



Bentonite Geosynthetic Clay Liner(GCL)

Bentonite composite waterproof blanket is a new type of geosynthetic material. It is a blanket-like waterproof membrane made of graded natural sodium bentonite particles and corresponding additives mixed as raw materials. The bentonite particles are fixed between geotextiles and plastic woven fabrics through a needle punching process. Bentonite waterproof blanket not only has all the characteristics of geotechnical materials, but also has excellent waterproof (seepage) performance.

Bentonite is a natural clay formed by weathering of volcanic ash. Its chief constituent is the clay mineral montmorillonite. Bentonite is distinguished from other clays by its extreme fineness, highly absorbent nature and curious property of swelling in water.

Welding Steel Plastic Geogrid has great friction with soil, and the contact area of Geogrid and soil reaches more than 20%-50%. Under low strain, it can produce extremely high tensile modulus. The synergistic action of the rib to the rib has a great locking effect on the soil. With polypropylene as the main material, adding anti aging agent and other auxiliaries, through extruding and drawing forming, it becomes a high strength refined strip. It is arranged in a certain distance and vertically and horizontally, and the welding point is welded by special reinforcement bonding.



Bentonite Geosynthetic Clay Liner(GCL) Features:

- Compactness: Sodium bentonite forms a high-density diaphragm under water pressure and has strong self-retaining water properties.
- Has permanent waterproof performance.
- Easy construction and short construction period: Compared with other waterproof materials, construction is relatively simple. GCL has the shortest construction period among existing waterproof materials
- Not affected by temperature: it will not break brittlely in cold climate conditions.
- Integration: Integration of waterproof materials and objects.
- Green and environmentally friendly: Bentonite is a natural inorganic material that is harmless to the human body and has no special impact on the environment. It has good environmental performance.

[Bentonite Geosynthetic Clay Liner(GCL)]

Bentonite waterproof blanket is filled with highly expandable bentonite inside non-woven fabric, which is used to waterproof and prevent leakage in some occasions. It is filled with highly expandable sodium bentonite between a special composite geotextile and non-woven fabric. The bentonite anti-seepage mat made by acupuncture method can form many small fiber spaces so that the bentonite particles cannot flow in one direction. When exposed to water, a uniform and high-density gel-like waterproof layer is formed inside the pad, effectively preventing water leakage. Bentonite waterproof blanket is a new type of waterproof material, which is more environmentally friendly than other waterproof materials.

Geomembrane Products: Bentonite Geosynthetic Clay Liner(GCL)

APPLICATION

Specially used in artificial lake waterscapes, landfills, underground garages, rooftop gardens, pools, oil depots and chemical storage yards.

1. Municipal engineering, subway, underground engineering of buildings and anti-seepage of roof reservoirs.
2. Environmental protection and sanitation, domestic waste landfills, sewage treatment plants, and industrial waste.
3. Water conservancy, anti-seepage, plugging and reinforcement of rivers, lakes and reservoirs.
4. Anti-seepage of gardens, artificial lakes, golf courses, and ponds.
5. Anti-seepage, anti-corrosion, leakage prevention and reinforcement of projects in petrochemical, mining, agriculture and other fields.

SPECIFICATIONS OF BENTONITE GEOSYNTHETIC CLAY LINER(GCL)

Bentonite Geosynthetic Clay Liner(GCL) Specifications				
Item		Technical Parameters		
		GCL-NP	GCL-OF	GCL-AH
GCL,Mass/Unitarea (g/m ²)		≥4000	≥4000	≥4000
Swell Index (ml/2g)		≥24	≥24	≥24
Absorb Blue Quantity (g/100g)		≥30	≥30	≥30
Tensile Strength (KN/m)		≥600	≥700	≥600
Elongation at Maxload %		≥10	≥10	≥8
Peel Strength (N/100mm)	Non-woven geotextile	≥40	≥40	-
	PE geotextileand	-	≥30	-
Pesitance Hydaulic Pressure(m/s)		≤5.0×10-11)	≤5.0×10-12)	≤1.0×10-12)
Resistance Hydraulic Pressure		0.4MPa,1h,noleakage	0.6MPa,1h,noleakage	0.6MPa,1h,noleakage
Fluid Loss (ml)		≤18	≤18	≤18
Durability of Bentonite(ml/2g)		≥20	≥20	≥20

Note:

GCL- NP means Needle punched process GCL

GCL-OF means Needle punched and cocoon process GCL

GCL-AH means Viscose process GCL

PARAMETER COMPARISON OF BENTONITE GEOSYNTHETIC CLAY LINER(GCL)

Item	National standard	Enterprise Standard	Inspection standards
	JG/T 193-2006		
Geosynthetic Clay Expansion index	≥24 ml/2g	≥25ml/2g	ASTM D5890
Mass Per Unit Area(g/m ²)	≥4800 g/m ²	≥4800 gm ²	ASTM D5993
Tensile Strength	≥6KN/m	≥8KN/m	ASTM 4632
Maximum load elongation	≥10%	≥10%	ASTM 4632
Permeability	≤5×10-9	≤5×10-9	ASTM D5084
Moisture content	≤15%	≤15%	ASTM D4643
Peel strength	≥40N	≥65N	ASTM D4632
Hydrostatic pressure	0.4Mp	0.4~0.6Mp	ASTM D5891

PROJECTS CASE OF BENTONITE GEOSYNTHETIC CLAY LINER(GCL)



[Artificial lake seepage prevention in Ethiopia]



[Anti-seepage and reinforcement of water conservancy dams in Indian]

BENTONITE GEOSYNTHETIC CLAY LINER(GCL) CONSTRUCTION

Construction method of Bentonite Geosynthetic Clay Liner(GCL):

- Construction preparation. First, clean the construction site to ensure that there are no sharp objects such as tree roots, etc., and compact the construction site. The compaction degree of the plain soil should reach more than 85% to improve the anti-seepage effect.
- Check the waterproof blanket. Check the appearance quality of the bentonite waterproof blanket, and record the mechanical damage, production trauma, holes and other defects found so that they can be repaired during laying.
- Lay the foundation. After the foundation meets the standards, the waterproof blanket should be laid. The laying should be overlapping along the direction of the water flow, with the bank first and then the bottom layer. The upstream GCL should be overlapped with the downstream GCL.
- Lapping and fixing. The overlapping part should be flat and the length should be no less than 300 mm. The overlapping part should be evenly sprinkled with 0.4 to 0.6 kg/m of bentonite powder. The front surface of the bentonite waterproof blanket is fixed with cement nails and gaskets, and the top surface is not fixed with cement nails.
- When the slope is laid, the direction of the exhibition membrane should basically parallel on the maximum slope line.
- Cover and seal. GCL's non-woven geotextile is laid on the white side, and then covered with 300 mm thick tamped clay, medium sand or 60 to 100 mm thick plain concrete. The overlap is sealed with bentonite sealant at a dosage of 0.3kg/m.

- Special handling. If a pipeline or pile head passes through the GCL, first use a piece of intact GCL to make a bottom reinforcement according to the pipe diameter plus a circumference of 300 mm, and then stir the bentonite powder into a slurry with water to patch the pipe edge.
- Environmental conditions. Construction should be carried out in weather conditions without rain or snow. If it rains or snows, plastic film should be used to cover it to avoid premature hydration of GCL.
- Backfill. After the waterproof blanket is laid, it should be backfilled in time to avoid damage caused by weather or other items. The backfill should be about 1 meter with plain soil (such as loess/viscous soil). After backfilling, it should be compacted to a compaction degree of $\geq 85\%$.

