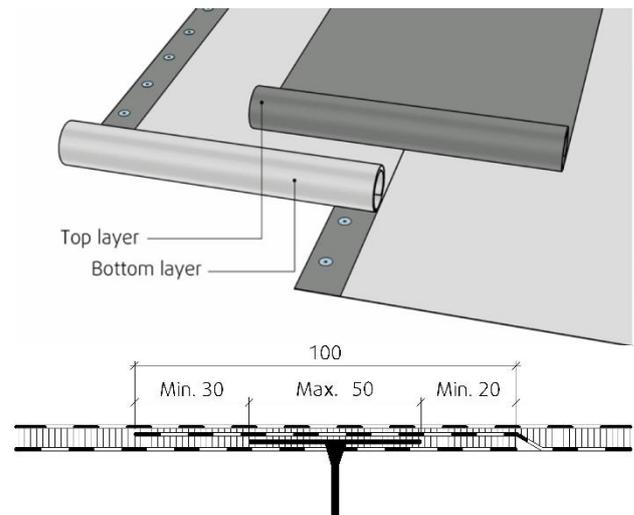


Fig 1
 SikaShield® double-layer roof waterproofing membrane. The top layer is fully bonded by welding to the mechanically fixed underlay.

3. Fields of application

SikaShield® double-layer roof waterproofing membrane can be used for covering pitched and flat roofs. It can be used both on new buildings and in rehabilitation projects. The system is designed especially for use as mechanically fixed double-layer roofing membrane, see fig. 1.

Roofs must have adequate slope to drain water from rain and melted snow. SINTEF recommends in general a minimum slope of 1:40 for all roofs.

4. Properties

Material properties

Product properties for fresh material are shown in table 2.

Properties related to fire

SikaShield® double-layer roof waterproofing membrane fulfils the requirements of class B_{ROOF} (t2) according to EN 13501-5 regarding external fire performance on substrates shown in Table 3. Testing is performed according to CEN/TS 1187, test 2.

SINTEF is the Norwegian member of European Organisation for Technical Assessment, EOTA, and European Union of Agrément, UEAtc

Table 2

Product properties for fresh material for products in SikaShield® double-layer roof waterproofing membrane

Property	Test method EN	SikaShield® E65 S 2,5 mm Underlay		SINTEF's recommended minimum performance ³⁾	SikaShield® E75 MG 4,5 mm Top layer		SINTEF's recommended minimum performance ⁴⁾	Unit	
		DoP ¹⁾	Control limit ²⁾		DoP ¹⁾	Control limit ²⁾			
Dimensional stability	1107-1	-	0.6	± 0.6	-	± 0.3	± 0.6	%	
Flexibility at low temperature	Upper face Lower face 1109	≤ -20	≤ -20 ≤ -20	≤ -15 ≤ -15	≤ -25	≤ -25 ≤ -25 ⁶⁾	≤ -15 -	°C	
Flow resistance at elevated temperature	1110	-	≥100	≥ 90	-	≥100	≥ 90	°C	
Watertightness 10 kPa/24 h	1928 (A)	-	Tight ⁷⁾	Tight	-	Tight ⁷⁾	Tight	kPa	
Adhesion of granules	12039	-	-	-	-	≤ 2.5 g ⁵⁾	≤ 2.5 g ⁵⁾	-	
Resistance to tearing (nail shank)	L T 12310-1	215 - 30 %	≥ 150	≥ 150	285 - 30 % 400 - 30 %	≥ 200 ⁶⁾ ≥ 280 ⁶⁾	--	N	
Tensile strength	L T 12311-1	750 - 20 % 600 - 20 %	≥600 ≥480	≥ 400	875 - 20 % 750 - 20 %	≥ 700 ≥ 600	≥ 400	N/50 mm	
Elongation at max load	L/T 12311-1	45 -15	≥ 30	≥ 10	45 -15	≥ 30	≥ 10	%	
Average peel resistance of joints Sidalap/Endlap	12316-1	100 ± 20 %	80	≥ 50	-	≥ 100 ⁶⁾	-	N/50 mm	
Maximum peel resistance of joints ⁵⁾ Sidalap/Endlap	12316-1	-	-	-	150 ±20 %	-	-	N/50 mm	
Shear resistance of joints	Sidalap Endlap 12317-1	600 - 20 % 500 - 20 %	≥480 ≥400	≥ 400	750 -20 %	≥ 600 ⁶⁾	-	N/50 mm	
Resistance to:	Impact +23 °C Impact -10 °C Static loading	2691 (A) 12691:2001 12730 (A)	≥ 500 - 15	≥500 - 15	≥ 500 - ≥ 15	≥ 1000 - ≥ 20	≥ 1000 ≤ 10 ⁶⁾⁷⁾ ≥ 20	≥ 500 - ≥ 15	mm mm diam. kg
Watertightness after stretching at low temperature (10 % elongation at -10 °C)	13897	-	-	-	-	Tight ⁶⁾⁷⁾	-	-	

