SINTEF Technical Approval

TG 20616

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Amended:
Valid until 01.06.2031
Provided listed on
www.sintefcertification.no

SINTEF confirms that

Sopralene MF 5000 and Soprarock YEP 3600 double layer bitumen 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

SOPREMA NV
Bouwelven 5
2280 Grobbendonk
Belgium
www.soprema.be

2. Product description

Sopralene MF 5000 and Soprarock YEP 3600 is a double-layer bituminous roofing membrane of SBS modified bitumen. The bottom layer Soprarock YEP 3600 is mechanically fastened through thermal insulation into the load bearing construction. The top layer Sopralene MF 5000 is fully bonded to the bottom layer by welding. See figure 1. Measures and tolerances are shown in table 1.

Soprarock YEP 3600 has a non-woven polyester reinforcement coated with SBS modified bitumen. The upper face has a finish of talcum/sand and the underside is protected by a thermofusible film.

Sopralene MF 5000 has a reinforcement of composite polyester coated with SBS modified bitumen on both sides. The upper face is coated with slate granulate. The underside is covered with a thermofusible film that melts during welding to the underlay. Roofing can be performed with hot air or open flame.

Table 1
Measures and tolerances for Sopralene MF 5000 and Soprarorock YEP 3600 according to EN 1848-1 and EN 1849-1

Property	Underlay	Top layer	Tolerance
	Soprarock YEP 3600	Sopralene MF 5000	
Thickness	2.9 mm	4.0 mm	
Weight	3.6 kg/m^2	5.0 kg/m^2	+/- 10 %
Width	1 m	1 m	-0/+1 %
Roll length	10 m	8 m	-0/+3 %
Weight of reinforcement	Ca. 150 g/m^2	Ca.170 g/m^2	

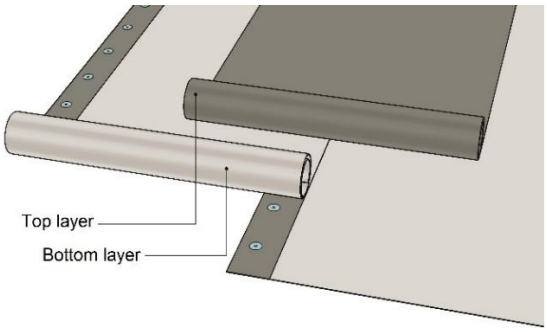

Fig. 1
Sopralene MF 5000 (top layer) and Soprarock YEP 3600 (bottom layer) double-layer bituminous roofing membrane.

3. Fields of application

Sopralene MF 5000 and Soprarock YEP 3600 double-layer bituminous roofing membranes are used on sloped and flat roofs.

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. Product performance

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

Properties related to fire
Sopralene MF 5000 and Soprarock YEP 3600 double-layer bituminous roofing membrane fulfils the requirements of class B_{ROOF} (t2) according to EN 13501-5 on substrates shown in table 3. The 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
Sopralene MF 5000 and Soprarock YEP 3600 have shown satisfying properties after artificial ageing in connection with type-testing and audit testing performed by SINTEF.

Table 2
Product properties for fresh material for products in Sopralene MF 5000 and Soprarock YEP 3600 double-layer bituminous roofing membrane

Property	Test method EN	Soprarock YEP 3600		SINTEF's recommended minimum performance[3]	Sopralene MF 5000		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	-	≤ ±0.6	≤ ±0.6	%
Flexibility at low temperature	1109-1	≤ -20	≤ -20	≤ -15	≤ -20	-20	≤ -15	°C
Flow resistance at elevated temperature	1110	-	90	≥ 90	-	≥ 90	≥ 90	°C
Water tightness 10 kPa/24 h	1928 (A)	Pass	Pass	Pass	Pass	Pass	Pass	-
Adhesion of granules [5]	12039	-	-	-	-	≤ 2.5	≤ 2.5	g
Resistance to tearing L/T (nail shank)	12310-1	200 ±25 %	≥ 150	≥ 150	270 ±25 %	≥ 202	-	N
Tensile strength L T	12311-1	650 ±20 % 500 ±20 %	≥ 480 ≥ 400	≥ 400 ≥ 400	850 ± 20 % 650 ± 20 %	≥ 680 ≥ 520	≥ 400 ≥ 400	N/50 mm
Elongation at max load L T	12311-1	35 ±15 ppt 35 ±15 ppt	≥ 20 ≥ 20	≥ 10 ≥ 10	35 ± 15 ppt 35 ± 15 ppt	≥ 20 ≥ 20	≥ 10 ≥ 10	%
Average peel resistance of joints Sidelap/Endlap	12316-1	135 ±25 %	≥ 101	≥ 50	160 ±25 %	≥ 120	-	N/50 mm
Shear resistance of joints Sidelap/Endlap	12317-1	670 ±25 %	≥ 502	≥ 400	800 ±25 %	≥ 600	-	N/50 mm
Resistance to: Impact +23 °C Static loading	 12691:2006 (A) 12730:2015 (A)	 ≥ 500 ≥ 15	 500 15	 ≥ 500 ≥ 15	 ≥ 1000 ≥ 20	 ≥ 1000 ≥ 20	 ≥ 500 ≥ 15	 mm. kg

