PileForm™ F System

High Strength FRP Repair and Protection

Don't Replace. Restore.

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Engineering Your Success.

Installation Guide

Five Star® PileForm™ F FRP Pile Rehabilitation Jackets exceed marine engineering standards, offering durable, long-lasting protection against extreme environmental conditions. Proven performance—field-tested by commercial divers and engineers in real-world conditions.

NOTE: Read these instructions thoroughly and refer to the Technical Data Sheet prior to installation.

STEP 1 - Installation & Mobilization Planning

A. Appropriate storage to condition materials before placement.

B. Define mixing and pumping location so not to exceed 250 ft (75 m) of pumping distance and allow for environmental impact requirements.


Step 2.A Cleaning piles

STEP 2 - Substrate Preparation

A. Clean existing pilings using a minimum of 4,000 psi (276 Bar) high-pressure water blast or other mechanical means of cleaning piles of marine growth, rust, and other contaminants.

B. Attach reinforcement as specified by engineer.

C. If jacketed into the mud line, excavate the required material.

D. If it is a suspended jacket, install a support platform to support the jacket.

E. If the jacket will be removed after installation, contact Five Star Products.


Step 2.B Attaching reinforcement

STEP 3 - Pump Port Assembly

If planning to pour or tremie grout jackets, Step 3 is not required. Contact Five Star Products.

A. Drill the appropriate sized hole into PileForm™ F Jacket to match the diameter of the 2 inch (5 cm) minimum NPT bulkhead fitting pump port using a diamond-tipped core hole saw.

B. Space pump port holes approximately every 5 inches (1.5 m), or as specified, alternating hole placement on opposite sides.

Step 3.B Pump port spacing

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STEP 4 - Spacer Installation

2 inch (5 cm) long pvc spacers with OD similar to annular or coverage space, fixed with stainless screws or non-corrosive wire.

A. Install longitudinal spacers, parallel to the length of the PileForm™ F Jacket, 6 inches (150 mm) from the top and bottom and evenly spaced longitudinally every 36 inches (1000 mm).

B. For round or flat jackets, install spacers every 12 inches (300 mm) around the inside circumference of the jacket.

C. For square jackets, install spacers 6 inches (150 mm) from each corner and add additional spacers between corner spacers so spacers are not more than 12 inches (300 mm) apart.

Step 5 Epoxy Gel Adhesive Installation

STEP 5 - Epoxy Gel Adhesive Installation

A. Insert static mixer tip 50% into the groove.

B. Fill epoxy 33% of the groove depth.

STEP 6 - FRP Jacket on Substate Installation

A. If unreinforced repair, open PileForm™ F Jacket around substrate and allow to slide into place.

B. If reinforced repair, place PileForm™ F Jacket beside repair then open to avoid sliding jacket along reinforcement.

STEP 7 - Bottom Seal Installation

A. Seal the open end of the PileForm™ F Jacket using a backer rod which will create a seal between the jacket and the pile after ratchet straps are tensioned in place.


Step 6 Opening an FRP Jacket Correctly

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STEP 8 - Secure Jacket Closure

A. For round jackets, once around the pile, engage the tongue and groove enclosure with rachet straps placed every 12 - 18 inches (305 - 450 mm) on center as approved by the project engineer. Ensure a minimum of 2 inches (5 cm) engagement of tongue and groove.

B. For square jackets, use bracing materials as specified and approved by the project engineer.

C. Install screws every 6 inches (150 mm) longitudinally along the closure ensuring screws penetrate both sides of the groove and the tongue.


Step 8.A Secure Jacket Closure


Step 8.B Bracing Example

STEP 9A - Annular Space Grouting with Five Star® Cementitious Underwater High Strength Grout

A. Use mortar mixer (stationary barrel with moving paddles).

B. Use peristaltic / rotar stator pump. If pumping distances greater than 50 feet (15 m) or if planning to pour or tremie grout the jackets, contact Five Star Products.