¹⁾ The manufacturers Declaration of Performance, DoP²⁾ Control limits show the values the product has to satisfy during internal factory production control and audit testing³⁾ SINTEF's recommended minimum performance in SINTEF Technical Approval for the underlay in double layer system⁴⁾ SINTEF's recommended minimum performance in SINTEF Technical Approval for the top layer in double layer system⁵⁾ Modified to give the result of weight loss of granules in gram⁶⁾ Control limit concerns SikaShield® E75 MG 4,5 mm as a one-layer system⁷⁾ Result from type testing

L = Longitudinal

T = Transversal

Table 3

SikaShield® double-layer roof waterproofing membrane has fire classification B_{ROOF} (t2) on following substrates

Type of substrate	SikaShield® double-layer roof waterproofing membrane
EPS	No
Stone wool	Yes
Wood particle board	Yes
Concrete / silicate plate	Yes
Old roofing membrane on EPS	No
Old roofing membrane on stone wool	Yes
Old roofing membrane on wood particle board	Yes
Old roofing membrane on concrete / silicate plate	Yes

Durability

SikaShield® E65 S 2,5 mm and SikaShield® E75 MG 4,5 mm have shown satisfying properties after artificial ageing in connection with type-testing and audit testing performed by SINTEF.

Fastening capacity

The design capacity for tested fasteners is given in table 4. The capacity applies to the connection between the membrane and the fasteners and is determined in form of a system test according to EN 16002.

For weak substrates the connection between the substrate and the fastener might limit the capacity. This must be considered, and only the lowest capacity for membrane or substrates must always be used.

Calculation of fasteners' spacing is carried out according to SINTEF Building Research Design Guide no. 544.206 *Mekanisk feste av asfalt takbelegg og takfolie på flate tak* and "TPF informerer nr. 5" published by Takprodusentenes Forskningsgruppe (TPF), see www.tpf-info.org.

Table 4

Design capacity at ultimate limit state for the attachment of SikaShield® double-layer roof waterproofing membrane

Fastener/Fastening system, fixed in minimum 100 mm welded overlap	Design Capacity ^{1) 2)} N/fastener
SFS ISO-TAK R 45 x 65 plastic washer SFS BS-4 steel screws (soft substrate, attachment in steel plate)	511
SFSintec MW-40-FH steel washer isotak® wood screw IWF-5.2x35 (firm substrate, attachment in plywood board)	433

¹⁾ Measured according to method EN 16002, safety factor $\gamma_m=1.5$ according to EAD 030351-00-0402

²⁾ Wind load capacity is determined using a partial factor of $\gamma_m=1.5$. During a transitional period until January 1, 2028, designers may choose to use wind load capacities recalculated with a partial factor of $\gamma_m=1.3$.

5. Environmental aspects

Substances hazardous to health and environment

The product contains no hazardous substances with priority in quantities that pose any increased risk for human health and environment. Chemicals with priority include CMR, PBT or vPvB substances.