[1] The manufacturers Declaration of performance, DoP
[2] Control limit shows values the product must satisfy during internal factory production control and audit testing.
[3] SINTEF's recommended minimum performance in SINTEF Technical Approval for the bottom layer in a double layer system
[4] SINTEF's recommended minimum performance in SINTEF Technical Approval for the top layer in a double layer system
[5] Modified to only give the result of weight loss of granules in gram, according to EN 544

Table 3
Sopralene MF 5000 and Soprarock YEP 3600 double-layer bituminous roofing membrane has fire classification B_{ROOF}(t2) on following substrates

Type of substrate	Sopralene MF 5000 + Soprarock YEP 3600
EPS	No
Mineral wool [1]	Yes
Wood particle board [2]	Yes
Concrete / calcium silicate board [3]	Yes
Old roofing membrane on EPS	No
Old roofing membrane on mineral wool [1]	Yes
Old roofing membrane on wood particle board [2]	Yes
Old roofing membrane on concrete / calcium silicate boards [3]	Yes

[1] Fire class B_{ROOF}(t2) on mineral wool applies to non-combustible substrates with density ≥ 98.5 kg/m^3.
[2] Fire class B_{ROOF}(t2) on wood particle board applies to combustible substrates with density ≥ 487 kg/m^3.
[3] Fire class B_{ROOF}(t2) on calcium silicate board applies to non-combustible substrates with density ≥ 98.5 kg/m^3.

Fastening capacity
The design capacity for the fastening of the membrane with different fasteners and premises is given in table 4.

Fastening to weaker substrates than given in Table 4 may limit capacity and must be specifically documented

Table 4
Design capacity at ultimate limit state for the attachment of Sopralene MF 5000 and Soprarock YEP 3600 double-layer bitumen membrane, with different fastening systems

Fastener/Fastening system Fastening in 100 mm welded joint	Design capacity N / fastener
SFS RP50 plastic washer and BS-4.8 screw Tested on soft substrate, attachment in 0.75 mm steel plate, fy = 320 N/mm2 Distance between fasteners: C/C 320 mm Row distance: C/C 900 mm	733 [1]
SFS SP 40 steel washer and TS 5.2x35 mm screw Tested on firm substrate, attachment in 18 mm plywood board Distance between fasteners: C/C 320 mm Row distance: C/C 900 mm	600 [1]

[1] Measured according to method EN 16002, safety factor γm=1.5 according to EAD 030351-00-0402. During a transitional period until January 1, 2028, designers may choose to use wind load capacities recalculated with a partial factor of γm=1.3

It is not possible to assume increased wind load capacity with shorter distance between the fasteners then what was tested; due to uncertainty in the type of failure, ref. EAD 030351-00-0402 Annex 1. 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. The lowest capacity for attachment in the membrane / substrate must always be used for the calculation.

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

5. Environmental aspects

Substances hazardous to health and environment

The products contain 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 products are evaluated to have no negative effects on soil or water.

Waste treatment/recycling

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

Environmental declaration

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

6. Conditions of use

General

The roofing membrane shall be installed in accordance with the manufacturer's installation manual and the principles shown in SINTEF Building Research Design Guide no.:

- 544.202 *Takfolie. Egenskaper og tekking*
- 544.203 *Asfalttakbelegg. Egenskaper og tekking*
- 544.204 *Tekking med asfalttakbelegg eller takfolie. Detaljløsninger*
- 544.206 *Mekanisk innfesting av asfalttakbelegg og takfolie på skrå og 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*

Installation

Soprarock YEP 3600 shall be mechanically fastened with overlaps of minimum 100 mm which are welded over the entire width. The fasteners must be positioned at a distance from the membrane edges that provides minimum 20 mm bonding on the inside and minimum 30 mm bonding on the outside of the fastener, see fig. 2. If necessary, the underlay can be mechanically fastened through the membrane on the outside of the overlap with minimum 100 mm wide strips or patches of Soprarock YEP 3600 over the fasteners, see fig. 3.

