

Geomembrane **ALVATECH 5002-HDPE** is manufactured by SOTRAFA S.A. (Almería-Spain), a company of the Armando Alvarez Group.

**ALVATECH 5002-HDPE** is a High Density Polyethylene liner, available in 5,8m and 7,5m and manufactured with the latest cast system technology.

**SOTRAFA** certifies that HDPE Geomembrane (ALVATECH 5002-HDPE) satisfactorily meets the quality required by standards UNE-EN 13361:2013 (reservoirs) // UNE-EN 13362:2013 (channels) // UNE-EN 13491:2013 (tunnels and underground works) // UNE-EN 13492 :2013 (dumps for liquid waste) // UNE-EN 13493 :2013 (dumps for solid waste) // UNE -EN 15382:2013 (transport infrastructure)

PROPERTIES	UNIT	HDPE GEOMEMBRANE (ALVATECH 5002-HDPE)				TEST METHOD
		HDPE Geo 1.0	HDPE Geo 1.5	HDPE Geo 2.0	HDPE Geo 2.5	
Density	g/cm <sup>3</sup>	> 0.940	> 0.940	> 0.940	> 0.940	UNE-EN ISO 1183
Melt Index (190°C, 2.16 kg) (190°C, 5 kg)	g/10 min	≤ 1.0 ≤ 3.0	≤ 1.0 ≤ 3.0	≤ 1.0 ≤ 3.0	≤ 1.0 ≤ 3.0	UNE-EN ISO 1133
Thickness	mm	1.00 ± 5 %	1.50 ± 5 %	2.00 ± 5 %	2.50 ± 5 %	UNE -EN 1849-2
Break Strength (1) Break Elongation (1) Yield Strength (1) Yield Elongation (1)	MPa % MPa %	<b>33</b> (≥ 26) <b>900</b> (≥ 700) <b>17</b> (≥ 16) <b>10</b> (≥ 8)	<b>33</b> (≥ 26) <b>900</b> (≥ 700) <b>17</b> (≥ 16) <b>10</b> (≥ 8)	<b>33</b> (≥ 26) <b>900</b> (≥ 700) <b>17</b> (≥ 16) <b>10</b> (≥ 8)	<b>33</b> (≥ 26) <b>900</b> (≥ 700) <b>17</b> (≥ 16) <b>10</b> (≥ 8)	UNE-EN ISO 527-3, Test Type 5
Static Puncture Resistance	kN	3,3	4,5	6,0	7,0	UNE-EN ISO 12236
Tear Resistance (1)	N	<b>150</b> (≥ 135)	<b>225</b> (≥ 200)	<b>300</b> (≥ 270)	<b>375</b> (≥ 335)	UNE ISO 34-1
Temperature Resistance (1)	°C	NO CRACKS				UNE-EN 495-5
Linear Expansion Coefficient	° C <sup>-1</sup>	2·10 <sup>-4</sup>	2·10 <sup>-4</sup>	2·10 <sup>-4</sup>	2·10 <sup>-4</sup>	ASTM D 696
Stability size Change measure	%	≤ <b>1,0</b> (≤1,5)	≤ <b>1,0</b> (≤1,5)	≤ <b>1,0</b> (≤1,5)	≤ <b>1,0</b> (≤1,5)	UNE-EN ISO 14632
<b>Carbon black</b> Carbon Black Content Particle Size Ashes Content Carbon Black Dispersion	% nm % -	<b>2.50</b> (2.25± 0.25) ≤ 25 ≤ <b>0,1</b> ≤ 3	<b>2.50</b> (2.25± 0.25) ≤ 25 ≤ <b>0,1</b> ≤ 3	<b>2.50</b> (2.25± 0.25) ≤ 25 ≤ <b>0,1</b> ≤ 3	<b>2.50</b> (2.25± 0.25) ≤ 25 ≤ <b>0,1</b> ≤ 3	UNE 53375-2 ISO 18553
Oxidative Induction Time (O.I.T) Standard OIT (200°C, O <sub>2</sub> , 1 atm)	min	≥ 100	≥ 100	≥ 100	≥ 100	UNE-EN 728
Oven Aging at 85°C, Standard OIT (200°C, O <sub>2</sub> , 1 atm)-% retained after 90 days.	% retained	≥ 55	≥ 55	≥ 55	≥ 55	
UV Resistance, Standard OIT (200°C, O <sub>2</sub> ,1 atm) % retained after 1600 h.	% retained	≥ 55	≥ 55	≥ 55	≥ 55	
Stress Cracking (SP-NCTL) (2)	H	≥ 400	≥ 400	≥ 400	≥ 400	UNE-EN 14576 ASTM D 5397
<b>Artificial Ageing</b> Reduction Break Elongation (2)	%	≤ 15	≤ 15	≤ 15	≤ 15	UNE-EN 12224
<b>Oven Ageing</b> Reduction Break Elongation (2)	%	≤ 15	≤ 15	≤ 15	≤ 15	UNE-EN 14575
<b>Water Absorption</b> 24 hours 6 days	% %	≤ 0.2 ≤ 1	≤ 0.2 ≤ 1	≤ 0.2 ≤ 1	≤ 0.2 ≤ 1	UNE-EN ISO 62
Root Resistance	-	No perforations	No perforations	No perforations	No perforations	CEN/TS 14416
Stagnation against gases	(m <sup>3</sup> /m <sup>2</sup> ) / (d.atm)	<2 x 10 <sup>-3</sup>	<2 x 10 <sup>-3</sup>	<2 x 10 <sup>-3</sup>	<2 x 10 <sup>-3</sup>	ASTM D 1434
Hydraulic Permeability	(m <sup>3</sup> /m <sup>2</sup> )/d	<2 x 10 <sup>-6</sup>	<2 x 10 <sup>-6</sup>	<2 x 10 <sup>-6</sup>	<2 x 10 <sup>-6</sup>	UNE-EN 14150

(1) Both directions (longitudinal and transversal) (2) Both sides.

All the values are nominal with a tolerance of ±5%. Those values between parentheses are the minimum ones required by the norm.

**We manufacture HDPE, LLDPE and VLDPE Geomembranes, with thickness between 0,75mm and 3mm, smooth or structured sheets.**

*This information is provided for reference purposes only. The values are not guaranteed. SOTRAFA is not responsible for improper use of this information or for the final use of the product if that use is not the normal application of the geomembrane. This information is subject to change without prior notice. Please contact SOTRAFA for any updated information.*