TERRE ARMEE

TechRevetment®

FABRIC FORM CONCRETE MATTRESSES FOR EROSION CONTROL AND SCOUR PROTECTION

TechRevetment®

TechRevetment® is a pre-engineered factory custom grouted mattress system used for permanent erosion protection works. Depending upon project requirements, design considerations and specific application, the type of fabric form is designed and pre-fabricated at the factory and delivered to job sites. This technology is used to protect embankments (dry or wet), protect bridge abutments against scour, and used for flood bank and bed protection of major rivers and waterways, lining of canals and for mining and industrial erosion protection and lining applications. This system can be installed at rapid speed and under water without the need for dewatering.

TechRevetment® is an alternative and durable solution for erosion protection with flexible concrete block. High strength woven Geotextile made from polyester yarn is used to provide the shape and form.

Essential components of TechRevetment® are non-woven geotextile filter, woven geotextile fabric form and fine aggregate concrete. Depending upon the design requirement and specific application, the type of fabric form to be used is chosen.

APPLICATIONS

Tensile Testing

- River bank protection against erosion and scour
- Guide bund and spur protection a protection of abutments and piers of river bridge against scour
- Coastal defensive structures
- Impermeable lining works for reservoirs, canals or any water body
- Protection of road and railway embankment slope
- Lining of industrial and solid waste landfill area against contamination

Types of Fabric Form

FILTER POINT

UNIFORM SECTION

ARTICULATING BLOCK

FILTER BAND

ENVIRO MAT

ARMOR UNITS

TechRevetment® Articulating Block (AB) Fabric Form Concrete Lining

Typical Dimensions and Weight

Product and Sizes	AB400	AB600	AB800	AB1000	AB1200
Average Thickness, in (mm)	4 (102)	6 (152)	8 (203)	10 (254)	12 (305)
Mass per unit area, lb/ft^2 (kg/m^2)	45 (220)	68 (330)	90 (440)	113 (550)	135 (661)
Mass per block, lb (kg)	88 (39.8)	188 (85.2)	325 (148)	563 (255)	844 (382)
Nominal Block Dimension, in (mm)	20 x 14 (508 x 356)	20 x 20 (508 x 508)	20 x 26 (508 x 660)	30 x 24 (762 x 610)	30 x 30 (762 x 762)
Concrete Coverage ft^2/yd^3 (m^2/m^3)	75 (9.1)	50 (6.1)	38 (4.6)	30 (3.6)	25 (3.0)
Shear Resistance, lb/ft^2 (kg/m^2)	8 (203)	10 (254)	12 (305)	14 (356)	16 (406)

TechRevetment® Articulating Block mattress consists of a series of compartments linked by an interwoven perimeter. Grout ducts interconnect the compartments, and high strength revetment cables are installed between and through the compartments and grout ducts. once filled, the AB Mats become a mattress of pillow-shaped, rectangular concrete blocks. The interwoven perimeters between the blocks serve as hinges to permit articulation. The cables remain embedded in the concrete blocks to link the blocks together and facilitate articulation. Some relief of hydrostatic pressure is accomplished through the filtration bands formed by the interwoven perimeters of the blocks.

Cables in AB mat shall be galvanized steel cables of minimum 6 mm diameter and the breaking strength of the cable shall not be less than 30 kN. Typically, the cables shall be laid in both direction of the mat when it is used as launching apron and the cables shall be laid in one direction when the mat is used for the protection of slope or river bank.

TechRevetment® Filter Point (FP) Fabric Form Concrete Lining

Typical Dimensions and Weight

Product and Sizes	FP220	FP300	FP400	FP600	FP800	FP1000	FP1200
Average Thickness, in (mm)	2.2 (56)	3 (76)	4 (102)	6 (152)	8 (203)	10 (254)	12 (305)
Mass per unit area, lb/ft^2 (kg/m^2)	25 (121)	34 (165)	45 (220)	68 (330)	90 (440)	113 (550)	135 (661)
Concrete Coverage ft^2/yd^3 (m^2/m^3)	136 (16.6)	100 (12.2)	75 (9.1)	50 (6.1)	38 (4.6)	30 (3.6)	25 (3.0)
Filter Point Spacing, in (mm)	5 (127)	6.5 (165)	8 (203)	10 (254)	12 (305)	14 (356)	16 (406)

TechRevetment® Filter Point linings with filtration point (drains) provide an erosion resistant, permeable concrete lining having a cobbled surface and a relatively high coefficient of hydraulic friction in order to reduce water velocity and wave run-up. The spacing of the filter points determines the linings thickness and weight, while the specially designed filter points relieve hydrostatic pressure and reduce applied stress to the fabric form during pumping.

