IECS ENVIRONMENTAL INC.
Head Office: 22295 Hoskins Line, Rodney, ON N0L 2C0
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Ph: 1-800-821-7462 Fx: 1-866-496-1990

Cable Concrete
CC60M Specifications

A. DESCRIPTION

Cable Concrete CC60M is an articulated concrete block revetment system developed by IECS Group. The system has an extensive range of civil applications and is most commonly used for preventative erosion control measures caused by water, wind, and/or traffic. CC60M is a very viable solution for submerged hard armored applications such as pipeline protection and scour protection. With a centered cabling structure and a trapezoidal base to each block, the system is designed to be extremely flexible in both upward and downward directions. CC60 is an effective alternate to traditional methods such as rock armoring, sand and grout bags, structural concrete, and other hard armoring systems.

The standard mat sizes are 2.44m x 6.1m Long (8'x20') and are designed to be placed side by side or end to end to provide an unvarying protective system. The mats consist of concrete blocks interlocked by revetment cables, which are poured through each block in both directions. The blocks typically have 203.2mm (8") square top faces and 203.2mm (8") square bottoms.

SYSTEM	Minimum BLOCK WEIGHT		Minimum BLOCK HEIGHT	
	kg/sm	***lbs/sf***	***mm***	***inches***
CC60M	283.18-302.71	58-62	250-260	9.8"-10.2"

B. CONCRETE

The minimum required concrete strength shall be 25 MPA @ 28 days. The concrete mix used shall be an approved mix design with 5-8 % air entrainment. Customize/specialty concrete mix designs available upon request.

C. CABLES

The cables shall be made of type ultraviolet stabilized copolymer extruded fiber rope. Cables shall be integral (poured into) to the concrete block and shall traverse through each block in both longitudinal and lateral directions, providing a flexible interlocked system.

System	Revetment Cable	Lengthwise mm	Lengthwise inches	Widthwise mm	Widthwise inches
CC60M	Copolymer	25mm	1"	25mm	1"
CC60M	Copolymer	12.7mm	.5"	12.7mm	.5"

D. INSTALLATION

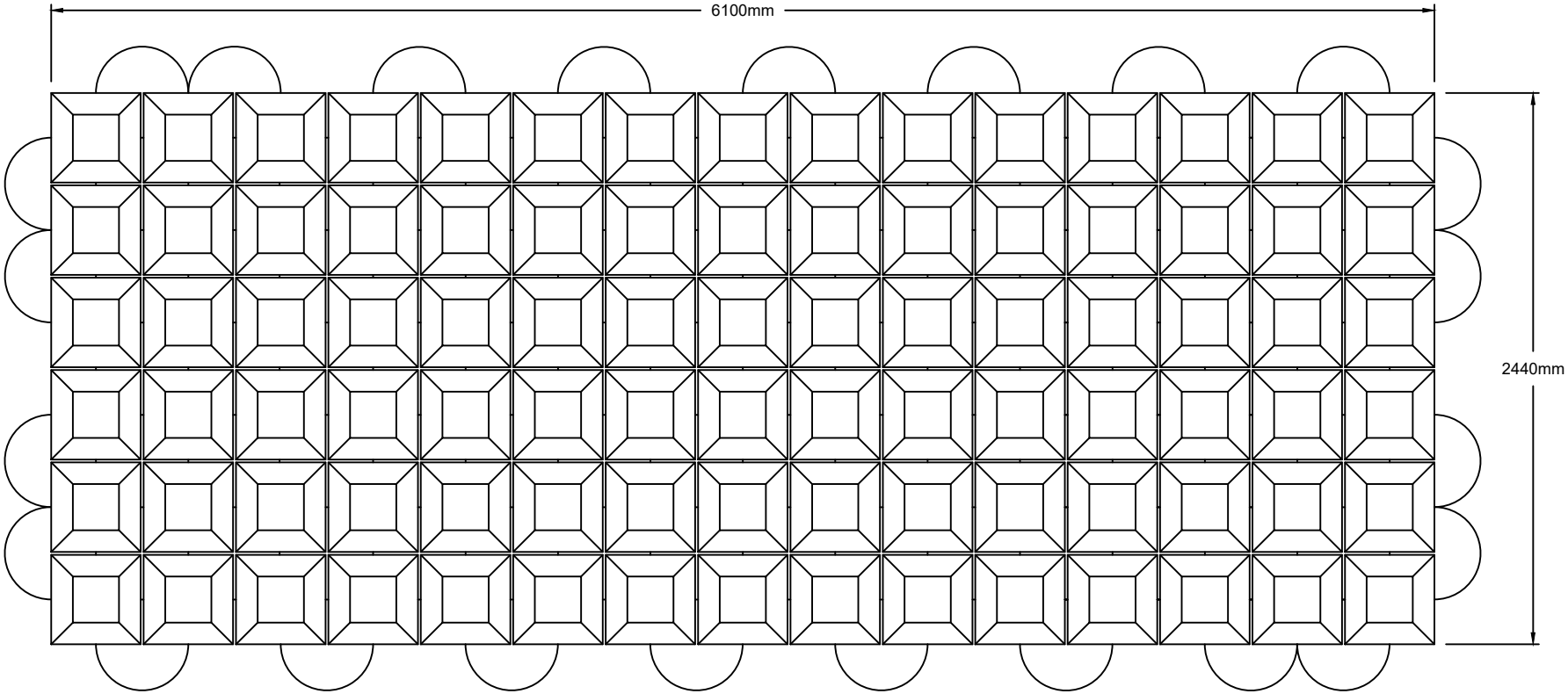
Installation equipment shall have a lifting capacity, capable of completely lifting the concrete mat and the lifting bar during unloading, stockpiling and installing etc.
Prepared areas shall be graded and prepared to an approved finish and inspected by the onsite (owners) engineer. Specified geotextile to be placed according to owners and manufacturing recommendations. The gap between each mat that is not submerged underwater is recommended not be greater than 2" or it must be closed using an approved cement mixture. It is recommended (not required) that after the installation of the mat system, that it be covered with desired backfill. Any surface application should not be placed prior to the inspection of the system.

