

SINTEF confirms that

Technoelast double-layer bituminous 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

LLC "Technoflex"
 Prizheleznodorozhnaya, 5
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 Russia
<https://en.technicol.eu/>

2. Product description

Technoelast double-layer bituminous roofing membrane is a roof waterproofing membrane system made of SBS modified bitumen. The top layer is welded fully to the underlay. The system consists of:

Underlay: Technoelast K-MS 170/3000
 Top layer: Technoelast K-PS 170/5000

Technoelast double-layer bituminous roofing membrane has a total nominal thickness of 6.5 mm. Measures and tolerances are given in table 1 and 2.

Table 1
 Measures and tolerances for Technoelast K-MS 170/3000 according to EN1848-1 and 1849-1

Property	Measure	Unit	Tolerances
Thickness	2.5	mm	±0.2 mm
Weight	3.0	kg/m ²	±0.25 kg/m ²
Width	1	m	+5 / -0 mm
Roll length	10	m	+40 / -0 mm
Weight reinforcement	ca. 220	g/m ²	-

Tabell 2
 Measures and tolerances for Technoelast K-PS 170/5000 according to EN1848-1 and 1849-1

Property	Measure	Enhhet	Tolerances
Thickness	4.0	mm	± 0,2 mm
Weight	5.0	kg/m ²	± 0,25 kg/m ²
Width	1,0	m	+5 / -0 mm
Roll length	8,0	m	+40 / -0 mm
Weight reinforcement	ca. 220	g/m ²	-

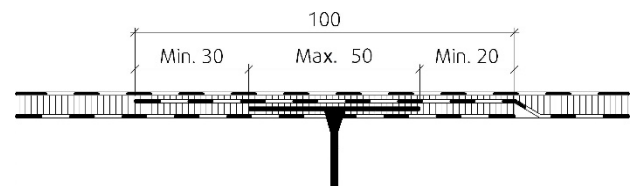
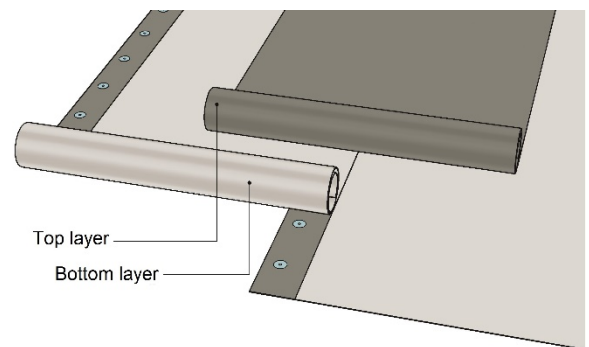


Fig. 1
 Technoelast double-layer bituminous roofing membrane's top layer fully bonded by welding to the mechanically fixed bottom layer.

Technoelast K-MS 170/3000 and K-PS 170/5000 have a reinforcement of polyester and are coated with SBS polymerasphalt on both sides.

Technoelast K-MS 170/3000 is covered on both sides with fine grained sand. The areas for overlaps are covered with a thin plastic film which melts during welding.

Technoelast K-MS 170/5000 is covered with slate granules on top. The underside is covered with a thin plastic film which melts during welding. The top layer Technoelast K-MS 170/500 shall be completely welded to the underlay Technoelast K-MS 170/3000. Technoelast K-MS 170/5000 can be supplied in different colors.

3. Fields of application

Technoelast double-layer bituminous roofing membrane is used for covering sloped and flat roofs. The system is designed specially for use as a mechanically fixed roofing membrane. See Fig. 1.

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Table 3
Product characteristics for fresh material of Technoelast K-MS 170/3000 and K-PS 170/5000

