

## HI-DRILINE® SMOOTH (HDPE) Product Data Sheet

HI-DRILINE® Smooth (HDPE) is a black, high quality, high density polyethylene geomembrane produced from specially formulated, virgin polyethylene resin. The polyethylene resin is designed specifically for flexible and durable geomembrane applications. HI-DRILINE® Smooth (HDPE) contains approximately 97.5% polyethylene, 2.5% carbon black and trace amounts of antioxidants and heat stabilizers. HI-DRILINE® Smooth (HDPE) has outstanding chemical resistance, mechanical properties, environmental stress crack resistance, dimensional stability and thermal aging characteristics. HI-DRILINE® Smooth (HDPE) has excellent resistance to UV radiation and is suitable for exposed applications. These product specifications ( $\geq 0.75$  mm) meet or exceed GRI-GM 13.

Tested Property	Unit	Test Method	Values(*)				
Thickness (a)	mm	ASTM D 5199	0.5	0.75	1.0	1.5	2.0
Density	g/cm <sup>3</sup>	ASTM D 792	$\geq 0.94$	$\geq 0.94$	$\geq 0.94$	$\geq 0.94$	$\geq 0.94$
Tensile Properties (each Direction)		ASTM D 638 / D 6693; type IV					
Strength at Yield	N/mm	50 mm/min	8 <sup>(7)</sup>	13 <sup>(11)</sup>	16 <sup>(15)</sup>	24 <sup>(22)</sup>	32 <sup>(30)</sup>
Elongation at Yield	%	1 $\sigma$ = 33 mm	16 <sup>(13)</sup>	16 <sup>(13)</sup>	16 <sup>(13)</sup>	16 <sup>(13)</sup>	16 <sup>(13)</sup>
Strength at Break	N/mm	200 mm/min	17 <sup>(12)</sup>	26 <sup>(20)</sup>	33 <sup>(27)</sup>	49 <sup>(40)</sup>	66 <sup>(33)</sup>
Elongation at Break	%	1 $\sigma$ =50mm	800 <sup>(700)</sup>	800 <sup>(700)</sup>	800 <sup>(700)</sup>	800 <sup>(700)</sup>	800 <sup>(700)</sup>
Tear Resistance	N	ASTM D 1004	70 <sup>(65)</sup>	100 <sup>(95)</sup>	140 <sup>(130)</sup>	205 <sup>(190)</sup>	275 <sup>(250)</sup>
Puncture Resistance	N	ASTM D 4833	240 (160)	340 (240)	420 (320)	560 (480)	980 <sup>(960)</sup>
Carbon Black Content	%	ASTM D 1603	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0
Carbon Black Dispersion	Category	ASTM D 5596	1 / 2 <sup>(b)</sup>	1 / 2 <sup>(b)</sup>	1 / 2 <sup>(b)</sup>	1 / 2 <sup>(b)</sup>	1 / 2 <sup>(b)</sup>
Dimensional Stability (each Direction)	%	ASTM D1204 (120 °C/1h)	$\pm 2$	$\pm 2$	$\pm 2$	$\pm 2$	$\pm 2$
Melt Flow Index <sup>(c)</sup>	g/10 min	ASTM D 1238 (190 °C /5.0 kg)	$\leq 3$	$\leq 3$	$\leq 3$	$\leq 3$	$\leq 3.0$
		(190 °C /2.16 kg)	$\leq 1$	$\leq 1$	$\leq 1$	$\leq 1$	$\leq 1.0$
Stress Crack Resistance (NCTL)	h	ASTM D 5397; Appendix	$\geq 400$	$\geq 400$	$\geq 400$	$\geq 400$	$\geq 400$
Reference Property	Unit	Test Method	Values(*)				
Low Temperature Brittleness	°C	ASTM D 746	-77	-77	-77	-77	-77
Oxidative Induction Time (OIT)	min	ASTM D 3895	$\geq 100$	$\geq 100$	$\geq 100$	$\geq 100$	$\geq 100$
UV Resistance <sup>(d)</sup>		(200°C; Pure O <sub>2</sub> ; 1 atm) GRI-GM11					
HP-OIT retained after 1,600 hours <sup>(e)</sup>	%	ASTM D 5885	$\geq 50$	$\geq 50$	$\geq 50$	$\geq 50$	$\geq 50$
Roll Width (approx.)	m	-	6.95		7.5 / 6.95		
Surface	--	-	Double-sided smooth				

(\*): All values - unless otherwise noted - are nominal values. Values in brackets are minimum values within the 95% confidence interval.

(a): Tolerance:  $\pm 10\%$ ; 0.3 mm: Tolerance:  $\pm 15\%$  - Special thickness available upon request.

(b): Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be category 1 or 2. No more than 1 view from category 3.

(c): Standard test conditions: 190°C 15.0 kg.

(d): Test-Conditions: 20 hours UV cycle at 75°C followed by 4 hours condensation at 60°C; total: 1,600 hours.

(e): UV Resistance is based on percent retained value regardless of the original High Pressure - OIT value.