CABLE TIED CONCRETE EROSION CONTROL MAT
SYSTEM SPECIFICATIONS – SHOREFLEX II®

SECTION 1 – GENERAL

SCOPE OF WORK

A. This section shall consist of the all the required work, material, and activities to ensure that the system is both working properly and following the intent of its original design.

1.1 SUBMITTALS

A. The Contractor shall submit to the Engineer of Record (EOR) evidence of full-scale hydraulic testing in accordance with ASTM D-6460.

B. The Contractor shall furnish manufacturer’s certificate of compliances for Cable Tied Concrete Erosion Control Mats/Rolls, revetment cable, geotextile, and any revetment cable fittings and connectors. The Contractor shall also furnish the manufacturer's specifications, literature, preliminary shop drawings for the layout of the mats, installation and safety instructions, and any recommendations, if applicable, that are specifically related to the project.

C. The Cable Tied Concrete Erosion Control Mat is considered a system composed of project specific backing material mechanically attached to the concrete erosion control mat. This system is then rolled and sent to the jobsite as a single unit.

D. Drawings will be submitted with each project depicting; size and location of mats, proper toe-in depths and anchoring, appropriate mat to mat connection techniques as per the design of the EOR.

E. Material must be ShoreFlex II® or approved equal. Alternative materials maybe be considered. Such materials must be pre-approved in writing by the engineer prior to bid date. Alternative materials packages must be submitted to the engineer a minimum of thirty (30) days prior to bid dates. Submittal packages must include, as a minimum, the following:

1. Full scale laboratory testing performed by the submitting manufacturer and associated engineered calculations quantifying the hydraulic capacity of the proposed cellular concrete mat system in similar conditions to the specified project.

2. Proposed alternate concrete block material must be constructed in a brick lay pattern perpendicular to water flow to ensure that channeling within the mat cannot occur.
1.2 DELIVERY, HANDLING, and STORAGE

A. ShoreFlex II® will be rolled with lifting straps and an optional roll core for ease of handling and installation on site. Spreader bar may be obtained from supplier if needed.

B. Prior to shipment, rolls must be tarped or individually wrapped for protection of the erosion control backing material from wind damage.

C. Delivered rolls or mats that will be stored for longer than 30 days shall be covered to ensure protection from UV light.

D. Upon delivery, rolls or mats should be inspected to ensure that all the units are free of defects that may hinder either performance or installation of ShoreFlex II®.

E. Missing concrete due to chipping or cracking shall not exceed 15% of the average concrete unit weight. If the threshold of 15% is surpassed the material may be rejected by the engineer. Repair, patch, or replacement of the affected area should be done per the manufacturer’s recommendation.

SECTION 2- PRODUCT

2.1 General

A. Tied Concrete Block Erosion Control Mat Minimum Requirements

ShoreFlex II® is manufactured from individual concrete blocks that are tied together to form an erosion control mat. Each concrete block within the mat will be tapered, uniform, and interlocked. The tapered face of the block will have nodes to help slow down the water. Block interlocking will occur with the use of a high strength polyester core revetment cable.

1. The concrete blocks will meet a minimum compressive strength of 5000 psi at 28 days as per ASTM standards. The concrete blocks will be spaced 1.5 in. apart creating an average minimum mat weight of 10.5 lbs. per square foot and an open area of 30% for vegetation growth.

2. The 1.5” spacing between the blocks, perpendicular to the flow of water, will be held by using nylon spacers in between blocks and covering the polyester cord revetment cable.

3. Nylon rigid straps will be used to hold the 1.5” space between the blocks at both ends of the mat with lifting loops.

4. The concrete blocks within the mat should be laid in a brick lay pattern perpendicular to the flow of water. The brick lay pattern impedes the water flow from row to row and prevents channeling within the mat.
5. Nodes located on the tapered surface of the concrete blocks will be uniform and evenly spaced to ensure consistent performance. (See minimum requirements in Table 3)

6. Standard mat panels will come in 16 ft. by 50 ft. lengths unless otherwise specified by the plans or contractor. Custom mat dimensions available upon request.