Property	Test method EN	K-MS 170/3000			K-PS 170/5000			Unit
		DoP ¹⁾	Control limit ²⁾	SINTEF's recom. minimum performance ³⁾	DoP ¹⁾	Control limit ²⁾	SINTEF's recom. minimum performance ⁴⁾	
Dimensional stability	1107-1	≤ ± 0.6-	≤ ± 0.6	≤ ± 0.6	-	≤ ± 0.6	≤ ± 0.6	%
Flexibility at low temperature, upper / lower face out	1109-1	≤ - 25	≤ - 25	≤ - 15	≤ - 25	≤ - 25	≤ - 15	°C
Flow resistance at elevated temp.	1110	≥ 90	≥ 90	≥ 90	90	≥ 90	≥ 90	°C
Water tightness 10kPa / 24t	1928 (A)	Tight	Tight	Tight	Tight	Tight	Tight	-
Adhesion of granules ⁵⁾	12039	-	-	-	-	≤ 2.5	≤ 2.5	g
Resistance to tearing, nail shank L / T	12310-1	≥ 150	≥ 150	≥ 150	180 ± 30	≥ 150	≥ 150	N
Tensile strength L T	12311-1	700 ± 100 500 ± 100	≥ 600 ≥ 400	≥ 400	700 ± 100 500 ± 100	≥ 600 ≥ 400	≥ 400	N/50 mm
Elongation at max. load L / T	12311-1	50 ± 25	≥ 25	≥ 10	50 ± 25	≥ 25	≥ 10	%
Average peel resistance of joints Sidelap / Endlap	12316-1	≥ 50	≥ 50	≥ 50	-	-	-	N/50 mm
Shear resistance of joints of joints Sidelap Endlap	12317-1	≥ 400 ≥ 400	≥ 400 ≥ 400	≥ 400 ≥ 400	-	-	-	N/50 mm
Resistance to puncture Impact at +23 °C Static load	12691 (A) 12730 (A)	≥ 500 20	≥ 500 ≥ 20	≥ 500 ≥ 15	≥ 500 ≥ 20	≥ 500 ≥ 20	≥ 500 ≥ 15	Mm kg

¹⁾ The manufacturers Declaration of performance, DoP

²⁾ Control limit shows values, product has to satisfy during internal factory production control and audit testing

³⁾ SINTEFs recommended minimum performance in SINTEF Technical Approval for bottom layer in two layer bituminous waterproofing membrane

⁴⁾ SINTEFs recommended minimum performance in SINTEF Technical Approval for top layer in two layer bituminous waterproofing membrane

⁵⁾ Modified to loss of granules in gram

L = Longitudinal T = Transversal

Technoelast double-layer bituminous roofing membrane can also be used for loosely applied, ballasted, accessible and non-accessible roofs. Examples are shown in Fig. 2 and 3. Relevant fields of applications are terraces, roofs covered with gravel, parking decks with floating floor and culverts.

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.

Other structures, such as parking decks and terraces, must have adequate slope to drain water from rain and melted snow. For inverted constructions or duo constructions the membrane can be laid horizontally when integrally casted wear layers have a slope towards gutter and drain of at least 1:100.

4. Properties

Product properties:

Product characteristics for fresh material are shown in table 3.

Properties related to fire

Technoelast double-layer bituminous roofing membrane fulfills the requirements of class B_{ROOF} (t2) according to EN 13501-5 regarding external fire performance on substrates shown in table 4. Testing is performed according to CEN/TS 1187, test 2.

Table 4

Technoelast double-layer bituminous roofing membrane achieves reaction-to-fire classification class B_{ROOF} (t2) on following substrates

Type of substrate	Technoelast double-layer
EPS *	No
Rock wool	Yes
Wooden sheeting	Yes
Concrete	Yes
Reroofing on old membrane on EPS *	No
Reroofing on old membrane on rock wool	Yes
Reroofing on old membrane on wooden sheeting	Yes
Reroofing on old membrane on concrete	Yes

*) In case of roofing on lightweight combustible insulation (eg EPS, XPS or PIR): 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.

Durability

Technoelast double-layer bituminous roofing membrane have shown satisfying properties after artificial ageing.

Fastening capacity

The design capacity for the mechanical fastening of Technoelast double-layer bituminous roofing membrane with approved fastening systems are shown in table 5. The capacity applies to the connection between the membrane and the fastener according to EN 16002.

Table 5

Design capacity in ultimate limit state for the mechanical attachment of Technoelast double-layer bituminous roofing membrane

Fastening system	Design capacity N/fastener
Koelner GOK Ø50xl with Koelner WX-4,8xL	610 ¹⁾

¹⁾ Measured according to method EN 16002 with the safety factor used in Norway $\gamma_m=1.3$.

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.

5. Environmental aspects

Substances hazardous to health and environment

Technoelast K-MS 170/3000 and Technoelast K-MS 170/5000 are containing 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 ground water.

Waste treatment/recycling

Technoelast K-MS 170/3000 and Technoelast K-MS 170/5000 shall be sorted as residual waste on the building/demolition site. 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 Technoelast K-MS 170/3000 and Technoelast K-MS 170/5000.

6. Special conditions for use and installation

Installation

The joints of Technoelast double-layer bituminous roofing membranes can be torched or hot air welded. 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.

