Technical Approval

SINTEF Building and Infrastructure confirms that

Technoelast double-layer bituminous waterproof membrane

meets the provisions regarding product documentation given in Norwegian building regulations, with properties, fields of application and conditions as stated in this document

1. Holder of the approval

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2. Manufacturer

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3. Product description

Technoelast double layer waterproof membrane is a waterproof system for roofs with two layers made of SBS modified bitumen. The top layer is welded fully to the bottom layer. System contains:

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

Technoelast double layer waterproof membrane has a nominal thickness of 6, 5 mm. Measures and tolerances are given in table 1.
Technoelast K-MS 170/3000 and Technoelast K-PS 170/5000 have a reinforcement of polyester and are coated with SBS polymerasfalt on both sides.

Table 1
Measures and tolerances for Technoelast double layer waterproof membranes according to EN1848-1 and 1849-1

Property	K-MS 170/3000 bottom layer	K-PS 170/5000 top layer	Tolerances
Thickness	2,5 mm	4,0 mm	± 0,2 mm
Weight	3,0 kg/m^2	5,0 kg/m^2	± 0,25 kg/m^2
Width	1,0 m	1,0 m	+5 / -0 mm
Roll length	10,0 m	8,0 m	+40 / -0 mm
Weight reinf.	ca. 220 g/m²	ca. 220 g/m²	-

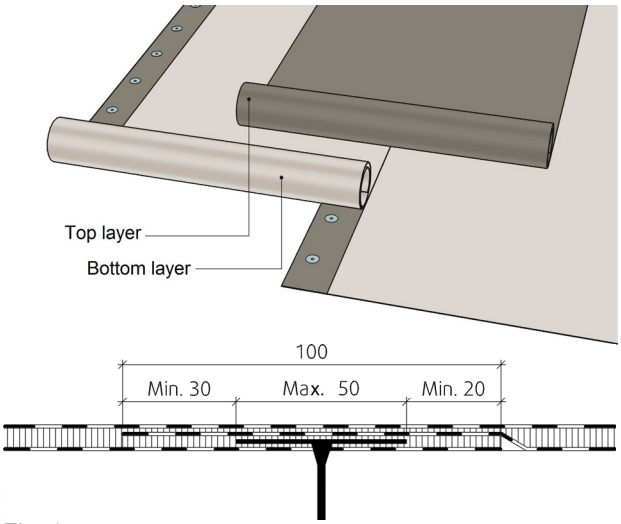

Fig. 1
Technoelast double layer waterproof membrane´s top layer fully bonded by welding to the mechanically fixed bottom layer.

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 under welding.

Technoelast K-MS 170/5000 is covered with slat granules on top. The bottom is covered with a thin plastic film which melts under welding. Technoelast can be supplied in different colors. Top layer will be completely welded to the bottom layer Technoelast K-MS 170/3000.

4. Fields of application

Technoelast double layer waterproof membrane is used as double layer membrane for covering sloped and flat roofs. The system is designed specially for use as mechanically fixed single roofing membranes. See fig. 1.

The slope of the roof must be sufficient to allow rain and melting water to drain away. SINTEF Building and Infrastructure recommends a slope of at least 1:40 for all roofs.

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Table 2
Product-properties for fresh material of Technoelast K-MS 170/3000 and K-PS 170/5000

Property	Test method	Control limit[1)]		Unit
		K-MS 170/3000 bottomlayer	K-PS 170/5000 top layer	
Dimensional stability	EN 1107 -1 :1999	≤ ± 0,6	≤ ± 0,6	%
Flexibility at low temperature upper face: lower face:	EN 1109 -1 :1999	≤ - 20 ≤ - 20	≤ - 15 ≤ - 15	°C
Flow resistance at elevated temperature	EN 1110 :1999	≥ 100	≥ 100	°C
Water tightness 10kPa / 24t:	EN 1928 :2000 (A)	Tight	Tight	-
Adhesion of granules [2)]	EN 12039 :2000	-	≤ 2,5	g
Resistance to tearing, nail shank L: T:	EN 12310 -1 :2000	≥ 180 ≥ 180	-	N
Tensile strength L: T:	EN 12311 -1 :2000	≥ 700 ≥ 500	≥ 700 ≥ 500	N/50 mm
Elongation L: T:	EN 12311 -1 :2000	≥ 30 ≥ 30	≥ 30 ≥ 30	%
Average peel resistance of joints	EN 12316 -1 :2000	≥ 45	-	N/50mm
Shear resistance of joints	EN 12317 -1 :2000	≥ 400	-	N/50mm
Resistance to puncturing Impact+23 °C: Static load:	EN 12691 :2006 (A) EN 12730 :2001 (A)	≥ 700 ≥ 20	≥ 1000 ≥ 20	mm Kg

