



FIVE STAR

STRUCTURAL CONCRETE® UNDERWATER HP

Hand Applied, Rapid Strength Underwater Repair

PRODUCT DESCRIPTION

Five Star Structural Concrete® Underwater HP (Hand Pack) 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 underwater washout. Designed for placement in tidal zones and underwater, application thickness may range from one-half inch (13 mm) to several inches in a single installation. Five Star Structural Concrete® Underwater HP provides corrosion protection of steel reinforced structures with migrating corrosion inhibitor technology and very low chloride ion permeability.

ADVANTAGES

- Rapid set underwater placement
- Minimal washout
- Saltwater resistant
- Chloride and sulfate resistant
- High early strength
- Variable application thickness
- One component for reliability and ease of use
- Migrating corrosion inhibitor technology

USES

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

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 0.48 cubic feet (13.6 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	3,000 psi (20.7 MPa)
1 Day	4,000 psi (27.6 MPa)
7 Days	5,000 psi (34.5 MPa)
28 Days	7,000 psi (48.3 MPa)

Underwater Bond Strength, ASTM C 882

7 Days	1,150 psi (7.9 MPa)
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Length Change, ASTM C 157

28 Days Wet	+0.02%
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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.

PLACEMENT GUIDELINES

- 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. Featheredging 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 Five Star Products' Engineering and Technical Service Center at 1-800-243-2206.
- MIXING:** Five Star Structural Concrete® Underwater HP is designed 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 followed by repair material and mix for two to three minutes. Adjust consistency as necessary. Do not mix more material than can be placed in 10 minutes.
- 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 application instructions, contact Five Star Products' 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 1,000 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. Five Star® Summerset® may also be used if necessary to provide more working time.
- 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 Products' Engineering and Technical Service Center at 1-800-243-2206.

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 1,000 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® distributor, local sales representative, or you may call Five Star Products' Engineering and Technical Service Center at 1-800-243-2206.

SKU / PRODUCT CODE	DESCRIPTION	UNIT SIZE
29215	Five Star Structural Concrete® Underwater HP	50 lb. Bag
Call	Five Star Structural Concrete® Underwater HP	50 lb. Pail

WARRANTY: "FIVE STAR PRODUCTS, INC. (FSP) PRODUCTS ARE MANUFACTURED TO BE FREE OF MANUFACTURING DEFECTS AND TO MEET FSP'S CURRENT PUBLISHED PHYSICAL PROPERTIES WHEN APPLIED IN ACCORDANCE WITH FSP'S DIRECTIONS AND TESTED IN ACCORDANCE WITH ASTM AND FSP STANDARDS. HOWEVER, SHOULD THERE BE DEFECTS OF MANUFACTURING OF ANY KIND, THE SOLE RIGHT OF THE USER WILL BE TO RETURN ALL MATERIALS ALLEGED TO BE DEFECTIVE, FREIGHT PREPAID TO FSP, FOR REPLACEMENT. THERE ARE NO OTHER WARRANTIES BY FSP OF ANY NATURE WHATSOEVER, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IN CONNECTION WITH THIS PRODUCT. FSP SHALL NOT BE LIABLE FOR DAMAGES OF ANY SORT, INCLUDING PUNITIVE, ACTUAL, REMOTE, OR CONSEQUENTIAL DAMAGES, RESULTING FROM ANY CLAIMS OF BREACH OF CONTRACT, BREACH OF ANY WARRANTY, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR FROM ANY OTHER CAUSE WHATSOEVER. FSP SHALL ALSO NOT BE RESPONSIBLE FOR USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT HELD BY OTHERS."

Five Star Products, Inc.
Corporate Headquarters
750 Commerce Drive
Fairfield, CT 06825 USA
Tel: 203-336-7900 • Fax: 203-336-7930
FiveStarProducts.com



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