7. The Polyester Core revetment cable connection system is an extremely firm, stiff rope construction manufactured with high tenacity polyester fiber. Revetment cable has a parallel core of multifilament polyester with tightly braided polyester cover which makes it suitable for crimped aluminum sleeve connectors. (See Table 4 below)

8. Lifting/Anchoring loops are composed of the same polyester cord revetment cable used to interlock the blocks. The lifting/anchoring loops shall have a minimum of 7:1 factor of safety when lifting from all loops at the ends of the mat/roll.

B. Backing Materials

1. Backing material selection shall be done on a project specific basis and shall be specified by the EOR.

2. All soil retention blankets will be mechanically attached to the concrete erosion control mat via galvanized hog rings. To ensure proper function of the underlying soil retention blanket.

3. Backing material shall be attached to the concrete erosion control mat using galvanized hog rings around the outer edges of the mats a minimum of every third block spacing. A minimum of 5 hog rings per square yard shall be used in attaching backing material throughout the entirety of the mat.

4. Hog rings to be appropriately sized as to ensure that no damage shall occur to Polyester core revetment cable and plastic spacing units.

2.2 Materials

A. Cementitious Materials - Materials shall conform to the following applicable ASTM specifications:

1. Portland Cements – Specifications C 150, Portland Cement

2. Blended Cements – Specifications C 595, For Blended Hydraulic Cements


4. Pozzolans – Specification C 618, for Fly Ash and Raw or Calcined Natural Pozzolans for use in Portland Cement Concrete
B. Aggregates shall conform to the following ASTM specifications, except that grading requirements shall not necessarily apply:

1. Normal Weight – Specification C 33, for Concrete Aggregates

2.3 Casting

A. The concrete units shall be produced by dry cast method. The dry cast units obtain strength in a shorter duration as well as an increase in durability and overall quality of product.

2.4 Physical Requirements

A. Concrete Blocks

1. At the time of delivery to the work site, the concrete units shall conform to the physical requirements prescribed in Tables 1, 2, and 3 below.

| Table 1: Concrete Minimum Physical Requirements. |
| Compressive Strength Net Area Min. p.s.i. (mPa)* | Water Absorption Max. lbs./ft³ (kg/m³)* |
| Avg. of 3 units | Individual unit | Avg. of 3 units | Individual unit |
| 5,000 (34.5) | 4,500 (31) | 9.1 (160) | 11.7 (192) |

*Tested in accordance with ASTM C140/C140M

| Table 2: Concrete Minimum Block Size Requirements. |
| Block Type | Width | Length | Height | Weight | Tolerance |
| Standard | 6.5” | 6.5” | 1.75” | 4.5lbs | +/- 3% |
| Block and a Half | 6.5” | 10.5” | 1.75” | 7.5lbs | +/- 3% |

| Table 3: Additional Concrete Block Characteristic Requirements. |
| Block Sides Taper Angle (degrees) | Nodes per Standard Block | Nodes per Block and a Half | Height of Nodes (inches) | Node Diameter (inches) |
| 31° | 29 | 41 | .125 (1/8”) | .25 (1/4”) |
B. Polyester Revetment Cable, Fittings, Safety Factor

1. Revetment cable shall be constructed of high tenacity, low elongating, and continuous filament polyester fibers. Cable shall consist of a core construction comprised of parallel fibers contained within an outer jacket or cover. The weight of the parallel core shall be between 65% to 70% of the total weight of the cable with a minimum safety factor of 7:1. The revetment cable shall have the following physical properties listed in Table 4.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum requirement</th>
<th>Testing Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV Stabilization</td>
<td>25</td>
<td>years</td>
</tr>
<tr>
<td>Ultimate Tensile Strength</td>
<td>1500 lbs.</td>
<td>Method 4108</td>
</tr>
<tr>
<td>Elongation at Break</td>
<td>13%</td>
<td>Method 4106</td>
</tr>
<tr>
<td>Diameter, mm.</td>
<td>4.3</td>
<td>ASTM D 4268</td>
</tr>
<tr>
<td>Elastic Elongation at 10% of Break</td>
<td>.6</td>
<td></td>
</tr>
<tr>
<td>Elastic Elongation at 20% of Break</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Elastic Elongation at 30% of Break</td>
<td>2.2</td>
<td></td>
</tr>
</tbody>
</table>