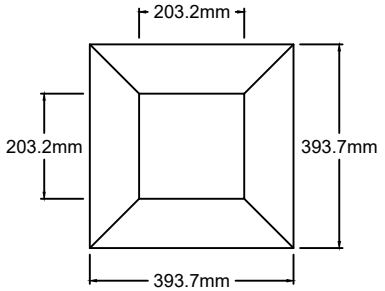
E. PAYMENT

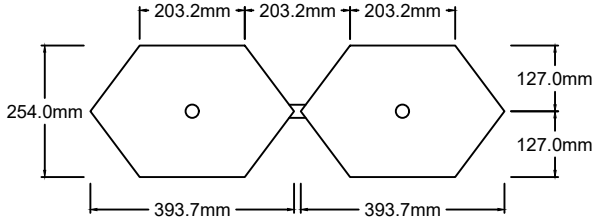
Payment shall be by the square metre and shall include Cable Concrete CC60M mats. Upgrades or additional items shall be considered additional costs.

F. TEST STANDARDS AND SPECIFICATIONS

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 C595	Specifications for Blended Hydraulic Cements
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 Block Systems (In Design)
ASTM D698	Laboratory Compaction Characteristics of Soil Using Standard Effort
ASTM D3786	Hydraulic Burst Strength of Knitted Goods and Nonwoven Fabrics
ASTM D4355	Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water
ASTM D4491	Water Permeability of Geotextiles by Permittivity
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
ASTM D6684-04	Standard Specification for Materials and Manufacture of Articulating Concrete Block (ACB) Revetment Systems
ASTM D6684-03	Standard practice for Installation of Articulating Concrete Block (ACB) Revetment
ASTM D6994-03	Standard Practice for Installation of Articulating Concrete Block (ACB) Revetment
ASTM D7276-16	Standard Guide for Analysis and Interpretation of Test Data for Articulated Concrete Block (ACB) Systems in Open Channel Flow
ASTM D7277–16	Standard Test Method for Performance Testing of Articulated Concrete Block (ACB) Revetment Systems for Hydraulic Stability in Open Channel Flow
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)
TEK 11 (2014)-9B	NCMA - Articulating Concrete Block for Erosion Control
TEK 11-12A	NCMA - Revetment Design – Factor of Safety Method
TEK 11–13 (2006)	NCMA – Articulating Concrete Block (ACB) Installation
HEC 23 Vol 1 & 2	Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance – Third Edition







