SINTEF Technical Approval

TG 20934

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Amended:
Valid until 01.12.2029
Provided listed on
www.sintefcertification.no

SINTEF confirms that

SikaShield® E65 MG FR 4 mm roofing 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

Sika Services AG
Tüffenwies 16
8048 Zürich
Switzerland
www.sika.com

2. Product description

SikaShield® E65 MG FR 4 mm roofing membrane consists of SBS modified bitumen with a non-woven reinforcement of Spunbond polyester and has a top surface coated with granules. The underside has a thin plastic film that will melt away during torching. SikaShield® E65 MG RF 4 mm can be delivered in different colours. Standard colours are grey and black.

Measures and tolerances are stated in table 1.

Table 1
Measures and tolerances for SikaShield® E65 MG FR 4 mm according to EN 1848-1 and EN 1849-1

Property	Measure	Unit	Tolerance
Thickness	4.0	mm	± 5 %
Area weight	5.0	kg/m²	± 10 %
Width	1	m	± 1 %
Length of roll	8	m	- 0 / + 2 %
Weight of reinforcement	ca. 180	g/m²	-

3. Fields of application

SikaShield® E65 MG FR 4 mm roofing membrane is used as a single-layer roof waterproofing membrane 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 single-layer roofing membrane, see figure 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.

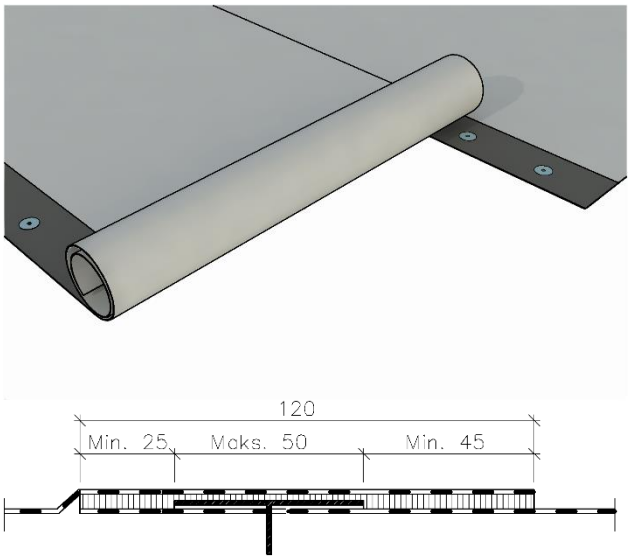


Fig. 1
SikaShield® E65 MG FR 4 mm mechanically fastened in a 120 mm fully torched or hot air welded overlap joint.

4. Properties

Product properties
Product properties for fresh material are shown in table 2.

Properties related to fire
SikaShield® E65 MG FR 4 mm fulfils the requirements of fire 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.

For more information regarding fire property requirements for the roofing, see TPF Informerer no. 6 *Branntekniske løsninger for kompakte tak og terrasser* published by Takprodusentenes Forskningsgruppe (TPF), see www.tpf-info.org.

Durability
SikaShield® E65 MG FR 4mm has shown satisfying properties after artificial ageing in connection with type testing and audit testing performed by SINTEF.

Table 2
Product properties for fresh material of SikaShield® E65 MG FR 4 mm

Property		Test method EN	SikaShield® E65 MG FR 4 mm		SINTEF's recommended minimum performance [3]	Unit
			DoP [1]	Control limit [2]		
Dimensional stability		1107-1	-	± 0,6	± 0,6	%
Flexibility at low temperature	Upper face out Lower face out	1109	≤ - 20-	≤ -20 ≤ -20	≤ -15 ≤ -15	°C
Flow resistance at elevated temperature		1110	-	≥ 100	≥ 90	°C
Watertightness 10 kPa/24 h		1928 (A)	Pass	Pass [5]	Pass	-
Adhesion of granules [4]		12039	-	≤ 2,5 g [4]	≤ 2,5 g [4]	-
Resistance to tearing (nail shank)	L T	12310-1	250 ±75 300 ±75	≥ 175 ≥ 225-	≥ 150	N
Tensile strength	L T	12311-1	≥ 600 ≥ 600	≥ 600 ≥ 600	≥ 600	N/50 mm
Elongation at max load	L/T	12311-1	45 ±15	≥ 30	≥ 10	%
Average peel resistance of joints Sidelap/Endlap		12316-1	-	≥ 150	≥ 50	N/50 mm
Shear resistance of joints	Sidelap Endlap	12317-1	≥ 600 ≥ 600	≥ 600 ≥ 600	≥ 600-	N/50 mm
Resistance to:	Impact +23 °C Impact -10 °C Static loading	12691 (A) 12691:2001 12730 (A)	≥ 1000 - ≥ 20	≥ 1000 ≤ 30 [5] ≥ 20	≥ 500 ≤ 30 ≥ 20	mm mm diam. kg
Watertightness after 10 % elongation at -10 °C		13897	-	Pass [5]	Pass	-

[1] The manufacturers Declaration of Performance, DoP
[2] Control limits show values the product has to satisfy during internal factory production control and audit testing
[3] SINTEF's recommended minimum performance in SINTEF Technical Approval for the single layer bituminous waterproofing
[4] Modified to give the result of weight loss of granules in gram
[5] Result from type testing