C. Add 75% of the potable water first to the mixer.

D. Add grout and allow to mix for a minimum of 5 minutes. Add remaining 25% of water and allow to mix for an additional 3 minutes. (doesn't match TDS)

E. Discharge all the grout into the pump hopper.

F. Engage pump until grout fills hose. Attach hose to bottom pump port.

G. Fill bottom 6 inches (150 mm) of PileForm™ F Jacket. Allow to set for 24 hours to form a hydraulic seal.

H. Next day, repeat steps to grout space. Fill next pump port. Pump material until material is no more than 6 inches (150 mm) from the next port or until it reaches the top of the jacket. NOTE: Material can be placed in lifts if approved by the project engineer.


Step 9A.G Fill Bottom 6 inches of Jacket.

STEP 9B - Annular Space Grouting with Five Star® High Flow Pile Jacket Epoxy Grout LPL-HF

A. Use mortar mixer (stationary barrel with moving paddles).

B. Use peristaltic / rotar stator pump. If pumping distances greater than 50 feet (15 m) or if planning to pour or tremie grout the jackets, contact Five Star Products.

C. Materials should be stored in dry conditions. All components should be conditioned for 24 hours between 40°F and 100°F (4°C - 38°C) prior to use. For optimum ease of placement, condition all components to between 65°F and 85°F (18°C - 29°C). Refer to Five Star® High Flow Pile Jacket Epoxy Grout LPL-HF Technical Data Sheet for typical properties.

D. Pour all Component B (hardener) into pail containing Component A (resin). Mix thoroughly by hand with a paddle or with a slow speed drill and paddle mixer to avoid air entrapment. Mix for 2 minutes.

E. Add mixed A&B to the mortar mixer. Slowly add three bags of Part C aggregate to the mixer as it is rotating until aggregate is completely saturated.

F. Discharge all the grout into the pump hopper.

G. Engage pump until grout fills hose. Attach hose to the bottom pump port.

H. Fill bottom 6 inches (150 mm) of jacket. Allow to set for 24 hours to form a hydraulic seal.

I. Next day, repeat steps to grout the space. Fill the next pump port. Pump material until it is no more than 6 inches (150 mm) from the next port or until it reaches the top of the jacket.

J. Promptly clean up all epoxy grout and pump with suitable water and detergent or a suitable solvent before setting begins.


Step 9B.H Fill Bottom 6 inches of Jacket.

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STEP 10 - Installation Completion

A. After the initial set of the grout, fill the remaining head space up to the top of the jacket and create a 45° angle using Five Star® Splash Zone™ or equivalent product. This will seal the top of the jackets preventing any water from getting between the PileForm™ F Jacket and the grout, and it will help prevent any problems as a result of freeze/thaw.

B. After the grout is set, remove external bracing.

C. It is recommended that inspection workers ensure the entire PileForm™ F Jacket has been filled and no voids exist under the jacket.

