



STRUCTURAL CONCRETE® **UNDERWATER HAND PACK**

Hand Applied, Rapid Strength Underwater Repair

PRODUCT DESCRIPTION

Five Star Structural Concrete® Underwater 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 6 mm to 75 mm in a single installation. Five Star Structural Concrete® Underwater Hand Pack 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 Hand Pack is packaged in 25 kg bags yielding approximately 13.3 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 25°C AT MAX WATER

Compressive Strength, ASTM C 109

3 Hours	17 MPa
1 Day	24 MPa
7 Days	35 MPa
28 Days	45 MPa

Underwater Bond Strength, ASTM C 882

7 Days	8 MPa
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Length Change, ASTM C 157

28 Days Wet	+0.02%
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Working Time at 25°C

May be affected by colder & warmer temperatures¹ 5 - 10 minutes

¹ Refer to Five Star® Technical Bulletins: *Concrete Repair Material Placement in Cold Weather*; *Concrete Repair Material Placement in Hot Weather*

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.

APPLICATION INFORMATION

Mixing Ratio 3.5 - 4.0 L potable water per 25 kg bag

Placement Depth 6 mm - 75 mm
> 75 mm, call Five Star Products

PLACEMENT GUIDELINES

At time of placement, if temperatures of equipment and surfaces are not between 2°C and 35°C, contact Five Star Products for cold and hot weather procedures. For atmospheric temperature above 35°C, working and setting times will be reduced and material may dry prematurely without proper curing. Atmospheric temperatures below 20°C will slow setting time and strength development. Provide conditioning, either cooling or heating, plus curing as necessary in temperature extremes.

- SURFACE PREPARATION:** All horizontal and vertical concrete surfaces in contact with Five Star Structural Concrete® Underwater Hand Pack 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 6 mm should be provided for a durable repair. Featheredging is not desirable. Repair surfaces shall be between 2°C and 35°C at time of placement. Contact Five Star Products for further information.
- MIXING:** Five Star Structural Concrete® Underwater Hand Pack 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 2 - 3 minutes. Adjust consistency as necessary. Do not mix more material than can be placed in 5 - 10 minutes. Never exceed the maximum water content state on the package or add an amount that will cause segregation.
- PLACEMENT PROCEDURES:** Firmly work Five Star Structural Concrete® Underwater Hand Pack 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. Finish as necessary.

SPECIAL CONDITIONS: For use in cold temperatures, Five Star Structural Concrete® Underwater Hand Pack must be maintained at a temperature of at least 2°C. Protect from freezing until a compressive strength of 7 MPa is obtained. In hot temperatures, Five Star Structural Concrete® Underwater Hand Pack should be kept as cool as possible, but not exceeding 35°C. Cold water should be used for mixing to help maintain sufficient working time.

- POST-PLACEMENT PROCEDURES:** In tidal zones, Five Star Structural Concrete® Underwater Hand Pack shall be kept wet continuously for 30 minutes after hardening.

NOTE: PRIOR TO APPLICATION, READ ALL PRODUCT PACKAGING and SAFETY DATA SHEET THOROUGHLY. For more information contact Five Star Products.

HEALTH AND SAFETY

Contains cementitious material. May produce an allergic reaction. 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, READ THE SAFETY DATA SHEET.**

SKU / PRODUCT CODE	DESCRIPTION	# UNITS/PALLET	UNIT SIZE
29225	Five Star Structural Concrete® Underwater Hand Pack	40	25 kg Bag

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."

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