L = Longitudinal T = Transversal

Table 3
SikaShield® E65 MG FR 4 mm has fire classification B_{ROOF} (t2) on following substrates

Type of substrate	SikaShield® E65 MG FR 4 mm
EPS [1] [2]	No
Mineral wool [1]	Yes
Wood particle board [1]	Yes
Concrete / calcium silicate plate [1]	Yes
Old roofing membrane on EPS [2] [3]	Yes
Old roofing membrane on mineral wool	Yes
Old roofing membrane on wood particle board	Yes
Old roofing membrane on concrete / calcium silicate plate	Yes

[1] Standard substrate according to CEN/TS 1187, test 2.
[2] In case of roofing on combustible insulation (eg EPS):
See clause 6 Special conditions for use and installation, section Substrate, regarding requirements for replacement of combustible insulation to non-combustible around passages and against adjacent structures.
[3] See clause 6 *Special conditions for use and installation*, section *Substrate*, regarding requirements for the old roofing membrane.

Fastening capacity
The design capacity for the fastening of the membrane is given in table 4. The capacity applies to the connection between the membrane and the fasteners according to EN 16002.

Table 4
Design capacity at ultimate limit state for the attachment of SikaShield® E65 MG FR 4 mm roofing membrane

Fastener/Fastening system, Fastening in 120 mm welded overlap/joint	Design capacity N/fastener
SFS RP 50 plastic washer and SFS BS-4,8 screw Tested on soft substrate, attachment in 0,75 mm steel plate, f_y = 320 N/mm² Distance between fasteners: C/C 320 mm Row distance: C/C 880 mm	867 [1]

[1] Measured according to method EN 16002 and the safety factor γ_m = 1.5 according to EAD 030351-00-0402.

For weak substrates the connection between the substrate and the fastener might limit the capacity. This must be considered.

Calculation of fasteners' spacing is carried out according to SINTEF Building Research Design Guide no. 544.206 *Mekanisk innfesting av asfalttakbelegg og takfolie på skrå og flate tak* and "TPF informerer nr. 5 *Innfesting av fleksible takbelegg, dimensjonering og utførelse"* published by Takprodusentenes Forskningsgruppe (TPF), see www.tpf-info.no. It is not possible to assume increased wind load capacity by decreasing the distance between the fasteners; due to uncertainty in the type of failure, ref. EAD 030351-00-0402 Annex 1. The lowest capacity for attachment in the membrane / substrate must always be used for the calculation. The fastener capacity can be reduced if the distance between the fastener rows is increased and/or if the difference between the row distance and the fastener distance is increased

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 recycling.

Environmental declaration
No environmental declaration (EPD) has been worked out for the product.

6. Special conditions for use and installation

Installation
Mechanical fasteners shall be placed at welded overlaps with a minimum width of 120 mm. The fasteners must be positioned at a distance from the membrane edges that provides minimum 25 mm bonding on the inside and minimum 45 mm bonding on the outside of the fastener, see figure 1.

Transverse joints must have an overlap of minimum 150 mm. The underlying corner is fastened, and the overlying corner is cut at an angle. A good result is achieved by 'drowning' the granules of the surface in bitumen before the joint is fully welded.

Joints can be torched or hot air welded. TPF Informerer no. 6 Branntekniske løsninger for kompakte tak og terrasser describes which roofing methods can be used on various roof structures. When roofing with hot air or open flame all combustible insulation must in principle be protected with non-combustible insulation. However, TPF Informerer no. 6 describes exceptions for hot air welding of roofing membranes with fire class BROOF (t2).

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*
- 544.206 *Mekanisk feste av asfalttakbelegg og takfolie på flate tak*
- *525.207 Kompakte tak*

plus information sheets issued by Takprodusentenes Forskningsgruppe (TPF), see www.tpf-info.org:
- TPF informerer nr. 5 *Innfesting av fleksible takbelegg, dimensjonering og utførelse*
- TPF informerer nr. 6 *Branntekniske løsninger for kompakte tak og terrasser*
- TPF informerer *nr. 13 Tak under oppføring – forholdsregler og tiltak ved bruk*

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/m^2 (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*.

Substrates of combustible insulation, such as EPS, must be covered or divided into areas, and replaced with non-combustible insulation around bushings and adjacent constructions, such as parapets and walls, according to pre-accepted performances given in the guidance to *Forskrift om tekniske krav til byggverk § 11-9* and in TPF informerer nr. 6 *Branntekniske løsninger for kompakte tak og terrasser*.

When re-roofing, on old bituminous roofing membrane laid on insulation of EPS, the membrane in the old roofing must fulfil the requirements of class B_{ROOF} (t2) according to EN 13501-5 on EPS.

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 vendor's installation manual.

Transport and storage
SikaShield® E65 MG FR 4 mm must be transported in a manner that does not damage the product and stored upright on pallets.

7. Factory production control

SikaShield® E65 MG FR 4 mm is 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 product is produced in accordance with the preconditions applying to this approval.

The manufacturing of the product 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 SikaShield® E65 MG FR 4 mm 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.

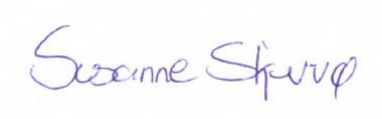
SikaShield® E65 MG FR 4 mm is CE marked in accordance with EN 13707.

The approval mark for SINTEF Technical Approval TG 20934 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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