3D Composite Drainage Network

3D composite drainage network is a new type of geosynthetic material, which consists of a three-dimensional geosynthetic core with needle punched non-woven geotextile adhered to both sides. Due to the combination of geotextile (anti filtration effect) and geotextile mesh (drainage and reinforcement protection effect), it can provide a complete "anti filtration drainage protection" effect.

This type of geosynthetic material is often used to intercept and transport leachate in landfill liners and cover systems, and to conduct steam or water under various types of pond liners.

Composite drainage network is a new type of drainage geotextile. Made from high-density polyethylene (HDPE) as raw material and processed through a special extrusion molding process, it has a three-layer special structure. The middle reinforcement has high rigidity and is arranged longitudinally to form a drainage channel. Cross arranged reinforcement forms support to prevent geotextiles from being embedded in drainage channels, maintaining high drainage performance even under high loads. The composite use of double sided adhesive permeable geotextile has the comprehensive performance of "reverse filtration, drainage, breathability and protection". It is currently an ideal drainage material.

[3D Composite Drainage Network]

[3D Composite Drainage Network]

Specification of drainage network:

Core thickness: 5 mm~8 mm, width: 2-4 m. The composite can be polyester short fiber needle punched geotextile, filament anti stick needle punched geotextile, high-strength polypropylene short fiber needle punched geotextile. The weight of the composite fabric is generally 200 g, and the length can be according to the requirements of the project.

3D Composite Drainage Network Features:

- Good flexibility and permeability: In coastal engineering, use its traits of appropriate flexibility and permeability to buffer the influence power of waves;
- Strong excessive strain load: Can stand up to a compression load of about 3000A for a lengthy time;
- Good performance: Made with three layer specific structure, bendy and durable, sturdy acid and alkali resistance, now not perishable, and lengthy carrier life;
- Reduce bloodless expansion: Laying a 3-dimensional composite drainage internet can assist limit the influence of frost heave;
- Uniform mixing: It can hydrate the concrete evenly, whether or not it is for inflexible roads or bendy street structures;
- Easy installation, cost and time effective (compare to traditional construction material such as sand, gravel and stone).

APPLICATION

3D composite drainage network is a drainage system with excellent performance, widely used in urban roads, car parks, parks, squares and other places.

Anti seepage and anti-corrosion: Composite drainage networks can prevent the loss of soil particles, protect soil stability, and prevent fine particles from infiltrating the drainage system, avoiding clogging of drainage holes.

Strengthening soil: Composite drainage networks can closely integrate with soil, enhance the tensile and shear strength of soil, improve the stability and bearing capacity of soil, and be used for slope and slope reinforcement to slow down soil erosion and landslide occurrence.

Plant growth: Composite drainage networks can serve as the bottom layer of vegetation coverage systems, providing good drainage and ventilation conditions, promoting plant growth and root development, and are used for greening, landscape, and ecological engineering.

SPECIFICATIONS OF 3D COMPOSITE DRAINAGE NETWORK

TECHNICAL STANDARD FOR 3D COMPOSITE DRAINAGE NETWORK GB/T17690

No	Item	Unit	Spec/Standard value				
			1200g/m²	1400g/m²	1600g/m²	1800g/m²	2000g/m²
1	Unit weight of compond production	g/m²	≥1200	≥1400	≥1600	≥1800	≥2000
2	Thickness of compond production	mm	≥6.0	≥7.0	≥8.0	≥9.0	≥10.0
3	Longitudinal tensile strength of Compond productiong	KN/m	≥16.0				
4	Water diversion ration of compond production	m²/s	≥1.2×10-4				
5	Peel strength of network core and geotextile	KN/m	≥0.3				
6	Thickness of network core	mm	≥5.0	≥5.0	≥6.0	≥7.0	≥8.0
7	Tensile strength of network core	KN/m	≥13.0	≥15.0	≥15.0	≥15.0	≥15.0
8	Unit weight of geotextile	g/m²	≥200				
9	Seepage coefficient of geotextile	cm/s	≥0.3				
10	Width	m	2.1				
11	Length of one roll	m	30				

The geotextile core of the composite drainage network itself includes a thick vertical rib, as well as one diagonal rib at the top and one diagonal rib at the bottom. It can quickly discharge groundwater from roads and has a pore maintenance system that can block capillary water under high loads. Moreover, it can withstand high compressive loads throughout the entire usage process and maintain a considerable thickness, providing excellent hydraulic conductivity.