2. Selection of cable and fittings shall be made in a manner that insures a safe design factor for mats being lifted from both ends, thereby forming a catenary. Consideration shall be taken for the bending of the cables around hooks or pins during lifting. Revetment cable splicing fittings shall be selected so that the resultant splice shall provide a minimum of 60% of the minimum rated cable strength. Fittings such as sleeves and stops shall be aluminum and washers shall be plastic unless otherwise shown on the Contract Drawings.

2.5 MANUFACTURER

A. Tied Concrete Block Erosion Control Mat Shall be ShoreFlex II® as manufactured, sold and distributed by:

PREMIER CONCRETE PRODUCTS

38200 LA Hwy 16  5102 Galveston Rd
Denham Spring, LA 70706  Houston, TX 77017
Phone: (800) 575 7293  Phone: (800) 575 7293

2.6 PERFORMANCE TESTING

A. Flume Testing

1. ShoreFlex II® will resist erosion and scour due to hydraulic forces. ShoreFlex II® will meet the requirements listed in Table 5 when tested with a backing material.
on a non-vegetated surface. All equals shall meet or exceed the limiting values tested.

Table 5: Limiting shear stress testing, ASTM D 6460

<table>
<thead>
<tr>
<th>Test</th>
<th>Tested value</th>
<th>Bed Slope</th>
<th>Limiting Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM 6460</td>
<td>Shear Stress</td>
<td>20%</td>
<td>20+ lb./ft.²</td>
</tr>
<tr>
<td>ASTM 6460</td>
<td>Velocity</td>
<td>20%</td>
<td>30+ ft./sec</td>
</tr>
</tbody>
</table>

SECTION 3- EXECUTION

3.1 INSTALLATION

A. ShoreFlex II® installation will be done by a manufacturer approved installer. All equipment, materials, labor, and incidentals associated with placing ShoreFlex II® are to be covered by the approved installer.

1. Subgrade prep should follow the construction plans submitted and approved by the EOR. The subgrade should be smooth, firm, unyielding, and free from all debris including sticks, rocks, roots, and other protrusions that would inhibit intimate contact with the subgrade. No individual block should be raised more than ¾". above the immediately adjacent block to ensure proper hydraulic performance.

2. Top soil and seed can be applied directly to prepped subgrade prior to the placement of the Mats to obtain desired expedited vegetation growth.

3. Mats should be installed per the line and grade shown in the plans that have been provided by the EOR. Technical assistance will be available from the manufacturer during installation if needed.

4. Installation of adjacent mat seams perpendicular to the flow should be done with a shingle installation method. The downstream mat should be placed a minimum of 18 in. underneath the upstream adjoining mat and can be fastened together as per the EOR’s recommendation.

5. Installation of adjacent mat seams parallel to the direction of flow should not meet in the middle of the channel and should have a 4-ft. erosion control blanket placed equally under both mats and both mats shall be fastened together using the EOR’s recommendation.

6. A recommended minimum toe trench of 18 in. should be dug for the leading edge of the concrete mat that is perpendicular to channelized flow. All exterior edges of the concrete mat not exposed to channelized flow should be trenched in a minimum of 1 block. The leading edge and sides of the mat will be placed in the trenches and backfilled with a non-erodible soil or site-specific soil.
7. Additional anchoring can be achieved by using 18” rebar anchors or other earth anchors that will cause minimum damage to revetment cable and blocks as per EOR’s approval. Anchoring system type to be approved by manufacturer for product compatibility.