KÖSTER
TPO Membranes

Technical guideline / Article Number **RT 8**
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Polyolefin based waterproofing membrane with centrally embedded glass fiber mesh

Features

KÖSTER TPO Membranes are made of flexible polyolefin.
A glass fiber mesh is embedded in the middle of the membrane to provide an especially high dimensional stability and resistance against perforation. It offers a high reliability and is characterized by a fast and economical installation. KÖSTER TPO Membranes are UV-stable, resistant to aging, microorganisms, and can be applied directly onto old bitumen membranes.

KÖSTER TPO Membranes are:

- environmentally friendly
- free of softeners and chlorine
- UV-stable
- safe for health, water, soil, and plants
- resistant to microorganisms
- highly tear resistant
- compatible with bitumen
- root resistant
- temperature and weather resistant
- recyclable
- aging and rot resistant

Technical data

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Field of application

For flat and sloped roofing structures where heat reflectance or architecture requirements dictate a light-colored surface.
Application by loose laying with ballast, mechanical fastening, or strip adhesion with KÖSTER PUR Membrane Adhesive (fleece coated membranes only).
The membrane is the final layer of the roof construction.

Application

Mechanical fastening

The most common method of installing TPO membranes is through mechanical fastening. The membrane is mechanically fastened to the roof structure, which can consist of either wooden sheathing, trapezoidal metal sheets, or a concrete slab. The membrane is generally fastened through the thermal insulation, which requires special fasteners. These fasteners have a large contact area which durably connect the membrane to the substrate. Overlapping the membranes over the fasteners prevent the penetration of water into the installation.

Loose laying with ballast

A quick and secure way to install KÖSTER TPO Membranes is through loose laying with ballast. Ballast can consist of either gravel, paving slabs, or even green roofs. Ballast helps protect the roofing membrane against wind loads and can accommodate a wide range of architectural styles.

Strip adhesion of KÖSTER TPO Membrane F

Strip adhesion to the substrate offers a time-saving installation. The KÖSTER TPO Membrane features a special fleece coating which increases the bonding of the KÖSTER PUR Membrane adhesive. This results in a high adhesive strength and creates a perfect bond to the substrate.

Welding of joints

The connection of the sheets is performed by hot air welding using automatic welding machines and manual welding tools. The membranes are plasticized in the overlapping area by the hot air flow and homogeneously connected by compressing with a roller. During this procedure a small weld seam is formed and material should flow slightly from the overlap. This should be kept as small as possible, but must be visible. The welding seam is an indicator of a secured and waterproof connection.

Technical Guidelines cited:

KÖSTER PUR Membrane Adhesive Art. Nr. RT 101

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KÖSTER Waterproofing Systems

	Material product description: Thermoplastic Polyolefine (TPO) Technical Details according to the DIN EN 13956		
Product description	**KÖSTER TPO 1.6**	**KÖSTER TPO 1.8**	**KÖSTER TPO 2.0**
Loose laying under ballast and under wear surfaces	x	x	x
Mechanically fastened, without ballast	x	x	x
Adhered with KÖSTER PUR Membrane Adhesive without ballast	-	-	-
Lamination	Centrally embedded glass fiber mesh	Centrally embedded glass fiber mesh	Centrally embedded glass fiber mesh
Color	Standard: light Grey [3]	Standard: light Grey [3]	Standard: light Grey [3]
Visible defects	passed	passed	passed
Length according to DIN EN 1848-2	20 m [1]	20 m [1]	20 m [1]
Width according to DIN EN 1848-2	2100/1500/1050/750/ 525/350/250 mm	2100/1500/1050/750/ 525/350/250 mm	2100/1500/1050/750/ 525/350/250 mm
Straightness according to DIN EN 1848-2	≤ 50 mm	≤ 50 mm	≤ 50 mm
Flatness according to DIN EN 1848-2	≤ 10 mm / 10 m	≤ 10 mm / 10 m	≤ 10 mm / 10 m
Area related weight according to DIN EN 1849-2	1560 g/m² -5% / + 10%	1740 g/m² -5% / + 10%	1960 g/m² -5% / + 10%
Nominal thickness [2]	1.6 mm	1.8 mm	2.0 mm
Effective thickness according to DIN EN 1849-2	+ / - 10%	+ / - 10%	+ / - 10%
Water tightness according to DIN EN 1928 (method B)	watertight	watertight	watertight
Reaction to liquid chemicals including water according to DIN EN 1847	passed	passed	passed
External fire exposure according to DIN V ENV 1187, DIN 4102-7	BROOF (t1) [5]	BROOF (t1) [5]	BROOF (t1) [5]
Reaction to fire according to DIN EN ISO 11925-2, DIN EN 13501-1	Class E	Class E	Class E
Resistance to shock loads (Hail) according to DIN EN 13583 *Rigid Substrate* *Flexible Substrate*	 ≥ 25 m/s ≥ 40 m/s	 ≥ 25 m/s ≥ 40 m/s	 ≥ 25 m/s ≥ 40 m/s
Peel strength of the overlap seam according to DIN EN 12316-2	Type of failure: 100% C No failure of the seam	Type of failure: 100% C No failure of the seam	Type of failure: 100% C No failure of the seam
Weld seam shear resistance according to DIN EN 12317-2	≥ 500 N / 50mm	≥ 500 N / 50mm	≥ 500 N / 50mm
Water vapor diffusion resistance according to DIN EN 1931	g = 5.8 · 10^{-9} kg / (m² / s) S_d = 136 m M = 85000	g = 5.8 · 10^{-9} kg / (m² / s) S_d = 153 m M = 85000	g = 5.8 · 10^{-9} kg / (m² / s) S_d = 170 m M = 85000
Elongation at break acc. to DIN EN 12311-2	≥ 7 N / mm²	≥ 7 N / mm²	≥ 7 N / mm²
Peel strength according to DIN EN 12316-2	≥ 500 N / 50mm	≥ 500 N / 50mm	≥ 500 N / 50mm
Peel strength according to DIN EN 12316-2 (method B)	≥ 550%	≥ 550%	≥ 550%
Resistance to shock loads according to DIN EN 12691 *Substrate Al Plate (method A)* *Substrate EPS (Method B)*	 ≥ 500 mm ≥1500 mm	 ≥ 750 mm ≥1250 mm	 ≥ 750 mm ≥1500 mm
Resistance to static loading DIN EN 12730 Method A/B	> 20 kg (tight)	> 20 kg (tight)	> 20 kg (tight)
Tear continuation resistance according to DIN EN 12310-2	≥ 150 N	≥ 150 N	≥ 200 N
Root penetration resistance [4]	given	given	given
Dimensional stability according to DIN EN 1107-2	≤ 0.2 %	≤ 0.2 %	≤ 0.2 %
Folding at low temperatures according to DIN EN 495-5	≤ - 40 °C Free of cracks	≤ - 40 °C Free of cracks	≤ - 40 °C Free of cracks
Behavior under UV irradiation, elevated temperatures, and water according to DIN EN 1297 (1000 h)	Level 0	Level 0	Level 0
Ozone resistance according to DIN EN 1844	passed	passed	passed
Behavior upon exposure to bitumen according to DIN EN 1548	passed	passed	passed

1) Special lengths available on request 2) Including lamination 3) Other colors available on request 4) Applies only to green roofs 5) Requirements are met for roofs tested by KÖSTER in Germany. Further information can be requested from KÖSTER.

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