



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

GSE BentoLiner CNSL Geosynthetic Clay Liner

GSE BentoLiner "CNSL" 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 with a uniform polypropylene geofilm coating applied to the woven surface to lower the hydraulic conductivity. The product is intended for applications that require excellent hydraulic conductivity properties and/or bentonite protection 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)
GEOTEXTILE PROPERTY				
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft ² (1/20,000 m ²)	6.0 oz/yd ² MARV ⁽¹⁾	200 g/m ² MARV ⁽¹⁾
Carrier Woven, Mass/Unit Area	ASTM D 5261	1/200,000 ft ² (1/20,000 m ²)	3.1 oz/yd ² MARV	105 g/m ² MARV
BENTONITE PROPERTY				
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
FINISHED GCL PROPERTY				
Bentonite, Mass/Unit Area ⁽²⁾	ASTM D 5993	1/40,000 ft ² (1/4,000 m ²)	0.75 lb/ft ² MARV	3.66 kg/m ² MARV
Tensile Strength ⁽³⁾	ASTM D 6768	1/40,000 ft ² (1/4,000 m ²)	40 lb/in MARV	7 kN/m MARV
Peel Strength	ASTM D 6496 ASTM D 4632 ⁽⁴⁾	1/40,000 ft ² (1/4,000 m ²)	3.5 lb/in MARV 21 lb MARV	610 N/m MARV 93 N MARV
Hydraulic Conductivity ⁽⁵⁾	ASTM D 5887	Periodically	5 x 10 ⁻¹² m/sec max	5 x 10 ⁻¹² m/sec max
Index Flux ⁽⁵⁾	ASTM D 5887	Periodically	1 x 10 ⁻⁹ m ³ /m ² /sec max	1 x 10 ⁻⁹ m ³ /m ² /sec max
Internal Shear Strength ⁽⁶⁾	ASTM D 6243	Periodically	500 psf Typical	24 kPa Typical
ROLL DIMENSIONS				
Width x Length ⁽⁷⁾	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 ²	216 m ²
Packaged Weight	Typical	Every Roll	2,600 lb	1,179 kg

NOTES:

- ⁽¹⁾Minimum Average Roll Value.
- ⁽²⁾Oven-dried measurement. Equates to 0.84 lb/ft² (4.1 kg/m²) when indexed to a 12% moisture content.
- ⁽³⁾Tested in machine direction.
- ⁽⁴⁾Modified ASTM D 4632 to use a 4 in (100 mm) wide grip. The maximum peak of five specimens averaged in machine direction.
- ⁽⁵⁾Deaired, deionized water @ 5 psi (34.5 kPa) maximum effective confining stress and 2 psi (13.8 kPa) head pressure.
Hydraulic Conductivity and Index Flux are performed only on a periodic basis because the polypropylene coating is essentially impermeable.
- ⁽⁶⁾Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf (9.6 kPa) normal stress.
- ⁽⁷⁾Roll widths and lengths have a tolerance of ±1%.