NOTES:
A. MATTRESS DIMENSIONS: 6.1m x 2.44m x 0.254m (20' x 8' x 10").
B. 90 BLOCKS PER MATTRESS.
C. MATTRESS WEIGHT: 4,683 Kg (10,325 lbs.).
D. CONCRETE DENSITY: 2,300 Kg/m³.
E. CONCRETE STRENGTH: 30 MPa.
F. ROPE: 12.7mm (1/2") DIAMETER PARALLEL CORE OF ULTRA VIOLET STABILIZED MULTIFILAMENT POLY WITH MINIMUM TENSIL STRENGTH OF 15,000 lbs.
G. TYPE 316 STAINLESS STEEL WIRE ROPE CLIPS.
H. ALL DIMENSIONS IN mm UNLESS OTHERWISE SHOWN.

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REVISIONS		
No.		DATE:
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MANUFACTURED BY:
IECS ENVIRONMENTAL

TYPICAL UNIT DEPTHS
CC 60M
2.44m x 6.10m

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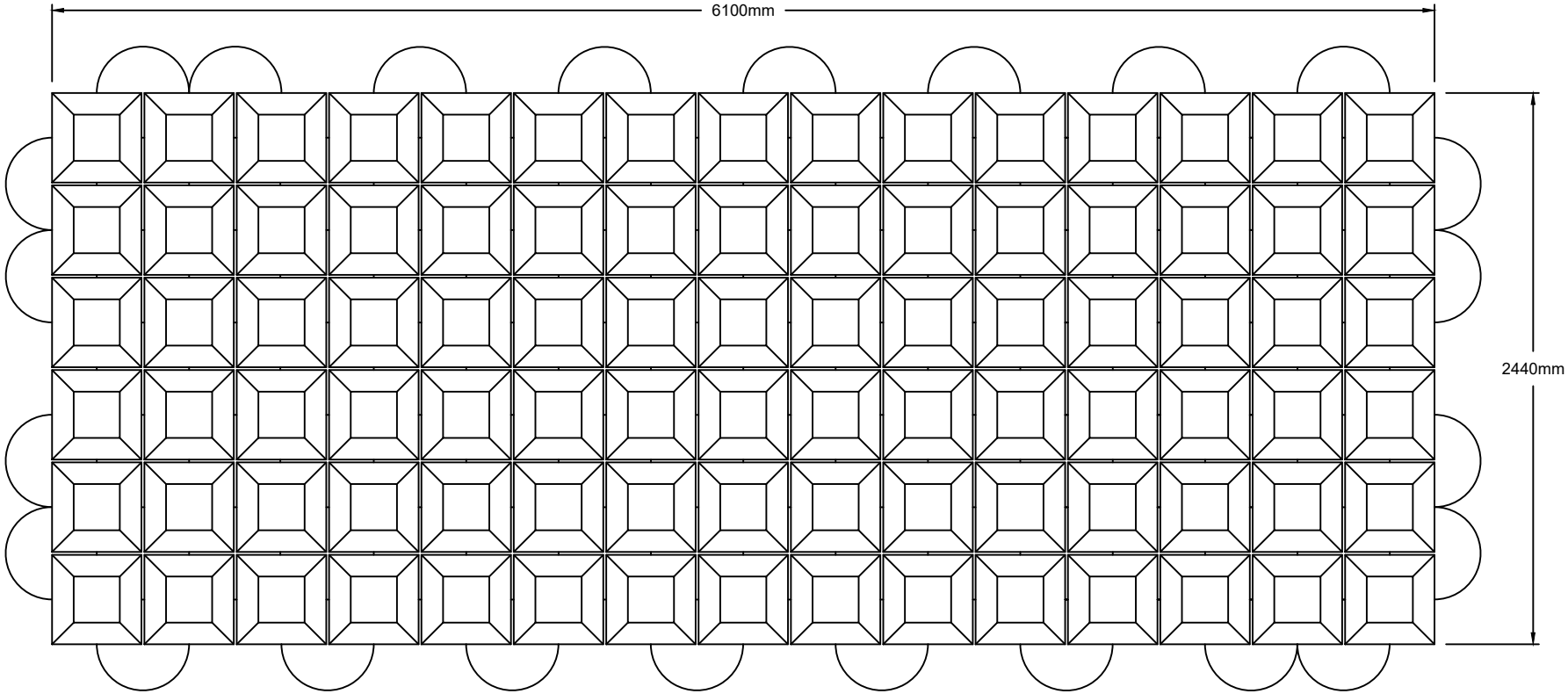
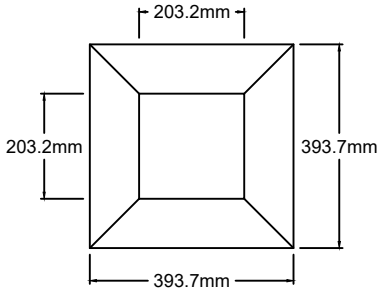
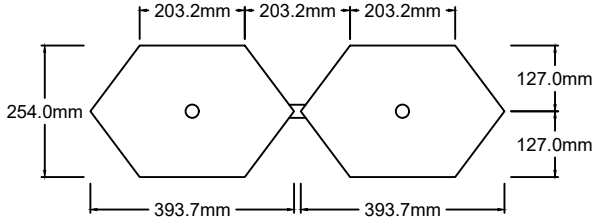
R. J.	M. M.	02/08/19	N.T.S.	1 OF 1