TechRevetment® Uniform Section (US) Fabric Form Concrete Lining

Typical Dimensions and Weight

Product and Sizes	US300	US400	US600	US800	US1000
Average Thickness, in (mm)	3 (76)	4 (102)	6 (152)	8 (203)	10 (254)
Mass per unit area, lb/ft^2 (kg/m^2)	34 (165)	45 (220)	68 (330)	90 (440)	113 (550)
Concrete Coverage ft^2/yd^3 (m^2/m^3)	100 (12.2)	75 (9.1)	50 (6.1)	38 (4.6)	30 (3.6)
Drop Point Spacing, in (mm)	3.8 x 2.9 (97 x 72)	3.8 x 3.8 (97 x 97)	38 x 57 (97 x 145)	5.7 x 7.6 (145 x 193)	5.7 x 8.6 (145 x 217)

TechRevetment® Uniform Section (US) Linings are similar to traditional concrete slope paving. They create a solid, high quality concrete lining with a relatively low hydraulic resistance and uniform cross section. These linings are used to reduce the infiltration or exfiltration of aggressive waste and chemical fluids into or out of open channels and basins. They are also used to reduce exfiltration in arid regions where open channels and basins require watertight linings.

TechRevetment® Enviro Mat (EM) Fabric Form Concrete Lining

Typical Dimensions and Weight

Product and Sizes	EM 250	EM 400
Average Thickness, in (mm)	2.5 (64)	4 (102)
Mass per unit area, lb/ft^2 (kg/m^2)	28 (138)	45 (220)
Concrete Coverage ft^2/yd^3 (m^2/m^3)	120 (14.6)	75 (9.1)
Open vegetated Area, %	20	20

TechRevetment® Enviro Mat linings with filtration/ vegetation points provide an erosion resistant, permeable concrete lining having a cobbled surface and a relatively high coefficient of hydraulic friction in order to reduce water velocity. EM Linings are comprised of concrete-filled elements and unfilled areas that allow for the growth of vegetation. The unfilled areas can be opened by cutting the fabric and are planted or are filled with topsoil and seeded. Within a growing season, a vegetated cover will normally extend over the lining, resulting in an erosion control system with the hydraulic, ecological and aesthetic features as desired.

The material property requirements of TechRevetment Fabric are listed below:

Property Requirements

TechRevetment® woven geotextile fabric[1, 2] form for AB, FP, US and EM type

Properties (AB)	Test Method	Units	MARV*
Physical Properties			
Composition of Yarns	Not Applicable		Polyester
Mass Per Unit Area (single-layer)	ASTM D 5261	g/m²	>200
Mass Per Unit Area (double-layer)			>400
Thickness (single-layer)	ASTM D 5199	mm	0.35
Mill Width (Woven)	Not Applicable	m	3.00
Mechanical Properties			
Wide Width Tensile Strength – MD | TD	ASTM D 4595	kN/m	50 | 50
Wide Width Elongation at Break - MD | TD		%	>10 | >10
Trapezoidal Tear Strength - MD | TD	ASTM D 4533	N	350 | 350
CBR Puncture Strength	ASTM D 6241	N	5100
Hydraulic Properties			**MARV* Range**
Apparent Opening Size (AOS)*	ASTM D 4751	mm	<0.8
Water Flow Rate*	ASTM D 4491	l/m²/min	>1000

1. Conformance of fabric to specification property requirements shall be based on ASTM D 4759.
2. All numerical values represent minimum verage roll values (i.e., average of te lts from any sample roll in a lot shall meet or exceed the minimum values). Lots shall be sampled according to ASTM D 4354.

FINE AGGREGATE CONCRETE

Fine aggregate concrete shall consist of a proportioned mixture of Portland-Puzzolana cement, fine aggregate (sand) and water. The grade of fine aggregate concrete shall be as per the project design. requirements. The consistency of the fine aggregate concrete delivered to the concrete pump shall be proportioned and mixed properly so as to have a flow time of 9-12 seconds when passed through the 19-mm orifice of the standard flow cone that is described in ASTM C 939. Additional Puzzolana and/or admixtures may be used with the approval of the Engineer-in-charge. The water/cement ratio varies with the exact granulometry of the fine aggregate (sand) and shall be determined by the ready-mix manufacturer using the above flow cone as mentioned previously. Flyash can be used to reduce the cement consumption.

Coastal Protection

DRAINAGE BEHIND TECHREVETMENT LINING

One layer of multi linear drainage composite - Draintube (above low water level) and one layer of non-woven geotextile filter fabric (below low water level) shall be placed behind the TechRevetment lining. Selection of the Draintube and non-woven geotextile filter fabric shall be done as per the design requirements.

Riverbank Protection

www.terre-armee.com | resourceasia@terre-armee.com

Local Contact: .....
.....
.....

April, 2023