

## ORGANOCLAY FILLED REACTIVE CORE MAT® REACTIVE CAPPING MATERIAL SPECIFICATION GUIDELINES

This specification is intended for use as a GENERAL GUIDELINE for developing a specification for a specific project. It is NOT intended as a substitute for a detailed specification, which must be written to address site specific conditions. Shaded areas of this guideline indicate items that are typically considered specific to certain application.

### 1.0 GENERAL

#### 1.1 Scope

This specification covers the technical requirements for the furnishing and installation of the reactive capping material described herein. All materials used shall meet the requirements of this specification, and all work shall be performed in accordance with the procedures provided herein and the contract drawings.

#### 1.2 Definitions

For the purposes of this specification guideline, the following terms are defined below:

Reactive Capping Material (RCM): A manufactured material consisting of and active media encapsulated between layers of geosynthetics.

Geotextile: Any permeable geosynthetic comprised solely of textiles.

Minimum Average Roll Value: For geosynthetics, the value calculated as the typical value minus two (2) standard deviations from documented quality control test results for a defined population from one specific test method associated with one specific property.

Overlap: Where two adjacent reactive capping material panels contact, the distance measuring perpendicular from the overlying edge of one panel to the underlying edge of the other.

Typical Value: The mean value calculated from documented manufacturing quality control test results for a defined population obtained from one test method associated with one specific property.

#### 1.3 Unit Prices (optional)

Measurement will be made of the total surface area in square feet covered by the RCM as shown on the contract drawings. Final quantities will be based on as-built conditions. Allowance will be made for RCM in anchor and trenches but no allowance will be made for waste, overlap, or materials used for the convenience of the Contractor. RCM installed and accepted will be paid for at the respective contract unit price in the bidding schedule.

#### 1.4 Submittals

- A. With the bid, the Contractor shall furnish the following information:
1. Conceptual description of the proposed plan for placement of the RCM panels over the area of installation.
  2. RCM manufacturer's MQC Plan for documenting compliance to Sections 2.1 and 2.2 of these specifications.
- B. At the engineer/owner's request, the contractor shall furnish a representative sample of the RCM.
- C. Upon shipment, the Contractor shall furnish the RCM manufacturer's Quality Assurance/Quality Control (QA/QC) certifications to verify that the materials supplied for the project are in accordance with the requirements of this specification.

#### 1.5 Qualifications

The RCM Installer must either have installed at least 1 million square feet (100,000 square meters) of RCM, or must provide to the Engineer satisfactory evidence, through similar experience in the installation of other types of geosynthetics, that the RCM will be installed in a competent, professional manner.

**2.0 PRODUCTS**

The RCM shall consist of a layer of organically modified bentonite clay encapsulated between geotextiles and shall comply with all of the criteria listed in this Section. Prior to using an alternate RCM, the Contractor must furnish independent test results demonstrating that the proposed alternate material meets all requirements of this specification. The Contractor also must obtain prior approval of the alternative RCM by the Project Engineer.

**2.1 Materials**

- A. Acceptable RCM products are Organoclay Reactive Core Mat, as manufactured by CETCO, 2870 Forbs Avenue, Hoffman Estates, IL USA (800-527-9948), or an engineer-approved equal.
- B. The RCM and its components shall have the properties shown in Table TR404-rcm.
- C. The minimum acceptable dimensions of full-size RCM panels shall be 75 feet in length.

**2.2 Product Quality Documentation**

The RCM manufacturer shall provide the Contractor or other designated party with manufacturing QC certifications for each shipment of RCM. The certifications shall be signed by a responsible party employed by the RCM manufacturer and shall include:

- A. Certificates of analysis for the organically modified bentonite clay used in GCL production demonstrating compliance with the parameters of the reactive media (bulk density, oil adsorption, and quaternary amine content as shown in tables TR404-RCM.
- B. Manufacturer's test data for finished RCM product including mass/area, RCM grab tensile and elongation strength and RCM hydraulic conductivity demonstrating compliance with the index parameters shown in tables TR404-RCM.
- C. RCM lot and roll numbers supplied for the project with corresponding shipping information.

**Table TR-404 - RCM**

Material Property	Test Method	Test Frequency	Value
<b>ORGANOCLAY<sup>1</sup></b>			
Bulk Density	CETCO Test Method	1/lot	44-56 lb/ft <sup>3</sup>
Oil Adsorption Capacity	CETCO Test Method	1/lot	0.5 lb of oil/lb of clay min
Quaternary Amine Content	TGA-CETCO Test Method	1/lot	25-33% loading @ 800°C
<b>FINISHED RCM PRODUCT</b>			
Organoclay Mass/Area	CETCO Test Method	1/40,000 sq.ft.	0.8 lb/ft <sup>2</sup> (4.0 kg/m <sup>2</sup> ) min.
RCM Grab Strength <sup>2</sup>	ASTM D 4632	1/200,000 sq.ft.	90 lbs (400 N) MARV
Hydraulic Conductivity <sup>3</sup>	ASTM D2434	1/lot	1 x 10 <sup>-3</sup> cm/s minimum

**Notes**

- <sup>1</sup>Organoclay properties performed periodically on material prior to incorporation into the RCM.
- <sup>2</sup>All tensile testing is performed in the machine direction.
- <sup>3</sup> At maximum 2 psi confining pressure.