[1)] Shown values are control limits which are valid for internal control audits of the manufacturer itself and for anual controlof third body. If there is only given one value, is this valid for both directions longitudinal and transverse.
[2)] Modified to loss of granules in gram.

In general Technoelast double layer waterproof membrane can be used for accessible and non accessible roofs, green roofs, terrace roofs and parking roofs with floating floor and culverters.

5. Properties

Product-properties:

Product-properties for fresh materials are shown in table 2.

Properties related to fire

Technoelast double layer waterproof membrane fulfills the requirements of class BROOF (t2) according to EN 13501-5 for all uncombustible underlays and for hard combustible underlays. The products have been tested in accordance with CEN/TC 1187-2.

Calculation of fasteners

The capacity for anchoring the membrane with Koelner WX-4,8 roofing screw and Koelner GOK Ø50 plasticwasher with integrated sleeve is 610 N per fastener. This capacity applies to the connection between the membrane and the fastener according to EN 16002. For weak underlays the connection between the underlay and the fastener might limit the capacity. This must be considered. The lowest value for membrane/underlay must always be used.

Calculation of fastener spacing is carried out according to SINTEF Building Research Design Sheet no. 544.206 and "TPF Informs No. 5".

Durability

Technoelast double layer waterproof membrane was tested for durability belonging to technical approvals both, for type approval and for annual control. Products were tested 12 and 24 weeks in heatchamber at (70 °C) and were assessed as satisfactory. Properties on aged materials are tested on tensile strength, elongation, flexibility at low temperature and flow resistance at elevated temperature.

6. 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.

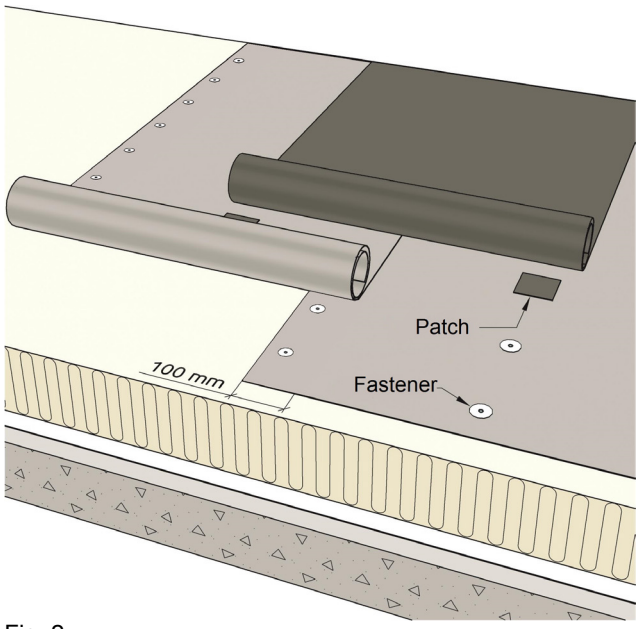

Fig. 2
Bottomlayer mechanically fixed on soft underlayers with fasteners placed in the overlap. If needed, fasteners can also go through membrane outside the overlaparea. These fasteners shall be covered with a patch of the top layer material. The Top layer shall be fully bonded by welding to the bottomlayer.

