



FIVE STAR STRUCTURAL CONCRETE® HTR

Fast 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 1000°F (538°C) in six hours and up to 2400°F (1316°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

USES

- Areas of high temperature exposure
- Thermal cycling up to 2400°F (1316°C)
- Rapid repairs during shutdowns
- Coker, kiln and foundry repairs

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

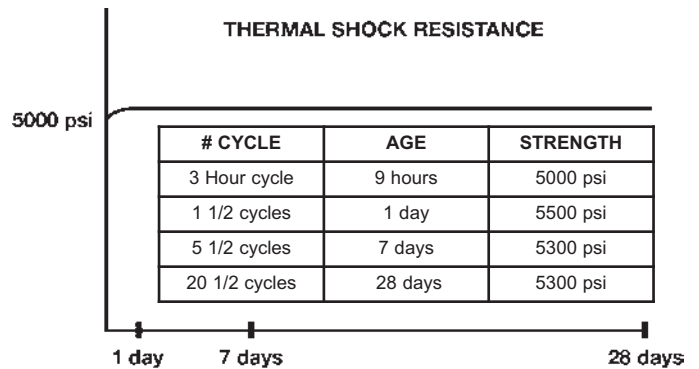
PACKAGING AND YIELD

Five Star Structural Concrete HTR is packaged in heavy-duty polyethylene lined bags containing 50 lb (22.7 kg) yielding approximately 0.40 cubic feet (11.3 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	
6 Hours	2500 psi (17.3 MPa)
1 Day	4500 psi (31.1 MPa)
7 Days	5500 psi (38.0 MPa)
28 Days	7000 psi (48.3 MPa)
Bond Strength, ASTM C 882	
1 Day	1500 psi (10.4 MPa)
7 Days	2500 psi (17.3 MPa)
Thermal Coefficient of Expansion, ASTM C 531	5.0 x 10 ⁻⁶ in/in/°F (9.0 x 10 ⁻⁶ mm/mm/°C)



Samples cured at 70°F (21°C) for 6 hours, then exposed to 1000°F (538°C) in 24 hour cycles



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® HTR shall be free of oil, grease, laitance, and other contaminants. Concrete must be clean, sound and rough to ensure a good bond. Remove all oxidation from exposed reinforcing steel and for additional protection coat reinforcing steel with Five Star® AC Coat. Featheredging is not desirable for structural repairs. A perimeter edge and minimum depth of two inches (50 mm) should be provided for a durable repair. Soak concrete surfaces prior to application with liberal quantities of potable water, leaving the concrete saturated and free of standing water. Surfaces shall be conditioned to between 40°F and 90°F (4°C and 32°C) at the time of placement.
2. **MIXING:** Mix Five Star Structural Concrete HTR for approximately five minutes to a uniform consistency with a mortar mixer. Do not mix more material than can be placed in 30 minutes. Do not exceed maximum recommended amount of mixing water as stated on the package or add an amount that will cause segregation. For large volume repairs, aggregate extension should be used with a low thermal coefficient of expansion aggregate. For detailed information regarding pumping, call the Five Star Products Technical Center at (800) 243-2206.
3. **PLACEMENT PROCEDURES:** Whenever possible, place Five Star Structural Concrete HTR full depth from one side of the repair to the other. Where this is not practical, placement must be continuous to prevent cold joints between pours. Finish as necessary.
4. **POST-PLACEMENT PROCEDURES:** Five Star Structural Concrete HTR shall be kept wet for at least 60 minutes immediately after hardening. Approximately six hours after placement, material can be brought up to an operating temperature of 1000°F (538°C). For operating temperature up to 2400°F (1316°C), wet cure for 3 days followed by dry cure for 4 days. Then slowly apply heat up to 2400°F (1316°C).
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 40°F and 90°F (4°C and 32°C) at time of placement. For cold and hot weather placement, refer to Design-A-Spec™.
- For placements thinner than two inches (50 mm) or greater than four inches (102 mm), and a volume exceeding two cubic feet (56.6 liters), contact the Five Star Products Technical Center.
- Placement shall be continuous to avoid cold joints.

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.



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Revision Date: 06/11/07