D. If the decision has been made by the engineer to use removable PileForm™ F Jackets, they can be removed at this time.

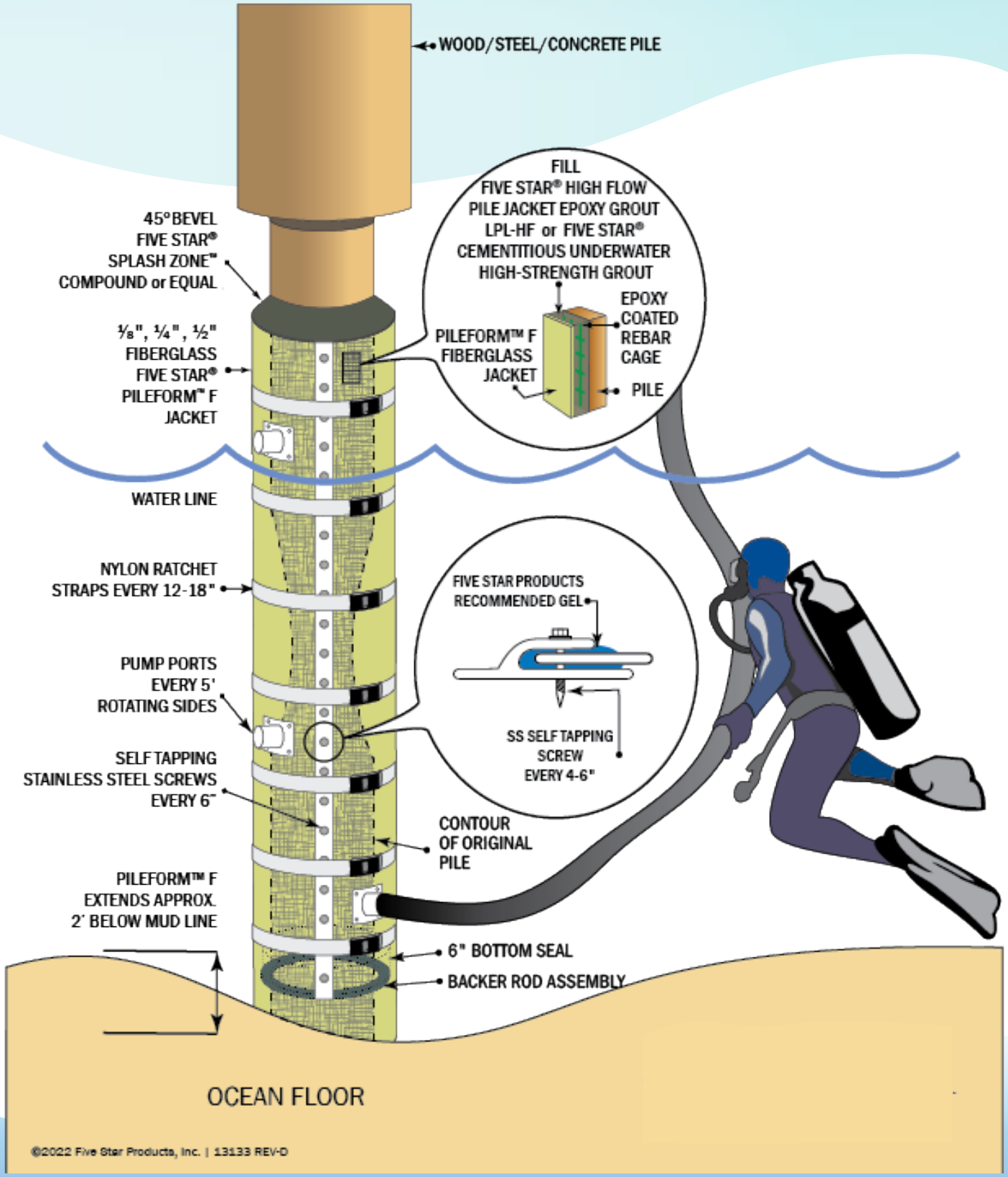
"General Deterioration Repairs" made with Fiberglass Jackets project a service life of 20-40 years...

Reference: "*Procedures, Cost and Effectiveness for Deteriorated Bridge Substructure Repair by Baolin Wan, Christopher M. Foley, Steven W. Ainge, and Christie Nguyen; Department of Civil, Construction and Environmental Engineering - Marquette University* in association with Wisconsin DOT; pg 230.

For short form specification, refer to the PileForm™ F Material Performance Specification.

Our field engineering experts can work with you to develop a solution that fits your needs. Contact Five Star Products at 1-800-243-2206.

Pile Encapsulation System



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About Five Star® Marine Products

In the challenging marine construction landscape, Five Star® is a trusted name. Our products, backed by rigorous field testing conducted by expert divers and engineers, offer effective solutions, particularly for pile restoration in harsh environments marked by ice, debris, and chemical pollutants. Designed to meet the diverse challenges of tidal variations, currents, and hostile marine settings, Five Star® products prioritize ease of installation, reliability, and consistent high-quality performance.

With Five Star®, marine professionals find both quality products and unwavering support.

Our unmatched support offerings are:

- Application Mock-Ups
- Installer Training
- On-Site Support
- Pre-Grout Meetings
- Product Demos
- Product Selection Guidance
- Project Pricing
- Specification Design Guidance

Custom is Our Standard

Specializing in Custom Fiberglass Jackets & Forms

FIVE STAR PRODUCTS, INC.
2 Enterprise Drive
Suite 303
Shelton, CT 06484-4733 U.S.A.
Phone: +1 203-336-7900
Toll Free: 1-800-243-2206 (U.S.)
FiveStarProducts.com

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