

# ARMORFORM®

YOUR SOLUTION TO PERMANENT HARD ARMOR EROSION CONTROL

## Installation Methods

### STEP 1: SITE PREPARATION

Slope grading equipment is used to excavate to required depths, contour the slopes to the specified slope ratio and form the anchor, toe and terminal trenches around the perimeter of the installation. The area to be protected must be free of rock, brush, roots or large soil clods. ARMORFORM® should be placed on a compacted subgrade and stable slope. The fabric forms are usually anchored into a trench approximately two feet deep, by one foot wide, at the top of the slope. The trench is located one to three feet from the top edge of the slope.

### STEP 2: PANEL PLACEMENT AND FIELD ASSEMBLY

Once the slope and other related excavation conforms to finished grade and elevation specifications, installation of the filter fabric and the ARMORFORM® fabric may begin. After a site specific filter fabric has been installed, the custom sized ARMORFORM® panels are rolled down the slope and positioned for unfolding. The panels are positioned according to prepared drawings where each panel is identified for placement. The panel is then unfolded by a work crew and pulled into position. The ARMORFORM® panels should be positioned loosely along the slope. Once positioned, the upper edge of the panel is folded into the anchor trench atop the slope. The extra fabric provided for contraction during pumping should be accumulated and held at the top of the slope and gradually released as the panel is filled. Adjacent panels are joined by field sewing or zippering the double layer fabric forms, bottom edge to bottom edge, and top edge to top edge. When installing Articulating Block Mat (ABM), transverse revetment cables should be spliced together prior to joining of the top layers of fabric.



### STEP 3: INSPECTION BEFORE FILLING

When inspecting the panels prior to pumping, wrinkles and loose fabric should be expected as they are necessary to compensate for form contraction. As much as 10% contraction in each direction may be experienced during the filling process. Carolina Yarn & Fabrics, Inc. can be contacted to determine the appropriate contraction factor for your site conditions. All field sewn seams, zipper connections and lap joints must be carefully inspected to assure that no holes in the forms are present. Colored thread is advised for all field sewn seams to facilitate inspection. For detailed installation guidelines contact Carolina Yarn & Fabrics, Inc.



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Fabric Formed Hard Armoring

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### STEP 4: STRUCTURAL GROUT PUMPING

The upper edge of the ARMORFORM® panel that has been placed into the anchor trench should be weighted down with sandbags to prevent the panel from sliding down the slope as it is pumped with grout. Grout should then be injected into the lower mat area first, proceeding gradually up the slope and into the upper anchor trench until the entire panel has been filled. Structural grout is injected into the ARMORFORM® panels by inserting a 3" diameter grout hose through a small slit in the upper layer of fabric near the top of the slope. A grout tight seal is formed by wrapping the injection hose with burlap, or similar material, while the grout is being injected. When the hose is withdrawn, the burlap is stuffed into the hole where it remains until the grout is no longer fluid. The burlap is then removed and the concrete surface at the hole is smoothed by hand.

### CONCRETE MIX DESIGN

A pumpable fine aggregate concrete (structural grout) is utilized in the construction of all ARMORFORM® revetments. As an aid to pumpability, a pozzolan grade fly ash may be substituted for up to 35% of the cement. Mixes designed with 5% to 8% air content will have improved pumpability and resistance to freeze-thaw. A retarding admixture may be used in hot weather. Excess mixing water expelled through the permeable ARMORFORM® fabric will reduce the volume of fluid structural grout from 27 cu. ft. to approximately 25 cu. ft. of hardened grout and also reduce the water/ cement ratio from approximately 0.7 to approximately 0.4. Fine aggregate concrete consistency should be in the 9-11 second range when passed through the 3/4" orifice of the standard flow cone described in ASTM C-939-93. Tests utilizing a concrete slump cone are not appropriate.



### TYPICAL RANGE OF MIX PROPORTIONS

Material	Mix Proportions	After Placement
	lbs./cu. yd.	lbs./cu. yd.
Cement	750-850	810-920
Sand (FM 2.60)	2030-2120	2195-2290
Water	485-555	360-430
Air	As required	NA

ARMORFORM® is pumped and formed under pressure. This method provides superior strength and durability when compared to conventional concrete forming. Tests show that structural grout pumped into ARMORFORM® is 1.5 to 1.75 times stronger, plus it absorbs 5% less water.

The ARMORFORM® system is ideal for situations requiring resistance to mild concentration of acid, alkali, salt or petrochemicals. With minimal water absorption, ARMORFORM also resists freeze - thaw action.

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