BENTOMAT® CLT CERTIFIED PROPERTIES

CETCO® Bentomat® CLT is a reinforced geosynthetic clay liner (GCL) consisting of a layer of sodium bentonite between a polypropylene woven geotextile and a polypropylene nonwoven geotextile, which are needle-punched together and laminated to a double-sided textured polyethylene geomembrane.

MATERIAL PROPERTY	TEST METHOD	TEST FREQUENCY	CERTIFIED VALUES
Woven Base Geotextile Mass/Area[1]	ASTM D5261	200,000 ft^2 (20,000 m^2)	3.2 oz/yd^2 (108 g/m^2) min.
Nonwoven Cap Geotextile Mass/Area[1]	ASTM D5261	200,000 ft^2 (20,000 m^2)	6.0 oz/yd^2 (203 g/m^2) min.
Bentonite Swell Index[2]	ASTM D5890	1 per 50 tonnes	24 mL/2g min.
Bentonite Fluid Loss[2]	ASTM D5891	1 per 50 tonnes	18 mL max.
Bentonite Mass/Area[3]	ASTM D5993	40,000 ft^2 (4,000 m^2)	0.75 lb/ft^2 (3.7 kg/m^2) min.
Geomembrane Density[1]	ASTM D1505	200,000 ft^2 (20,000 m^2)	0.94 g/cm^3
Geomembrane Thickness[1]	ASTM D5994	200,000 ft^2 (20,000 m^2)	20 mil (0.508 mm) min.
Geomembrane Break Strength[1,4]	ASTM D6993	200,000 ft^2 (20,000 m^2)	14 lbs/in (2.5 kN/m) min.
GCL Moisture Content	ASTM D5993	40,000 ft^2 (4,000 m^2)	35% max.
GCL Grab Strength[5]	ASTM D6768	200,000 ft^2 (20,000 m^2)	30 lbs/in (5.3 kN/m) min.
GCL Peel Strength[6]	ASTM D6496	40,000 ft^2 (4,000 m^2)	3.5 lbs/in (610 N/m) min.
GCL Hydraulic Conductivity[7]	ASTM D5887	Periodic	5 x 10^{-12} m/s max.
GCL Index Flux[7]	ASTM D5887	Periodic	1 x 10^{-9} $m^3/m^2/s$ max.
GCL Hydrated Internal Shear Strength[8]	ASTM D6243	1,000,000 ft^2 (100,000 m^2)	500 psf (24 kPa) typ.@ 200 psf (9.6 kPa)

Notes:

[1] Geosynthetic property tests performed on the geosynthetic components before they are incorporated into the finished GCL product.

[2] Bentonite property tests performed before the bentonite is incorporated into the finished GCL product.

[3] Reported at 0% moisture content.

[4] Geomembrane tensile break strength performed in the machine and cross-machine directions using ASTM D6693, Type IV.

[5] GCL tensile strength testing is performed in the machine direction using ASTM D6768.

[6] ASTM D6496 performed on the needle-punch geotextile bond only. This does not apply to the geofilm laminate bond.

[7] ASTM D5887 is modified to include the laminated thin flexible membrane on the test specimen. Index flux and hydraulic conductivity testing with deaired distilled/deionized water at 80 psi (550 kPa) cell pressure, 77 psi (530 kPa) headwater pressure and 75 psi (515 kPa) tailwater pressure. ASTM D5887 (modified) testing is performed only on a periodic basis because the thin flexible membrane is essentially impermeable. Historical data is provided upon request. The Bentomat® GCL core (without the flexible membrane) has a maximum hydraulic conductivity of 5 x 10^{-11} m/s with deaired distilled/deionized water. For more information, see CETCO® Technical Reference (TR) Nos. 111 and 112.

[8] Peak values measured at 200 psf (9.6 kPa) normal stress for a specimen hydrated for 48 hours. Site-specific materials, GCL products, and test conditions must be used to verify internal and interface strength of the proposed design.