



# GSE HD - Product Data Sheet

(available from 0.3 – 3.0 mm)

GSE HD is a black, high quality, high density polyethylene (HDPE) geomembrane produced from specially formulated polyethylene resin. The polyethylene resin is designed specifically for flexible and durable geomembrane applications. GSE HD contains approximately 97.5% polyethylene, 2.5% carbon black and trace amounts of antioxidants and heat stabilizers. GSE HD has outstanding chemical resistance, mechanical properties, environmental stress crack resistance, dimensional stability and thermal aging characteristics. GSE HD 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 (*)				
			0.3	0.5	0.75	1.0	1.5
Thickness (a)	mm	DIN EN ISO 9863-1	0.3	0.5	0.75	1.0	1.5
Density	g/cm <sup>3</sup>	DIN EN ISO 1183-1/A	$\geq 0.94$	$\geq 0.94$	$\geq 0.94$	$\geq 0.94$	$\geq 0.94$
Tensile Properties (each Direction)		DIN EN ISO 527-3 (Type 5; 100 mm/min; l <sub>0</sub> = 50 mm)					
Stress at Yield	MPa		17 (16)	17 (16)	17 (16)	17 (16)	17 (16)
Elongation at Yield	%		8.5 (7.5)	8.5 (7.5)	10 (9)	10 (9)	11 (10)
Stress at Break	MPa		35 (26)	35 (26)	35 (26)	35 (26)	35 (26)
Elongation at Break	%		700 (600)	700 (600)	800 (700)	800 (700)	800 (700)
Tear Resistance	N	DIN ISO 34-1/B(a)	40 (35)	75 (65)	110 (95)	145 (130)	225 (210)
Puncture Resistance	N	DIN EN ISO 12236	700 (550)	1,450 (1,150)	2,150 (1,700)	2,850 (2,400)	4,150 (3,700)
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 (b)	1 / 2 (b)	1 / 2 (b)	1 / 2 (b)	1 / 2 (b)
Dimensional Stability (each Direction)	%	DIN 53377 (120 °C/1h)	$\pm 2$	$\pm 2$	$\pm 2$	$\pm 2$	$\pm 2$
Melt Flow Index (c)	g/10 min	DIN EN ISO 1133 (190 °C / 5.0 kg) (190 °C / 2.16 kg)	$\leq 3.0$ $\leq 1.0$	$\leq 3.0$ $\leq 1.0$	$\leq 3.0$ $\leq 1.0$	$\leq 3.0$ $\leq 1.0$	$\leq 3.0$ $\leq 1.0$
Stress Crack Resistance (NCTL)	h	ASTM D 5397; Appendix	$\geq 400$	$\geq 400$	$\geq 400$	$\geq 400$	$\geq 400$
Oxidative Induction Time (OIT)	min	ASTM D 3895 (200°C; Pure O <sub>2</sub> ; 1 atm)	$\geq 100$	$\geq 100$	$\geq 100$	$\geq 100$	$\geq 100$
Reference Property	Unit	Test Method	Values (*)				
Low Temperature Brittleness	°C	ASTM D 746	- 77	- 77	- 77	- 77	- 77
UV Resistance (d)		GRI-GM 11					
HP-OIT retained after 1,600 hours (e)	%	ASTM D 5885	$\geq 50$	$\geq 50$	$\geq 50$	$\geq 50$	$\geq 50$
Roll Width (approx.) (f)	m	---	7.0		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 / 5.0 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.
- (f): Roll widths and lengths have a tolerance of  $\pm 1\%$ .



GSE HD is produced at GSE Rechlin plant, Germany.

*This information is provided for reference purposes only and is not intended as a warranty or guarantee. GSE assumes no liability in connection with the use of this information. Please check with GSE for current, standard minimum quality assurance procedures. This information is subject to change without prior notice. Please contact GSE for updated information.*



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