Special Specification 4056
Inwater Column or Piling Encapsulation

1. DESCRIPTION

Prepare columns or piling and encapsulate with a translucent, Fiberglass Reinforced Polymer (FRP) jacket as shown on the plans. Inject a water insensitive epoxy grout into the space between the jacket and the column or piling.

2. MATERIALS

Use one of the pre-approved systems listed in Table 1. Furnish the system's materials including:

- FRP outer jacket of a minimum 1/8 in. thickness and annulus of at least 3/8 in. between the jacket and the column or piling.
- Epoxy grout components compatible with the encapsulation system, and epoxy paste for sealing the outer jacket.
- Equipment expressly designed for proportioning, mixing, and pumping epoxy grout into the jackets.

Table 1
Pre-approved Encapsulation Systems

System Name	Producer	Contact Information
MasterBrace 6000UW	BASF	800-433-9517 www.master-builder-solutions.basf.us
FX-70 Structural Repair and Protection System	Simpson Strong-Tie Company Inc.	800-999-5099; www.strongtie.com
PileForm F – Fiberglass Reinforced Plastic & Pile Jacket Epoxy Grout	Five Star	800-243-2206; www.fivestarproducts.com
SeaShield Series 500 Pile Encapsulation & SeaShield 550 Epoxy Grout	Denso North America Inc.	888-821-2300; www.densona.com

3. CONSTRUCTION

3.1. **Submittals**. Before work begins, submit the following for approval:

- The make and model of epoxy grout equipment for use in proportioning, pumping, and mixing. Include the manufacturer's equipment manuals.
- Locations of typical longitudinal and transverse joints in the outer jackets including a description of the joint sealing methods, details of the typical bottom seal, temporary bracing, and support required during placement and curing of epoxy grout.
- Details of fixed or adjustable stand-offs and their locations on the outer jackets.
- Details of injection ports and the sequence to be used to place the epoxy grout.
- Details of final finishing of epoxy grout at the top of the encapsulation, permanent closure of the injection ports, and repair method for defects.
- Manufacturer's Material Safety Data Sheets for each material to be used.

3.2. **Substrate Surface Preparation.** Thoroughly clean substrate surfaces of marine growth, oil, grease, mud, rust, loose concrete, micro-organisms, and any other deleterious material which might inhibit bond between the epoxy grout and the concrete or steel. For concrete columns or piles, remove loose or delaminated concrete, providing a minimum of 1/2 in. clearance behind any exposed reinforcement. Install the jackets and inject the epoxy grout within 48 hours of the surface preparation.

3.3. **Encapsulation.** Prepare and install the jacket with temporary bracing and support following the manufacturer's recommendations. Pump epoxy grout to fill the annulus between the column or pile and the FRP jacket in accordance with approved procedures, the injection sequence, and the manufacturer's recommendations.

3.4. **Final Finishing and Inspection of the Completed Encapsulation.** Remove the temporary supports after the grouting process is completed and the grout is sufficiently cured as recommended by the manufacturer. Inspect the completed encapsulation for voids or other defects. Repair voids in the epoxy grout in accordance with the manufacturer's recommended procedures.

4. MEASUREMENT

This Item will be measured by the foot along the length of the column or piling. This is a plans quantity measurement Item. The quantity to be paid for is shown in the proposal unless modified by Article 9.2, "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

5. PAYMENT

The work performed and the materials furnished in accordance with this Item and measured under "Measurement" will be paid for at the unit price bid for "Inwater Column Encapsulation" or "Inwater Piling Encapsulation." This price is full compensation for cleaning and preparing the column or piling surfaces, furnishing the materials for the installation and placement, installing the encapsulation system, and for tools, labor, equipment, and incidentals.