NOTES:
A. MATTRESS DIMENSIONS: 6.1m x 2.44m x 0.254m (20' x 8' x 10").
B. 90 BLOCKS PER MATTRESS.
C. MATTRESS WEIGHT: 4,683 Kg (10,325 lbs.).
D. CONCRETE DENSITY: 2,300 Kg/m³.
E. CONCRETE STRENGTH: 30 MPa.
F. ROPE: 25mm (1") DIAMETER ULTRA VIOLET STABILIZED COPOLYMER EXTRUDED FIBER ROPE, MINIMUM TENSILE STRENGTH OF 21,730 lbs .
G. TYPE 316 STAINLESS STEEL WIRE ROPE CLIPS.
H. ALL DIMENSIONS IN mm UNLESS OTHERWISE SHOWN.

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TYPICAL UNIT DEPTHS
CC 60M
2.44m x 6.10m

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CC60M Cable Concrete Written Specifications

Articulated Concrete Block (ACB) / Cellular Concrete Mats

General

1. Articulated Concrete Block shall be manufactured by IECS Environmental Inc. (IECS) CC60M block or approved alternate.
2. Each block shall consist of 58-62/ft2 per block & 250.02-260.20 block height.
3. Cabling system to be centered within the block providing maximum flexibility in both upward and downward directions.
4. Centered cabling structure and a trapezoidal base to each block

Concrete Mix Design

1. Articulated Concrete Blocks to be wet cast / poured concrete, ensuring a constant 5-8% air entrainment within the approved concrete mix design.
2. The concrete for the articulated concrete block shall meet the requirements of CSA A23.1/A23.2 for materials, testing, and methods of construction. The concrete mix design shall be designed to meet CSA A23.1 Exposure Class F-2 requirements. **Contractor** shall submit a mix design for each type of concrete proposed on this project and shall retain a third-party testing agency to perform concrete sampling throughout the project. The Approved concrete mix design shall have a minimum compressive strength (28 day) of 25MPa.

Revetment Cabling

Articulated Concrete Blocks shall utilize a cabling system that shall be made of type ultraviolet stabilized copolymer extruded fiber rope. Cables shall be integral (poured into) to the concrete block and shall traverse through each block in both longitudinal and lateral directions, providing a flexible interlocked system. Polymer ligatures are typically either constructed in diameters of 12.7mm or 27mm.

Size of Articulated Concrete Mats

1. The articulated concrete mat shall be manufactured by IECS or approved other

2. Standard articulated concrete mat to have dimensions of 2.44m (8') Width by 4.88m (16') Length unless otherwise directed by the engineer.

3. The use of variable sizes of mats will be deemed acceptable only if supported by manufacture representative and approved by the designing engineer

Geotextile

1. Articulated concrete blocks shall have a non-woven needle punched geotextile installed prior to the placement of the CC60M mat.

2. Non-woven geotextile to have a 600mm overlap on three (3) sides of each mat.

Foundation Preparation

1. Prepared areas shall be graded to a finish free of any debris.

2. Any slope deformities including but not limited to stones, grade stakes, roots, etc. are to be removed or regraded to satisfaction of the manufacturer and or design engineer.

3. A 200mm leveling base course (2" minus gravel) if required shall be placed beneath the ACB.

4. Subgrade compaction to be a minimum of 95% of the Standard Proctor Maximum Dry Density (ASTM D698) or as specified by the manufacturer.

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CC60M Product Photographs

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