Description: A permeable composite of geotextiles and granular organoclay that reliably adsorbs organics from water.

Roll Width and edge closure: Total Roll width is ~15' 2". Effective product width measures 15'.

Roll Length: 100'

Packaging: Packaged on min. 4" I.D. core tubes, and wrapped with polyethylene plastic packaging.

### **2.3 Product Labeling**

- A. Prior to shipment, the RCM manufacturer shall label each roll, identifying:
  1. Product identification information (Manufacturer's name and address, brand product code).
  2. Lot number and roll number.
  3. Roll length, width and weight.

### **2.4 Packaging**

- A. The RCM shall be wound around a rigid core whose diameter is sufficient to facilitate handling. The core is not necessarily intended to support the roll for lifting but should be sufficiently strong to prevent collapse during transit.
- B. All rolls shall be labeled and bagged in packaging resistant to photo degradation by ultraviolet (UV) light.

## **3.0 EXECUTION**

### **3.1 Shipping and Handling**

- A. The manufacturer assumes responsibility for initial loading the RCM. Shipping will be the responsibility of the party paying the freight. Unloading, on-site handling and storage of the RCM are the responsibility of the Contractor, Installer or other designated party.
- B. A visual inspection of each roll should be made during unloading to identify if any packaging has been damaged. Rolls with damaged packaging should be marked and set aside for further inspection. The packaging should be repaired prior to being placed in storage.
- C. The party responsible for unloading the RCM should contact the Manufacturer prior to shipment to ascertain the appropriateness of the proposed unloading methods and equipment.

### **3.2 Storage**

- A. Storage of the RCM rolls shall be the responsibility of the installer. A dedicated storage area shall be selected at the job site that is away from high traffic areas and is level, dry and well drained.
- B. Rolls should be stored in a manner that prevents sliding or rolling from the stacks and may be accomplished by the use of chock blocks. Rolls should be stacked at a height no higher than that at which the lifting apparatus can be safely handled (typically no higher than four).
- C. All stored RCM materials must be covered with a plastic sheet or tarpaulin until their installation.
- D. The integrity and legibility of the labels shall be preserved during storage.

### **3.3 Bathymetry**

- A. Any surface upon which the RCM is installed shall be prepared in accordance with the project specifications and drawings.
- B. Immediately prior to RCM deployment, the surface shall be approved by the engineer.
- C. It shall be the installer's responsibility thereafter to indicate to the Engineer any change in the condition of the surface that could cause it to be out of compliance with any of the requirements listed in this Section.

### **3.4 RCM Placement**

- A. RCM rolls should be delivered to the working area of the site in their original packaging. Immediately prior to deployment, the packaging should be carefully removed without damaging the RCM. The orientation of the RCM (i.e., which side faces up) should be in accordance with the Engineer's recommendations.

- B. RCM rolls may be suspended and maneuvered over the surface utilizing a steel pipe placed through the core of the roll and suspended from suitable equipment utilizing a spreader bar to prevent chaffing of the edge of the roll.
- C. Care must be taken to minimize the extent to which the RCM is dragged across the surface in order to avoid damage suspension of the contaminants.
- D. The RCM panels shall be placed parallel to the direction of the slope.
- E. All RCM panels should lie flat on the underlying surface, with no wrinkles or fold, especially at the exposed edges of the panels.
- F. Only as much RCM shall be deployed as can be covered at the end of the working day with a sand or soil cover.

### **3.5 Anchorage**

As directed by the project drawings and specifications, the end of the RCM roll shall be anchored with a panel runout designed to resist pull out forces encountered during deployment.

### **3.6 Seaming**

- A. The RCM seams are constructed by overlapping their adjacent edges. Seams at the ends of the panels should be constructed such that they are shingled in the direction of the grade/slope.
- B. The minimum dimension of the longitudinal overlap should be 12 inches (300 mm). End-of-roll overlapped seams should be constructed with a minimum overlap of 24 inches (600 mm).
- C. RCM panels may be sewn together using geotextile sewing equipment prior to deployment to facilitate material deployment.

### **3.7 Detail Work**

Cutting the RCM should be performed using a sharp shears. Care should be taken to prevent spilling of the reactive media after RCM has been cut.

### **3.8 Damage Repair**

If the RCM is damaged (torn, punctured, perforated, etc.) during installation, it may be possible to repair it by cutting a patch to fit over the damaged area. The patch shall be obtained from a new RCM roll and shall be cut to size such that a minimum overlap of 12 inches (300 mm) is achieved around all of the damaged area. Place sand bags directly on top of the patch to prevent displacement of the patch during placement of the cover material.

### **3.9 Cover Placement**

- A. Cover materials shall be free of angular stones or other foreign matter that could damage the RCM. Cover material should be approved the project Engineer with respect to particle size, uniformity and chemical compatibility.
- B. Cover shall be placed over the RCM using construction methods that minimize stresses on the RCM. A minimum thickness of 6 inches (150 mm) of cover should be placed.
- C. Cover materials should be placed in a manner that prevents the material from entering the RCM overlap zones. Cover material shall not be pushed down slopes, to minimize tensile forces on the RCM.