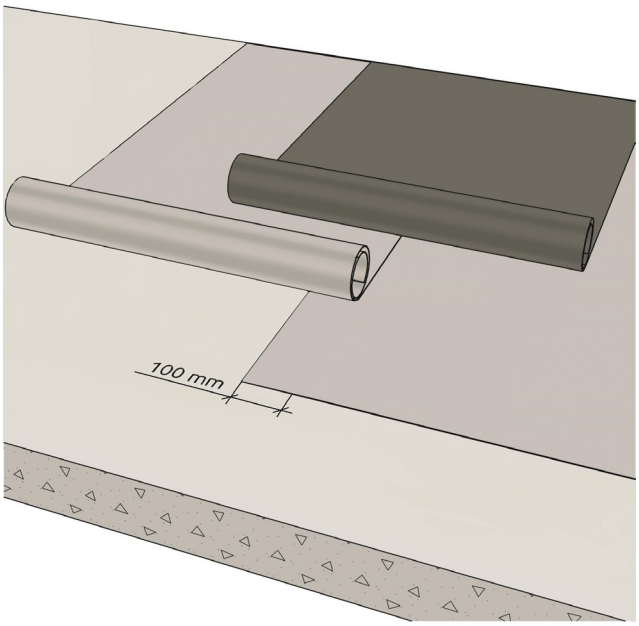

Fig. 3
On hard underlayers will the bottomlayer be welded or fixed by mechanically fasteners. Thereafter will the top layer be fully bonded by welding on top of the bottomlayer.

7. Special conditions for use and installation

Fasteners

Fastening with ordinary steel washers and skrews in longitudinal overlaps may be used on firm underlays such as woodbased sheathing or concrete.

On underlays of thermal insulation with a compression strength of at least 80 kPa/m2 (level CS (10) 80 according to EN 13162/13163), steel washers with deep collars or telescopic plastic washers should be used.

Fasteners with good telescopic effect must be used when the membrane is installed on thermal insulation materials with lower compressive strength. The tightening of the fasteners must be specially checked.

Installation

The joints of Technoelast double layer waterproof membranes can be torched or hot air welded, and shall be installed in accordance with the principles shown in SINTEF Building Design Sheets 544.203, 544.204 and 544.206 and in "TPF informs No. 5".

Mechanical fasteners will 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.

Underlay

When a fire classification is required the underlay must be in accordance with the provisions stated in section 5 "*Properties related to fire*".

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 repairing the roofing membrane, the surfaces have to be cleaned before welding starts.

Storage

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

8. Factory production control

Technoelast K-MS 170/3000 and Technoelast K-PS 5000 are subjects to supervisory factory production and product control according to contract between SINTEF Building and Infrastructure and TechnoNICOL concerning Technical Approval.

TechnoNICOL has a quality management system what is certified of ACERT Bureau, St. Petersborg, Russian Federation according to ISO 9001, certificate no: Q-08.00.05d.

9. Basis for the approval

Produktproperties have been determined by initial type testings on fresh and aged material, audit testings under anual control, documented in following reports:

- VTT Finland, Report RTE-479/04, dated 2004-02-12, Properties of Technoelast K-MS 170/3000
- VTT Finland, Report RTE-477/04, dated 2004-02-12, Properties of Technoelast K-PS 170/5000
- VTT Finland, Report RTE-787/04, dated 2004-03-09, Firetest according ENV 1187:2000, Test 2
- VTT Finland, Report RTE-790/04, dated 2004-03-09, Firetest according ENV 1187:2000, Test 2
- VTT Finland, Report RTE-4243/05, dated 2005-11-21, Properties for the double layer system
- VTT Finland, Report VTT-S-09477-06, dated 2006-10-17, Additional tests for CE-merking
- VTT Finland, Report VTT-S-00820-09, dated 2009-02-05, Properties of Technoelast K-MS 170/3000
- VTT Finland, Report VTT-S-08795-09, dated 2009-11-25, Properties of Technoelast K-PS 170/5000
- VTT Finland, Report S-05989-13, dated 2013-08-29, Properties of Technoelast K-PS 170/5000
- VTT Finland, Report S-05987-13, dated 2013-08-29, Properties of Technoelast K-MS 170/3000
- VTT Finland, Report S-06831-13, dated 2013-10-16, Properties of Technoelast K-MS 170/3000

10. Marking

Materialwrapping shall be marked with product description and production date.
The approval mark for SINTEF Technical Approval No. 20338 may also be used.

Approval mark

11. 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

12. Technical management

Project manager for this approval is Holger Halstedt SINTEF Building and Infrastructure, dep. Materials and Structures, Trondheim.

for SINTEF Building and Infrastructure

Hans Boye Skogstad
Approval Manager