Effect on soil, surface water and ground water

The leaching properties of the product are evaluated to have no negative effects on soil or water.

Waste treatment/recycling

The product shall be sorted as residual waste. The product shall be delivered to an authorized waste treatment plant for energy recovery.

6. Special conditions for use and installation

Installation

The underlay SikaShield® E65 S 2,5 mm shall be mechanically fastened with overlaps of minimum 100 mm which are welded over the entire width. The fasteners must be positioned about 50 mm from the edge of the sheet to provide minimum 20 mm bonding on the inside and minimum 30 mm bonding on the outside of the fastener. The number of fasteners along the overlap must be in accordance with the wind uplift forces and not less than one every 300 mm. The transverse joints of the underlay shall be mechanically fastened. The underlying corner is fastened, and the overlying corner is cut at an angle. A good result is achieved by 'drowning' the surfaces in bitumen before the joint is fully welded.

The top layer SikaShield® E75 MG 4,5 mm shall be installed with 120 mm welded overlaps and the sheets shall be fully welded to the underlay SikaShield® E65 S 2,5 mm. The longitudinal overlaps of SikaShield® E75 MG 4,5 mm shall be positioned on the middle of the underlay, see fig. 1.

Before welding of any overlaps the membrane shall be rolled out and positioned. The overlaps have to be welded with a burner or with a welding machine. Transverse joints are performed with 150 mm overlaps for both the underlay and top layer.

The roofing membrane shall generally be installed in accordance with the vendor's installation manual and the principles shown in SINTEF Building Research Design Guide no. 544.203 *Asfalttakbelegg. Egenskaper og tekking, 544.204 Tekking med asfalttakbelegg eller takfolie.*

Detaljløsninger and 544.206 *Mekanisk feste av asfalttakbelegg og takfolie på flate tak*, plus "TPF informerer nr. 5" published by Takprodusentenes Forskningsgruppe (TPF), see www.tpf-info.org.

Fasteners

Normal steel washers may be used in longitudinal overlapping joints on firm substrates such as wood-based roof sheathing or concrete.

On substrates of thermal insulation with compressive strength ≥ 80 kN/m² (level CS(10)80 according to EN 13162/13163) steel washers with deep collars or plastic washers should be used.

Washers with integrated sleeves and good telescopic function must be used for installation on thermal insulation with lower compression strength, and the tightening of the fasteners must particularly be checked.

Substrate

When a fire classification is required the substrate must be in accordance with the provisions stated in clause 4 regarding *Properties related to fire*.

Traffic on the roof

Special precautionary measures should be taken to protect the roofing membrane if the roof is expected to have more traffic than is necessary for inspection and maintenance purposes only.

Cleaning and maintenance

Before starting any welding, as a part of repair work, the roofing membrane must be cleaned locally, in accordance with the manufacturer's guidelines.

Transport and storage

SikaShield® E65 S 2,5 mm and SikaShield® E75 MG 4,5 mm must be stored upright on pallets or on a smooth, flat surface.

7. Factory production control

SikaShield® double-layer roof waterproofing membranes are produced in Italy for Sika Services AG.

The holder of the approval is responsible for the factory production control in order to ensure that the products are produced in accordance with the preconditions applying to this approval.

The manufacturing of the products is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

The manufacturer has a quality management system certified according to EN ISO 9001, and an environmental management system certified according to EN ISO 14001.

8. Basis for the approval

The evaluation of the products is based on reports owned by the holder of the approval.

The evaluation of design and technical solutions are based on recommendations given in SINTEF Building Research Design Guides.

9. Marking

All rolls shall be marked with producer, product name and batch number.

The products are CE marked in accordance with EN 13707.

The approval mark for SINTEF Technical Approval TG 20810 may also be used.

10. Liability

The holder/manufacturer has sole product responsibility according to existing law. Claims resulting from the use of the product cannot be brought against SINTEF beyond the provisions of Norwegian Standard NS 8402.

for SINTEF



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