



The Pioneer Of Geosynthetics  
S I N C E 1 9 7 2

## GSE BentoLiner NSL Geosynthetic Clay Liner

GSE BentoLiner "NSL" is a needlepunched reinforced composite geosynthetic clay liner (GCL) comprised of a uniform layer of granular sodium bentonite encapsulated between a woven and a nonwoven geotextile. The product is intended for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

### Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	VALUE (ENGLISH)	VALUE (SI)
<b>GEOTEXTILE PROPERTY</b>				
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft <sup>2</sup> (1/20,000 m <sup>2</sup> )	6.0 oz/yd <sup>2</sup> MARV <sup>(1)</sup>	200 g/m <sup>2</sup> MARV <sup>(1)</sup>
Carrier Woven, Mass/Unit Area	ASTM D 5261	1/200,000 ft <sup>2</sup> (1/20,000 m <sup>2</sup> )	3.1 oz/yd <sup>2</sup> MARV	105 g/m <sup>2</sup> MARV
<b>BENTONITE PROPERTY</b>				
Swell Index	ASTM D 5890	1/100,000 lb (50,000 kg)	24 ml/2 g min	24 ml/2 g min
Moisture Content	ASTM D 4643	1/100,000 lb (50,000 kg)	12% max	12% max
Fluid Loss	ASTM D 5891	1/100,000 lb (50,000 kg)	18 ml max	18 ml max
<b>FINISHED GCL PROPERTY</b>				
Bentonite, Mass/Unit Area <sup>(2)</sup>	ASTM D 5993	1/40,000 ft <sup>2</sup> (1/4,000 m <sup>2</sup> )	0.75 lb/ft <sup>2</sup> MARV	3.66 kg/m <sup>2</sup> MARV
Tensile Strength <sup>(3)</sup>	ASTM D 6768	1/40,000 ft <sup>2</sup> (1/4,000 m <sup>2</sup> )	30 lb/in MARV	5 kN/m MARV
Peel Strength	ASTM D 6496 ASTM D 4632 <sup>(4)</sup>	1/40,000 ft <sup>2</sup> (1/4,000 m <sup>2</sup> )	3.5 lb/in MARV 21 lb MARV	610 N/m MARV 93 N MARV
Hydraulic Conductivity <sup>(5)</sup>	ASTM D 5887	1/Week	5 x 10 <sup>-11</sup> m/sec max	5 x 10 <sup>-11</sup> m/sec max
Index Flux <sup>(5)</sup>	ASTM D 5887	1/Week	1 x 10 <sup>-8</sup> m <sup>3</sup> /m <sup>2</sup> /sec max	1 x 10 <sup>-8</sup> m <sup>3</sup> /m <sup>2</sup> /sec max
Internal Shear Strength <sup>(6)</sup>	ASTM D 6243	Periodically	500 psf Typical	24 kPa Typical
<b>ROLL DIMENSIONS</b>				
Width x Length <sup>(7)</sup>	Typical	Every Roll	15.5 ft x 150 ft	4.7 m x 45.7 m
Area per Roll	Typical	Every Roll	2,325 ft <sup>2</sup>	216 m <sup>2</sup>
Packaged Weight	Typical	Every Roll	2,600 lb	1,179 kg

#### NOTES:

- <sup>(1)</sup>Minimum Average Roll Value.
- <sup>(2)</sup>Oven-dried measurement. Equates to 0.84 lb/ft<sup>2</sup> (4.1 kg/m<sup>2</sup>) when indexed to a 12% moisture content.
- <sup>(3)</sup>Tested in machine direction.
- <sup>(4)</sup>Modified ASTM D 4632 to use a 4 in (100 mm) wide grip. The maximum peak of five specimens averaged in machine direction.
- <sup>(5)</sup>Deaired, deionized water @ 5 psi (34.5 kPa) maximum effective confining stress and 2 psi (13.8 kPa) head pressure.
- <sup>(6)</sup>Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf (9.6 kPa) normal stress.
- <sup>(7)</sup>Roll widths and lengths have a tolerance of ±1%.