



SYNTHETEX

5550 Triangle Parkway
Suite 220

Peachtree Corners, GA 30092 USA
www.synthetex.com



HYDROTEX® Enviro Mat 400 FABRIC FORMED CONCRETE

Hydrotex® 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. Enviromat Linings are comprised of concrete-filled elements and unfilled areas that allow for the establishment of vegetation. Once the concrete sets, the defined, unfilled and interwoven areas (approximately 20% of the total area of the lining) are used to establish 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 desired. The Enviro Mat linings can be used in conjunction with a light-weight turf reinforcement mat (TRM) based on local conditions. For example, the engineer can select a TRM to provide support and reinforcement of the subsoils to allow for vegetation establishment.

The fabric forms for casting the concrete lining(s) are HYDROTEX® Enviro Mat (EM400) fabric forms manufactured by Synthetex, LLC; 5550 Triangle Parkway, Suite 220 Peachtree Corners, Georgia 30092, Tel: 800.253.0561 or 770.399.5051, E-Mail: info@synthetex.com. Hydrotex Enviro Mat (EM4000) type has a finished average thickness of 4 inches, a nominal mass per unit area of 45 lb/ft² and a deeply cobbled surface appearance.

The fabric forms are composed of nylon or polyester yarns into woven fabric meeting the performance criteria in the following table. The fabric forms are woven with a minimum of 50% textured yarns (by weight). Partially-oriented (POY), draw-textured, and/or staple yarns are not used in the manufacture of the fabric. Each layer of fabric conforms to the physical, mechanical and hydraulic requirements Mean Average Roll Values listed in Table 1.0. The fabric forms are free of defects or flaws which significantly affect their physical, mechanical, or hydraulic properties.

Mill widths of fabric are a minimum of 84 inches. Each selvage edge of the top and bottom layers of fabric is reinforced for a width of not less than 1.35 inches by adding a minimum of 6 warp yarns to each selvage construction. Mill width rolls are cut to the length required, and the double-layer fabric separately joined, bottom layer to bottom layer and top layer to top layer, by means of sewing thread, to form multiple mill width panels with sewn seams on not less than 80-inch centers.

Fabric form panels are factory-sewn, by joining together the layers of fabric, top layer to top layer and bottom layer to bottom layer, into predetermined custom sized panels. Sewn seams are downward facing as shown on the Contract Drawings. All sewn seams and zipper attachments are made using a double line of U.S. Federal Standard Type 401 stitch. All seams sewn are not less than 100 lbf/inch when tested in accordance with ASTM D 4884. Both lines of stitches are sewn simultaneously and be parallel to each other, spaced between 0.25 inches to 0.75 inches apart. Each row of stitching shall consist of 4 to 7 stitches per inch. Thread used for seaming is polyester. Edges of the panels can be attached in the field by means of sewing or pre-attached zippers.

Synthetex can provide certificates of compliance for the fabric forms as well as specifications, literature, shop drawings for the layout of the concrete lining panels, and recommendations that are specifically related to the project.



Table 1.0 PROPERTY REQUIREMENTS – HYDROTEX FABRIC^{1,2}			
	Test Method	Units	MARV
Physical Properties			
Mass Per Unit Area (double-layer)	ASTM D 5261	oz/yd ²	13
Thickness (single-layer)	ASTM D 5199	mils	15
Mill Width (Woven)		inch	84
Mechanical Properties			
Wide-Width Strip Tensile Strength - MD TD	ASTM D 4595	lbs/inch	300 350
Elongation at Break - MD TD - Max.		%	15 15
Trapezoidal Tear Strength - MD TD	ASTM D 4533	lbs	150 175
CBR Puncture Strength	ASTM D 6241	lbs	1250
Mullen Burst Strength	ASTM D 3786 (Mod.)	psi	500
	Test Method	Units	MARV Range
Hydraulic Properties			
Apparent Opening Size (AOS)	ASTM D 4751	U.S. Standard Sieve	30 - 40
Flow Rate	ASTM D 4491	gal/min/ft ²	30 - 55

Notes:

1. Conformance of fabric to specification property requirements are based on ASTM D 4759. Material testing reports are available and prepared by a certified geotextile laboratory attesting to the fabric form material's compliance with this Specification. Material laboratory testing shall have been performed within ninety (90) days of the submittal date.
2. All numerical values represent minimum average roll values (i.e., average of test results from any sample roll in a lot shall meet or exceed the minimum values). Lots are sampled according to ASTM D 4354.

Many times, the forms are fabricated with baffles. The baffles are flow-directing vertical geotextile walls constructed between fabric form layers. Baffles are an integral part of the fabric form design. Baffles are designed to support the panel section, determine the concrete area of the section and direct the flow of fine aggregate concrete for maximum efficiency. Baffles are installed at predetermined mill width intervals to regulate the distance of lateral flow of fine aggregate concrete. The baffles are designed to maintain a full concrete lining thickness along the full length of the baffle. The grab tensile strength of the baffle is not less than 180 lbf/inch when tested in accordance with ASTM D 4632.

Certification (Open Channel Flow)

The average thickness, mass per unit area and hydraulic resistance of each concrete lining shall withstand the hydraulic loadings for the design discharges along the structure(s). The stability analysis for each concrete lining are accomplished using a factor-of-safety methodology. A minimum factor of safety of 1.3 is required, or higher as determined by local conditions or critical structures. Synthetex can provide the calculations if needed to confirm conformance to the project conditions and requirements.



Geotextile Filter Fabric or Turf Reinforcement Mat (TRM)

An underlying geotextile or TRM, as specified elsewhere, can be selected and placed on the graded surface approved by the Engineer.

Fine Aggregate Concrete

The Contractor shall provide a suitable fine aggregate concrete for proper filling of the fabric forms. Typical concrete mix proportions and sample mix designs can be provided by Synthetex, as well as installation means and methods.

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Hydrotex® products are manufactured and sold by:



5550 Triangle Parkway, Suite 220
Peachtree Corners, GA 30092 USA
Tel: 1.800.253.0561 or 770.399.5051
Fax: 770.394.5999

www.synthetex.com • e-mail: info@synthetex.com