GREENLAND

SPECIFICATIONS OF STAPLE FIBER GEOTEXTILE COMPOSITE GEOMEMBRANE

TECHNICAL STANDARD FOR 3D COMPOSITE DRAINAGE NETWORK ASTM

Property	Unit	BC50/D200	BC63/D200	BC70/D200	BC80/D200	Test Standard
Geocomposite Specification						
Hydraulic conductivity (MD)	M²/s	2.8×10-3	3.2×10-3	4.0×10²	5×10-3	ASTM D4716
Puncture Resistance	KN/m	0.17	0.17	0.17	0.17	ASTM D7005
Core Material Geonet Specification						
Thickness	mm	6.3	7	8	9	ASTM D5199
Density	g/cm³	0.94	0.94	0.94	0.94	ASTM D1505
Carbon Black Content	%	2	2	2	2	ASTM D1603
Tensile strength (MD)	KN/m	8	10	12	14	ASTM D7179
Geotextile Specification						
Unit weight	g/m²	200	200	200	200	200
Geotextile type		Continuous filament non-woven geotextile				

Three dimensional composite drainage network is a new kind of geosynthetics. Its shape is a three dimensional geonet core, and there are needle punched non woven geotextiles on each sides. The three dimensional geogrid core consists of a thick vertical rib and an inclined rib at the pinnacle and bottom, which can hastily drain the around water from the road. It additionally has a pore preservation system, which can block capillary water underneath excessive load. At the equal time, it can additionally play the function of isolation and basis reinforcement.

3D Composite Drainage Network: how to work:

3D Composite Drainage Network	Network core	1. Centralized middle HDPE strands provide channelized flow.
		2. Upper and bottom fillet form support to avoid geotextile inserting into dewatering channel.
	Geotextile	3. One sided or double sided adhesive seepage geotextiles form a "filtration - drainage - ventilation - protection" overall performance.

PROJECTS CASE OF 3D COMPOSITE DRAINAGE NETWORK

[Landfill in Chile]

[Pond in Australia]

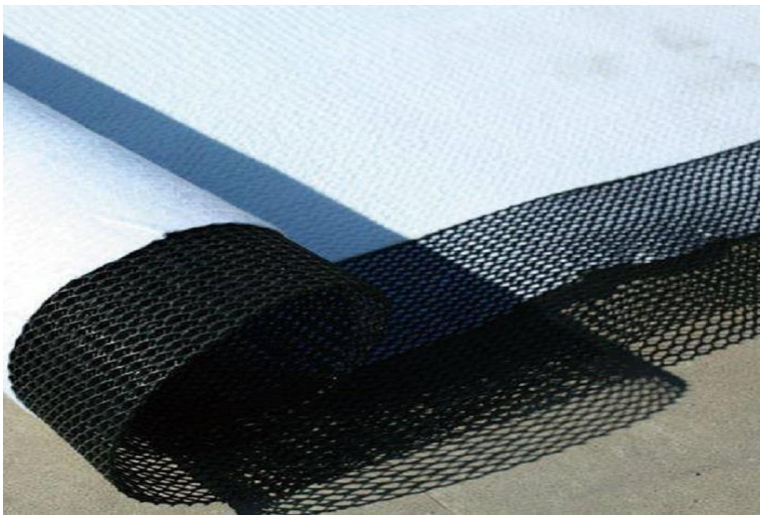
COMPOSITE GEOMEMBRANE CONSTRUCTION

Before laying the composite drainage network, foundation treatment should be carried out. Firstly, the lower layer should be leveled and compacted, with a flatness of no more than 15 mm and a compaction degree that meets the design requirements. Hard protrusions such as gravel and block stones are strictly prohibited on the surface. Laying environment; Outdoor temperature above 5 ℃, wind below level 4, no rain or snow. In case of special circumstances, construction must be carried out in harsh environments and protective measures should be taken.

When laying composite drainage networks, they should be straight, flat, and not twisted or folded. Overlapping areas should be fixed with U-shaped nails or joints. The main strength direction of the reinforcement should be perpendicular to the axis direction of the embankment, and each lap length should be equal to the main strength of the reinforcement. The overlap (longitudinal) should not be less than 15 cm, fixed with U-shaped nails or joints, with a spacing of 1.0 m, and a horizontal overlap length of 30-90 cm. The overlap position should be fixed with U-shaped nails or nylon ropes. Then carry out backfilling treatment. The maximum diameter of embankment filling within the range of the composite drainage network should not exceed 6cm. The first layer of the composite drainage network should be compacted along the axis of the embankment using a light bulldozer or front loader. The compacted thickness should be greater than 60cm. After the composite drainage network material is laid in place, it should be filled with fillers in a timely manner to avoid prolonged direct sunlight exposure. Generally, the interval time does not exceed 48 hours.

APPLICATION SCENARIOS

- Foundation wall drainage, tunnel drainage, railway drainage, retaining walls drainage, highway roadbed drainage, underground structure drainage, garden and playground drainage.
- Landfill leachate collection in landfill liners, leak detection, caps and closures.
- Methane gas collection.
- Pond leak detection.



When a geotextile is used on one or both sides of a geonet, the separation and filtration functions are always satisfied, but the drainage function is vastly improved in comparison to geotextiles by themselves. This drainage geocomposites also make effective drains to intercept water in a capillary zone where frost heave or salt migration is a problem. In all cases, the liquid enters through the geotextile and then travels horizontally within the geonet to a suitable exit.