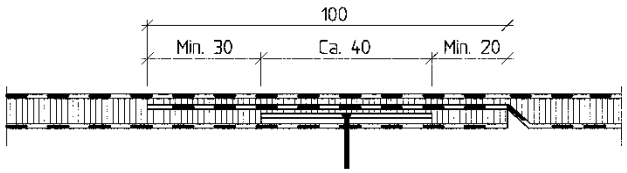

Fig. 2
Location of mechanical fastener and overlap

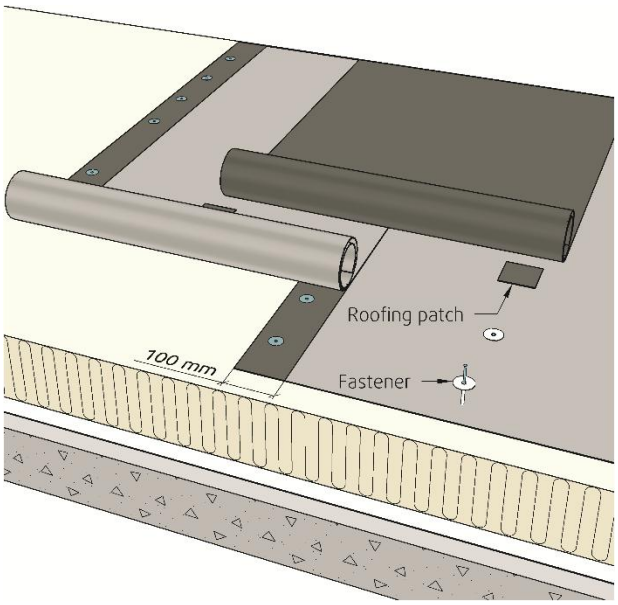

Fig. 3
If necessary, the underlay can be mechanically fastened through the membrane on the outside of the overlap with minimum 100 mm wide strips or patches of Soprarock YEP 3600 over the fasteners.

The top layer Sopralene MF 5000 shall be installed with 100 mm welded overlaps, and the sheets shall be fully welded to the underlay Soprarock YEP 3600. The longitudinal overlaps of Sopralene MF 5000 shall be positioned on the middle of the underlay, see fig. 3.

Transverse joints, in both the top layer and underlayer, 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.

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 B_{ROOF} (t2).

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 section 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 vendor's installation manual.

Transport and storage
Sopralene MF 5000 and Soprarock YEP 3600 must be transported in a manner that does not damage the product and stored upright on pallets. The products must be stored dry and tempered in freezing weather.

7. Product and factory production control

Sopralene MF 5000 is produced by Soprema NV, Bouwelven 5, B-2280 Grobbendonk, Belgium and by Soprema Polska SP z.o.o, Stefano Batorego 7, PL-05-870 BLONIE, Poland.

Soprarock YEP 3600 is produced by Soprema Polska SP z.o.o, Stefano Batorego 7, PL-05-870 BLONIE, Poland.

The holder of the approval is responsible for maintaining the factory production control to ensure that "the product" is manufactured in compliance with the preconditions upon which this approval is based.

The manufacturing of the products and the manufacturer's system for factory production control (FPC) is subject to continuous surveillance in accordance with the contract regarding SINTEF Technical Approval.

The manufacturers have 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 product's characteristics are documented in reports issued by independent bodies. The technical documentation serves as the basis for SINTEF's product assessment with respect to the product standard EN 13707, the guidelines for SINTEF Technical Approval, and recommendations as outlined in SINTEF Building Research Design Guides.

9. Marking

All rolls shall be marked with the name of the manufacturer, the product name, and the date of production.

Sopralene MF 5000 and Soprarock YEP 3600 are CE-marked in accordance with EN 13707

The approval mark for SINTEF Technical Approval TG 20616 may also be used.

10. Liability

The holder/manufacturer has sole product liability according to **current** law. Claims can only be made against SINTEF under general law or other special grounds.

for SINTEF

Ola Asphaug
Approval Manager