



STRUCTURAL CONCRETE HTR

High Early Strength Repair For High Temperature Exposure

PRODUCT DESCRIPTION

Five Star Structural Concrete® HTR is a unique high temperature resistant concrete repair material which can be pumped or poured into place. Five Star Structural Concrete® HTR gains strength rapidly and can be exposed to 540°C in six hours and up to 1,320°C after a 7-day curing procedure.

ADVANTAGES

- Thermal shock resistant
- High temperature resistance
- Coarse aggregate extension up to 100%
- Resistant to sulfates
- High early strengths
- Excellent freeze/thaw resistance

USES

- Areas of high temperature exposure
- Thermal cycling up to 1320°C
- Rapid repairs during shutdowns
- Coker, kiln and foundry repairs

PACKAGING AND YIELD

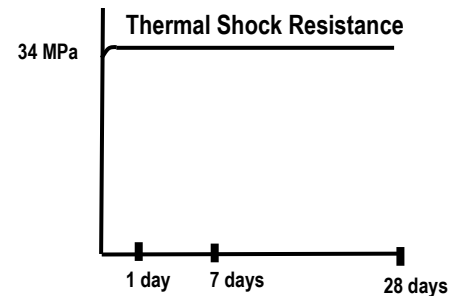
Five Star Structural Concrete® HTR is packaged in heavy-duty polyethylene lined bags and is available in 25 kg units yielding approximately 12.4 liters at maximum water.

SHELF LIFE

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

| TYPICAL PROPERTIES AT 25°C | |
|----------------------------------------------------------------|---------------------------------|
| Compressive Strength, ASTM C 109 | |
| 6 Hours | 17 MPa |
| 1 Day | 31 MPa |
| 7 Days | 38 MPa |
| 28 Days | 48 MPa |
| Bond Strength, ASTM C 882 | |
| 1 Day | 10 MPa |
| 7 Days | 17 MPa |
| Thermal Coefficient of Expansion, ASTM C 531 | |
| | 9.0 x 10 ⁻⁶ mm/mm/°C |
| Working Time at 25°C, ASTM C 1437 Modified | |
| May be affected by colder and warmer temperatures ¹ | |
| | 30 minutes |

¹Refer to Five Star Technical Bulletins for Cold Weather and Hot Weather Repairs.



| # CYCLE | AGE | STRENGTH |
|---------|-----|----------|
|---------|-----|----------|

| | | |
|---------------|---------|--------|
| 3 hour cycle | 9 hours | 34 MPa |
| 1 1/2 cycles | 1 day | 34 MPa |
| 5 1/2 cycles | 7 days | 34 MPa |
| 20 1/2 cycles | 28 days | 34 MPa |

Samples cured at 25°C for 6 hours, then exposed to 540°C in 24 hour cycles

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

APPLICATION INFORMATION

Mixing Ratio 2.5 - 3.25 L potable water per 25 kg bag

Placement Depth 25 mm - 50 mm
> 50 mm, contact 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® HTR shall be free of oil, grease, laitance, and other contaminants. A saw cut perimeter edge at 17-20 mm depth is recommended. To maximize bond, horizontal and vertical concrete surfaces should be prepared by acceptable means to coarse aggregate exposure. Remove all oxidation from exposed reinforcing steel to achieve a clean steel finish. Presoak with potable water concrete surfaces for 8 hours, continuously and consistently, via wet rags, wet burlap, ponding, or similar method to obtain a saturated surface dry condition (SSD). If presoaking is not an option, brush a very loose scrub or slurry coat to the properly prepared surface and immediately place Five Star Structural Concrete® HTR over the scrub coat. Featheredging is not allowed.
- FORMWORK:** Formwork should be constructed 24-hours prior to the installation. Formwork shall be constructed of rigid non-absorbent materials, securely anchored, liquid-tight and strong enough to resist forces developed during placement. Formwork and areas where bond is not desired must be treated with form oil, paste wax or similar material. Joints may be necessary depending on pour dimensions. Any existing joints within the repair area should be maintained. Contact Five Star Products for further information.
- MIXING: Mortar Mixer** (stationary barrel with moving blades)
Start with approximately 2.5 liters potable water per 25 kg bag in the mixer. Add Five Star Structural Concrete® HTR and mix for approximately 2 – 3 minutes after the addition of the final bag to a uniform consistency. Add additional potable water as necessary to achieve desired flow mixing for an additional 1 – 2 minutes after final addition of potable water. Do not exceed the maximum recommended amount of potable mixing water as directed or add an amount that will cause segregation.
Single Bag Mixing Drill and Paddle
Start with about 2.5 liters in the mix vessel. Add approximately 75-80% of Five Star Structural Concrete® HTR to the potable mix water and mix to uniform consistency only until product easily wets out and add remaining product and continue to mix to uniform consistency. Add additional potable water as needed to achieve desired flow mixing for an additional 1 – 2 minutes after final addition of potable water. Do not exceed the maximum recommended amount of potable mixing water as directed or add an amount that will cause segregation.
For pours over 50 mm in depth contact Five Star Products for aggregate extension recommendations. For bulk mixing applications, contact Five Star Products.
- METHODS OF PLACEMENT:** Whenever possible, place Five Star Structural Concrete® HTR full depth from one side of the repair to the other. To ensure optimal bond development, firmly work material into substrate. Placement should be continuous to prevent cold joints between pours.
- POST-PLACEMENT PROCEDURES:** Do not overwork Five Star Structural Concrete® HTR. Keep material as cool as possible and protect from wind and sun exposure. Wet curing shall begin as soon as material reaches final set (surface changes from dark to light and/or surface is hard). Five Star Structural Concrete® HTR shall be continuously wet cured for one to four hours depending on the volume and depth of the placement. If wet curing procedures cannot be met, an acceptable curing compound may be used instead. At lower temperatures final set and strength development may take longer. Do not allow product to freeze until it reaches 7 MPa compressive strength.
- CLEAN UP:** All tools and equipment may be cleaned with soap and water before the material hardens.

NOTE: PRIOR TO APPLICATION, READ ALL PRODUCT PACKAGING THOROUGHLY. For more detailed 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 |
|------------------|------------------------------------|----------------|-----------|
| 28801 | Five Star Structural Concrete® HTR | 40 | 25 kg bag |

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Specifications Subject to Change.



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