

BENTOGARD GEOSYNTHETIC CLAY LINER

Geosynthetic Clay Liners (GCLs) are needle-punched reinforced composites that combine geotextile outer layers with a low permeability sodium bentonite clay core. Often used as a replacement for compacted clay liners, these composites use sodium bentonite, a natural sealant that swells and seals on contact with water.

April 2023		GCL			
Style	ASTM	T366	NT366	T434	NT434
Non-woven Mass/Area	D5261	200 g/m ²	200 g/m ²	200 g/m ²	200 g/m ²
		5.9 oz/yd ²	5.9 oz/yd ²	5.9 oz/yd ²	5.9 oz/yd ²
Woven Mass/Area	D5261	105 g/m ²		105 g/m ²	
	MARV ⁽¹⁾	3.1 oz/yd ²		3.1 oz/yd ²	
Bentonite					
Bentonite Swell Index	D5890 Min	24 ml/2g			
Bentonite Fluid Loss	D5891 Max	18 ml			
Moisture Content	D4643 Max	12%			
Smectite (Montmorillonite)	XDR Min	90%			
Bentonite Geocomposite					
Bentonite Mass/Area ⁽²⁾	D5993	3.66 kg/m ²	3.66 kg/m ²	4.34 kg/m ²	4.34 kg/m ²
	MARV	0.75 lbs/ft ²	0.75 lbs/ft ²	0.89 lbs/ft ²	0.89 lbs/ft ²
Tensile Strength ⁽³⁾	D6768	10 kN/m	8.75 kN/m	10 kN/m	8.75 kN/m
	MARV	57 lbs/in	53 lbs/in	57 lbs/in	53 lbs/in
Peel Strength	D6496	610 N/m			
	Min	3.4 lbs/in			
Permeability ⁽⁴⁾	D5887 Max	5x10 ⁻⁹ cm/sec			
Index Flux ⁽⁴⁾	D5887 Max	1x10 ⁻⁸ m ³ /m ² /sec			
Internal Shear Strength ⁽⁵⁾	D6243 Typical	24 kPa 500 lbs/ft ²			
Dimensions					
Standard Width		4.4 m 14.4 ft			
Standard Length		45.4 m 149.3 ft			

(1) Minimum Average Roll Value.

(2) Oven-dried measurement. Equates to 0.84 lb/sqft (4.1 kg/sqm) when indexed to 12% moisture content.

(3) Tested in machine direction.

(4) Deaired, deionized water @ 5 psi (34.5 kPa) maximum effective confining stress and 2 psi (13.8 kPa) head pressure.

(5) Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf (9.6 kPa) normal

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Comparing Permeation Performance

Material	Perm Rate (Speed)*	Thickness (Distance)	Estimated Transit Time
Compacted Clay Liner	1×10^{-7} cm/sec	1 m (100 cm)	1×10^9 sec; 32 years
GCL	1×10^{-9} cm/sec	1 cm	1×10^9 sec; 32 years

Perm rates are measured with clean water.

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