

**VITALINE**  
**High Density Polyethylene (HDPE) Geomembrane – Smooth**

Index Properties	Test Method	1,0mm	1,5mm	2,00mm	Frequency
Thickness - (min. ave.) *lowest individual of 10 values	D 5199	nom. (mm) -10%	nom. (mm) -10%	nom. (mm) -10%	per roll
Density (min.)	D 1505/D 792	0,940 g/ml	0,940 g/ml	0,940 g/ml	90 000 kg
Tensile Properties <sup>(1)</sup> (min. ave.)	D 6693 Type IV				9 000 kg
. yield stress		15 kN/m	22 kN/m	29 kN/m	
. break stress		27 kN/m	40 kN/m	53 kN/m	
. yield elongation		12%	12%	12%	
. break elongation		700%	700%	700%	
Tear Resistance (min. ave.)	D 1004	125 N	187 N	249 N	20 000 kg
Puncture Resistance (min. ave.)	D 4833	320 N	480 N	640 N	20 000 kg
Carbon Black Content (range)	D 1603 <sup>(3)</sup>	2,0 - 3,0%	2,0 – 3,0%	2,0 – 3,0%	9 000 kg
Carbon Black Dispersion	D 5596	Note <sup>(4)</sup>	Note <sup>(4)</sup>	Note <sup>(4)</sup>	20 000 kg
Oxidative Induction Time (OIT) (min. ave.) <sup>(5)</sup> minutes	D 3895	100	100	100	90 000 kg
(a) Standard OIT or					
(b) High Pressure OIT	D 5885	400	400	400	
<b>Performance Properties</b>					
Stress Crack Resistance <sup>(2)</sup>	D 5397 (App.)	300 hr.	300 hr.	300 hr.	Per GRI-GM10
Oven Aging at 85° C <sup>(5)</sup> , <sup>(6)</sup>	D 5721				per each formulation
a) Standard OIT (min. ave.) % retained after 90 days or	D 3895	55%	55%	55%	
b) High Pressure OIT (min. ave.) % retained after 90 days	D 5885	80%	80%	80%	
UV - Resistance <sup>(7)</sup>					per each formulation
a) Standard OIT (min.ave.) or	D 3895	N.R. <sup>(8)</sup>	N.R. <sup>(8)</sup>	N.R. <sup>(8)</sup>	
b) High Pressure OIT (min. ave.) % retained after 1600 hrs <sup>(9)</sup>	D5885	50%	50%	50%	

- Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction  
 - Yield elongation is calculated using a gauge length of 33 mm  
 - Break elongation is calculated using a gauge length of 50 mm
- The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.
- Other methods such as D 4218 (muffle furnace) or microwave methods are acceptable if an appropriate correlation to D1603 (tube furnace) can be established.
- Carbon black dispersion for 10 different views:  
 - 9 in categories 1 or 2 and 1 in category 3.
- The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.
- It is also recommended to evaluate samples at 30 and 60 days to compare with the 90-day response.
- The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.
- Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.
- UV-resistance is based on percent retained value regardless of the original HP-OIT value.

Lining Material Supplied by: **Engineered Linings a division of PSVI**

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