



# FIVE STAR STRUCTURAL CONCRETE® UNDERWATER HP

Hand Pack Underwater Repair

## PRODUCT DESCRIPTION

Five Star Structural Concrete® Underwater HP is a high strength, one component, permanent concrete repair material intended for underwater application by hand. This concrete repair material features 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.

## ADVANTAGES

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

## 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

## TECHNICAL SUPPORT

Five Star Products maintains the industry's foremost Technical Support Group:

- Over 30 years of experience in concrete repair
- Technical Center staffed with experienced engineers available for consultation
- Design-A-Spec™ for engineering specification assistance
- Experienced representatives for field service
- Corporate research laboratory available to customize products for unique applications

## PACKAGING AND YIELD

Five Star Structural Concrete Underwater HP is packaged in heavy-duty polyethylene lined bags containing 50 lb (22.7 kg) 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. Higher humidity will reduce shelf life.

TYPICAL PROPERTIES AT 73°F (23°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 <sup>-6</sup> in/in/°F (9.0 x 10 <sup>-6</sup> mm/mm/°C)
Chloride Ion Permeability, ASTM C 1202	
28 Days	Negligible (< 100 Coulombs)

The data shown above reflect 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

1. **SURFACE PREPARATION:** All surfaces in contact with Five Star Structural Concrete® Underwater HP shall be free of marine growth, laitance, and other contaminants. Concrete must be clean, sound and rough to ensure a good bond. A one-half inch (13 mm) minimum perimeter edge 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 the time of placement.
2. **MIXING:** Five Star Structural Concrete Underwater HP is used for small volume underwater repairs. Hand mix thoroughly, above water, to a uniform nonsag consistency. 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:** When placing, work material firmly into prepared area or void.  
**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, material shall be kept wet for 30 minutes after hardening.  
**NOTE: PRIOR TO APPLICATION, READ ALL PRODUCT PACKAGING THOROUGHLY.** For more detailed placement procedures, refer to Design-A-Spec™ or call the Five Star Products Technical Center at (800) 243-2206.

## LIMITATIONS

- Never exceed the maximum water content as stated on the package or add an amount that will cause segregation.
- Temperature of surfaces must be between 45°F and 90°F (7°C and 32°C) at time of placement.
- Repair material shall be protected from freezing until it reaches 1000 psi (6.9 MPa).

## CAUTION

Contains cementitious material and crystalline silica. International Agency for Research on Cancer has evaluated 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's Technical Center at (800) 243-2206.

**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, EXPRESSED 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."



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