Specifications For

# CABLE CONCRETE CLOSED CELL

INTERNATIONAL
EROSION CONTROL
SYSTEMS

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## CABLE CONCRETE SPECIFICATIONS
## ORGINAL BLOCK - CLOSED CELL

### A. Description

Cable Concrete is an articulated concrete block revetment system, developed by International Erosion Control Systems to control various types of erosion due to water, wind, or vehicular traffic. This system shall be made up of 4' x 16' and 8' x 16' mattresses (if needed, irregular mat sizes may be designed), which are placed side by side and clamped together to provide one homogeneous erosion protection system. The mats are made up of concrete blocks interconnected by integrally woven stainless steel cables, which are poured within each block. The concrete blocks are held together by integrally woven stainless steel cables, which are poured within the block. A geotextile fabric, specified by the governing engineer, shall be attached to the base of each concrete mat. The size of the concrete blocks shall be 15.5" square at the base and 11.5" square at the top face (a truncated pyramid shape). The only variations between the four different mat systems are the block heights.

Table 1

| General: | | CC20 | CC35 | CC45 | CC70 |
|---|---|---|---|---|---|
| | Weight (lbs/sf)<br>Block Height | 23<br>2.5" | 38<br>4.5" | 48<br>5.5" | 73<br>8.5" |
| Cable: | | | | | |
| | Longitudinal:<br>Transverse: | 1/8"<br>1/8" | 5/32"<br>1/8" | 5/32"<br>5/32" | 3/16"<br>5/32" |

### B. Concrete

The minimum required concrete strength should be 4000 psi @ 28 days. Air entrainment of 4% to 7% shall also be added. All ASTM standards will be met in the production of the concrete. The finished concrete product shall consist of a minimum density of 140lbs/cf, in an average of 3 units. No individual block shall consist of a minimum concrete density lower than 135lbs/cf.

### C. Cables

The cables shall be made of stainless steel aircraft cable of type 302 or 304, depending on the specific use and conditions of the project. The cable shall be of type 1 x 19 construction. Cables

shall be integral (poured into) to the concrete block, and shall traverse through each block in both longitudinal & lateral directions of the mat system.

D. Geotextile

The geotextile used is to be specified by the governing project engineer. The standard geotextile material used on non-specific projects is an 8-oz. Needle punched non-woven fabric. The geotextile shall be attached to the bottom of the concrete block mats unless otherwise stated in the plans. An overlap of 2 ft. to 3 ft. shall be incorporated on three sides of the mat. The overlap shall provide an area for the adjoining mats to be placed upon and prevent undermining of the erosion control system. It should be noted that when different geotextile weights are used and/or when additional overlap area is added to the mats, additional costs would adjust the price per unit.

E. Clamps

Sufficient stainless steel wire rope clamps shall be used to secure loops of adjoining Cable Concrete mats.

The number of loop connections is based on project specifics, and may be shown in the shop drawings or in typical detail sheets (or see the Guide for the Design and Placement of Cable Concrete Mats). Clamping in field must follow project layout details to be acceptable. Details available showing the proper method of clamping.

F. Anchoring

Cable Concrete mats are designed to take velocities in certain slope and bedding situations. This information is founded on engineered flume testing. The data shows maximum limits of the mat system, base on unanchored mats.

Anchoring Cable Concrete mats offers additional safety to the erosion protection system. But, if a situation arises where velocities exceed maximum limits of a mat system, or if slopes of 1.5 to 1 or greater are encountered, then anchoring becomes an item to be specified by the governing project engineer. See detail sheets of rule-of-thumb procedures when considering anchoring.

G. Installation

The supplier shall have a technician experienced in the installation of the Cable Concrete System available at the start of an installation where the engineer of contractor have not had experience with the product to assist in any special techniques need to assure a proper installation.

The mats shall be laid from the downstream end of project to the upstream end, so the geotextile joints are shingled to direct flow over the joint and to prevent undermining. Intimate contact with the surface is critical to the systems performance in the field. The gaps between each mat shall not be greater then 2"; or else the gap must be closed using a grout mixture. The outside edges of the mat system shall be entrenched edges.

It is recommended that after the installation of the mat system be covered with black dirt and seeded with vegetation (grasses). The mat system will allow moisture to traverse back and forth from sub grade to vegetation. The mat system will lend support and an even grade for maintenance vehicles (mowers) to traverse over it. Any surface application should not be placed prior to the inspection of the systems clamping and anchoring.

H. Payment

Payment will be by the square foot and shall include the Cable Concrete mats and the geotextile (8NP). Upgrades or additional items to what is called for on a project shall be considered additional costs. Anchors and stainless steel wire rope clamps are separate and are an additional cost to the system.

I. Test Standards and Specifications

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| ASTM C31 | Practice for Making and Curing Concrete Test Specimens in the Field |
| ASTM C33 | Specifications for Concrete Aggregates |
| ASTM C39 | Compressive Strength of Cylindrical Concrete Specimens |
| ASTM C42 | Obtaining & Testing Drilled Cores and Sawed Beams of Concrete |
| ASTM C140 | Sampling and Test Concrete Masonry Units |
| ASTM C150 | Specification for Portland Cement |
| ASTM C207 | Specification for Hydrated Lime Types |
| ASTM C618 | Specifications for Fly Ash and Raw or Calcined Natural Pozzolans for use in Portland Cement Concrete. |
| ASTM D18.25.04 | Specifications for Articulated Concrete Clock Systems (In Design) |
| ASTM D698 | Laboratory Compaction Characteristics of Soil Using Standard Effort |
| ASTM D3786 | Hydraulic Burst Strength of Knitted Goods and Non-woven Fabrics |
| ASTM D4355 | Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water |
| ASTM D4491 | Water permeability of Geotextiles by Permittivily |
| ASTM D4533 | Trapezoidal Tearing Strength of Geotextiles |
| ASTM D4632 | Breaking Load and Elongation of Geotextiles (grab Method) |
| ASTM D4751 | Determining Apparent Opening Size of a Geotextile |
| ASTM D4833 | Index Puncture Resistance of Geotextiles, Geomembranes and Related Products |
| ASTM D5101 | Measuring the Soil-Geotextile System Clogging Potential by the Gradient Ratio |
| ASTM D5567 | Hydraulic Conductivity Ratio Testing of Soil/Geotextile Systems |
| AASHTO T88 | Determining the Grain–size Distribution of Soil |
| AASHTO M288-96 | Standard Specification for Geotextiles |
| | |
| FHWA-RD-89-199 November 1989 | Standard Testing for Hydraulic Stability of Concrete Revetment System During Overtopping Flow |
| FHWA-RD-88-181 | Minimizing Embankment Damage During Overtopping Flow (Replace by FHWA-RD-89-199 in November 1989) |