

MACLINE[®] TMH & TDH
HIGH DENSITY POLYETHYLENE (HDPE) GEOMEMBRANES

MACLINE[®] TMH & TDH are high density polyethylene geomembranes manufactured from maximum quality polyethylene resins, and textured on one or two sides.

MACLINE[®] TMH & TDH geomembrane contains not less than 97% of pure polyethylene polymer, a carbon black content higher than 2% and antioxidants and thermal stabilizers.

MACLINE[®] TDH (both faces textured) and **TMH** (only one face textured) geomembrane have similar properties to the non textured products.

Surface: M textured one side - D textured both sides Raw Material Characteristics			
Property	Unit	Test method	Value
Membrane density (4, 7)	g/cm ³	EN ISO 1183-1	> 0.940
Melt flow index (4, 7)	g/10min	EN ISO 1133,190°C/5.0kg EN ISO 1133,190°C/2.16kg	≤ 3.0 ≤ 1.0
Carbon black content (4, 7)	%	EN ISO 11358 ASTM D4218	2.0 - 3.0
Carbon black dispersion (4, 7)	-	ISO 11420 ISO 18553	≤ 3

Durability			
Resistance to weathering @3000h (1, 7)	-	EN 12224	Reduction of tensile strength and elongation at break <25% of original values; OIT residual value >55%
Resistance to oxidation @85°C & 90days (1, 7)	-	EN 14575	
Resistance to microorganism (4, 7)	-	EN 12225	
Resistance to chemicals (4, 7)	-	EN 14415	
Resistance to leachate (4, 7)	-	EN 14414	As above with additional loss of the mass not higher than 25% of the original mass
Stress crack resistance (1, 2, 7)	h	EN 14576 ASTM D5397	400 (>336)

Colour: black Ral Code: -			
Functional Properties			
Property	Unit	Test method	Value
Low temperature brittleness (4, 7)	°C	EN 495-5	≤ -40
Dimensional stability (4, 7)	%	EN 1107-2	≤ 2
Linear thermal expansion coefficient (4, 7)	mm/mm/°C	ASTM D696	≤ 2x10 ⁻⁴
Water permeability (1, 7)	m ³ m ⁻² day ⁻¹	EN 14150	< 1 x 10 ⁻⁶
Gas permeability (1, 7)	m ³ m ⁻² day ⁻¹	ASTM D1434	≤ 2x10 ⁻³
Asperity height (4)	mm	ASTM D7466	≥ 0.9
Fire resistance (4)	-	ISO 11925-2	E

- Property included in the CE certificate and reported in the DoP of the product;
- Nominal values, in brackets minimum values;
- Tested properties; recorded values are reported on the roll certificate issued at the production date;
- Property not included in the CE certificate; the value has to be considered as informative data at the best of our knowledge;
- Maximum tolerance equal to 10%; typical value equal to 6%;
- Tolerance equal to 1% of the nominal value declared;
- Characteristics tested on the smooth side of the product, as representative of the performance also of the textured side of the membrane.

Geomembrane physical-mechanical properties				MacLine [®] TMH & TDH			
Tested Property	Unit	Test Method		150	200	250	300
Thickness (2, 3, 4, 5, 7)	mm	EN 1849-2		1.50	2.00	2.50	3.00
Roll width (4, 6)	m	EN 1848-2		8.0			
Roll length (4, 6)	m	-		variable			
Tensile properties							
• Tensile strength at yield (2, 3, 4) (4)	N/mm ² N/mm	EN ISO 527-3 5 samples 100 mm/min		17 (≥ 14) 26 (≥ 21) 10 (≥ 9)	17 (≥ 14) 34 (≥ 28) 10 (≥ 9)	17 (≥ 14) 43 (≥ 35) 10 (≥ 9)	17 (≥ 14) 51 (≥ 42) 10 (≥ 9)
• Elongation at yield (2, 3, 4)	%			12 (≥ 10)	12 (≥ 10)	12 (≥ 10)	12 (≥ 10)
• Tensile strength at break (1, 2, 3) (1, 2)	N/mm ² N/mm			18 (≥ 15) 150 (≥ 100)	24 (≥ 20) 150 (≥ 100)	30 (≥ 25) 150 (≥ 100)	36 (≥ 30) 150 (≥ 100)
• Elongation at break (2, 3)	%						
Static CBR puncture resistance (1, 2, 3)	kN	EN ISO 12236		3.5 (≥ 3.0)	4.5 (≥ 4.0)	5.5 (≥ 5.0)	6.5 (≥ 6.0)
Tear resistance (2, 4) (4)	N/mm N	ISO 34-1		130 195	130 260	130 325	130 390

For the optimisation and improvement process of the technical characteristics of the products, the producer reserves the right to modify standards and characteristics of the product without warning. The information contained herein is to the best of our knowledge accurate, but since the circumstances and conditions in which it may be used are beyond our control, we do not accept any liability for any loss or damage, however arising, which results directly or indirectly from the use of such information nor do we offer any warranty or immunity against patent infringement. Specifiers are requested to check the validity of the specification they are using.

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