



**FIVE STAR
MARINE**

Structural Concrete Underwater HP

Hand Pack Underwater Repair

Description

Five Star Marine Structural Concrete Underwater HP is a rapid strength gain, single component, permanent concrete repair material intended for underwater application by hand or trowel. This concrete repair material allows small volume hand placements with minimal washout underwater. Designed for placement in tidal zones and underwater only, application thickness may range from one-half inch (13 mm) to several inches in a single installation.

Uses

- Underwater repair of concrete tanks, dams and hydraulic structures
- Underwater repair of concrete piles, piers, seawalls and marine structures
- Filling underwater concrete cavities and voids

Benefits

- Rapid setting
- Minimal washout
- Saltwater resistant
- High three hour strength
- Chloride and sulfate resistant
- One component for reliability and ease of use
- Variable application thicknesses

Packaging and Yield

Five Star Structural Concrete Underwater HP is packaged in heavy-duty polyethylene lined bags or plastic pails and is available in 50 lb (22.7 kg) units yielding approximately 0.42 cubic feet (11.9 liters) at maximum water.

Shelf Life

One year in original unopened packaging when stored in dry conditions; high relative humidity will reduce shelf life.

*TYPICAL PROPERTIES AT 70°F (21°C)	
Compressive Strength, ASTM C 109	
3 Hours	4000 psi (27.6 MPa)
1 Day	5000 psi (34.5 MPa)
7 Days	6000 psi (41.4 MPa)
28 Days	7000 psi (48.3 MPa)
Underwater Bond Strength, ASTM C 882	
1 Day	950 psi (6.5 MPa)
7 Days	1150 psi (7.9 MPa)
Length Change, ASTM C 157	
28 Days Wet	+0.02%
Thermal Coefficient of Expansion, ASTM C 531	5.0 x 10 ⁻⁶ in/in/°F (9.0 x 10 ⁻⁶ mm/mm/°C)
Chloride Ion Permeability, ASTM C 1202	
28 Days	Negligible (<100 Coulombs)
Working Time at 70°F (21°C)	10 minutes

**The data shown above reflects typical results based on laboratory testing under controlled conditions. Reasonable variations from the data shown above may result. Test methods are modified where applicable.*



Structural Concrete Underwater HP

Placement Guidelines

- 1. Surface Preparation:** All horizontal and vertical concrete surfaces in contact with Five Star Structural Concrete Underwater HP shall be free of marine growth, laitance, and other contaminants. All horizontal and vertical concrete surfaces must be clean, sound and rough to ensure a good bond. Presoak concrete surfaces in tidal zone areas. A perimeter edge and minimum depth of 1/2 inch (13 mm) should be provided for a durable repair. Feather edging is not desirable. Repair surfaces shall be between 45°F and 90°F (7°C and 32°C) at time of placement. For cold and hot weather placement, refer to Design-A-Spec™ or call the Five Star Marine Engineering and Technical Service Center at (800) 338-3145.
- 2. Mixing:** Five Star Structural Concrete Underwater HP is used for small volume underwater repairs. Mix thoroughly with a drill and paddle mixer to a uniform consistency. Start by adding the minimum amount of potable water (total water content is 3.0 to 3.5 quarts potable water per 50 lb. unit) followed by repair material and mix for three to four minutes. Adjust consistency as necessary, but do not exceed maximum water content as stated on the package or add an amount that will cause segregation. Do not mix more material than can be placed in ten minutes.
- 3. Placement Procedures:** Firmly work Five Star Structural Concrete Underwater HP into concrete surface with a trowel or by hand, taking care not to leave air pockets. Application is from one side of the repair to the other, filling the repair to the desired level. For multiple lift applications, contact the Five Star Marine Engineering and Technical Service Center. Finish as necessary.
SPECIAL CONDITIONS: For use in cold temperatures, Five Star Structural Concrete Underwater HP must be maintained at a temperature of at least 45°F (7°C). Protect from freezing until a compressive strength of 1000 psi (6.9 MPa) is obtained. In hot temperatures, Five Star Structural Concrete Underwater HP should be kept as cool as possible, but not exceeding 90°F (32°C). Cold water should be used for mixing to help maintain sufficient working time. Summerset® may also be used if necessary to provide more working time.
- 4. POST-PLACEMENT PROCEDURES:** In tidal zones, Five Star Structural Concrete Underwater HP shall be kept wet continuously for 30 minutes after hardening.

NOTE: PRIOR TO APPLICATION, READ ALL PRODUCT PACKAGING THOROUGHLY. For more detailed placement procedures, refer to Design-A-Spec™ installation guidelines or call the Five Star Marine Engineering and Technical Service Center at (800) 338-3145.

Considerations

- Never exceed the maximum water content stated on the package or add an amount that will cause segregation.
- Repair material shall be protected from freezing until it reaches a compressive strength of 1000 psi (6.9 MPa).

Caution

Contains cementitious material and crystalline silica. International Agency for Research on Cancer has determined that there is sufficient evidence for the carcinogenicity of inhaled crystalline silica to humans. Take appropriate measures to avoid breathing dust. Avoid contact with eyes and contact with skin. In case of contact with eyes, immediately flush with plenty of water for at least 15 minutes. Immediately call a physician. Wash skin thoroughly after handling. Keep product out of reach of children. **PRIOR TO USE, REFER TO MATERIAL SAFETY DATA SHEET.**

For worldwide availability, additional product information and technical support, contact your local Five Star Marine sales representative, or you may call the Five Star Marine Engineering and Technical Service Center at (800) 338-3145.

Warranty

Five Star Marine warrants that at the time and place we make shipment, our materials will be of good quality and will conform to our published specifications in force on the date of acceptance of the order. THE FOREGOING WARRANTY SHALL BE EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER WARRANTIES OTHERWISE ARISING BY OPERATION OF LAW, COURSE OF DEALING, CUSTOM OR TRADE OR OTHERWISE. As the exclusive remedy for breach of this Warranty, we will replace defective materials, provided, however, that the buyer examines the materials when received and promptly notify in writing of any defect before the materials are used or incorporated into a structure. Twelve (12) months after Five Star Marine has shipped the materials, all our Warranty and other duties with respect to the quality of the materials delivered shall conclusively be presumed to have been satisfied, all liability therefore terminates, and not acting for breach of any duties may thereafter commence. Five Star Marine shall in no event be liable for consequential damages. Unless otherwise agreed to in writing, no warranty is made with respect to materials not made by Five Star Marine. We cannot warranty or in any way guarantee any particular method of use of application or the performance of materials under any particular condition. Neither this Warranty nor our liability may be extended or amended by our sales people, distributors or representatives or by any sales information or drawings.



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