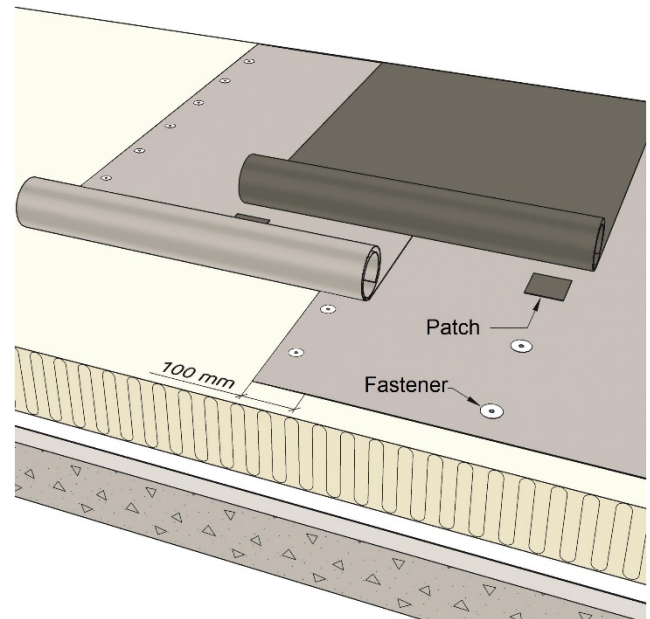


Fig. 2

Bottomlayer mechanically fixed on soft substrates with fasteners placed in the overlap. If needed, fasteners can also go through membrane outside the overlap area. These fasteners shall be covered with a patch of the top layer material.

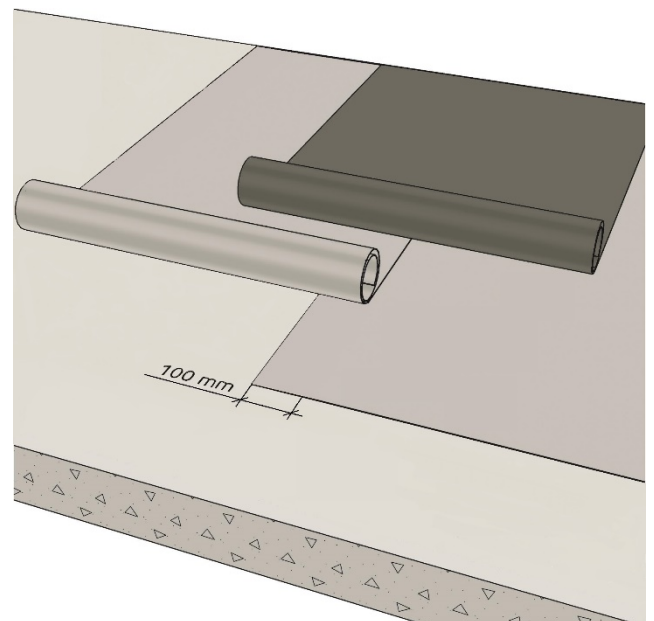


Fig. 3

On hard substrates will the bottomlayer be welded or fixed by mechanical fasteners. Thereafter will the top layer be fully bonded by welding on top of the bottomlayer

Mechanical fasteners shall be placed in welded overlaps with a minimum width of 100 mm. 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. 1.

Transverse joints must have a 150 mm overlap. 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.

Technoelast double-layer bituminous roofing membrane is also suitable to be fully welded on concrete. See Fig. 3.

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.

Substrates of combustible insulation as EPS, XPS or PIR must be covered or divided, and also replaced with non-combustible insulation around bushings and adjacent constructions according to regulations in "Veiledning om tekniske krav til byggverk" § 11-9 and further description in "TPF informerer nr. 6" *Branntekniske konstruksjoner for tak* published by Takprodusentenes Forskningsgruppe.

For re-roofing on old roofing that contains softeners as for example PVC a separate migration barrier of approximately 150 g/m² polyester felt has to be used.

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.

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.

Storage

Technoelast K-MS 170/3000 and Technoelast K-PS 5000 must be stored in an upright position on pallets.

7. Factory production control

Technoelast K-MS 170/3000 and Technoelast K-PS 5000 are produced by LLC "Technoflex", Ruberoidnaya St., 7, Leningradskaya region, Vyborg, 18804, Russia (<https://en.technonicol.eu/>). The holder of the approval is responsible for the factory production control in order to ensure that Technoelast K-MS 170/3000 and Technoelast K-PS 5000 are produced in accordance with the preconditions applying to this approval.

The manufacturing of Technoelast K-MS 170/3000 and Technoelast K-PS 5000 is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

LLC "Technoflex" has a quality management system certified by ACERT Bureau, St. Petersburg, Russian Federation according to ISO 9001, certificate no. Q-08.00.05d.

8. Basis for the approval

The evaluation of Technoelast K-MS 170/3000 and Technoelast K-PS 5000 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

The wrapping shall be marked with the name of the producer, product description and production date.

Technoelast K-MS 170/3000 and Technoelast K-MS 170/5000 product is CE marked in accordance with EN 13707.

The approval mark for SINTEF Technical Approval TG 20378 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



Hans Boye Skogstad
Approval Manager