



FIVE STAR® HTR GROUT

High Temperature Exposure Nonshrink Grout

PRODUCT DESCRIPTION

Five Star® HTR Grout is a unique cement based grout for supporting equipment and structural baseplates in high temperature environments. Five Star HTR Grout can be poured into place, gains strength rapidly and can be exposed to 1000°F (538°C) in 24 hours and up to 2400°F (1316°C) after a 7-day curing procedure. Five Star HTR Grout exhibits positive expansion when tested in accordance with ASTM C 827.

ADVANTAGES

- Air release technology
- Thermal shock resistance
- High temperature resistance
- Resistant to sulfates
- High early strengths

USES

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

TECHNICAL SUPPORT

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

- Over 50 years of experience in precision grouting
- Technical Center staffed with field experienced application specialists
- Design-A-Spec™ for engineering specification assistance
- Experienced representatives for field service
- Corporate research laboratory available to customize products for unique applications

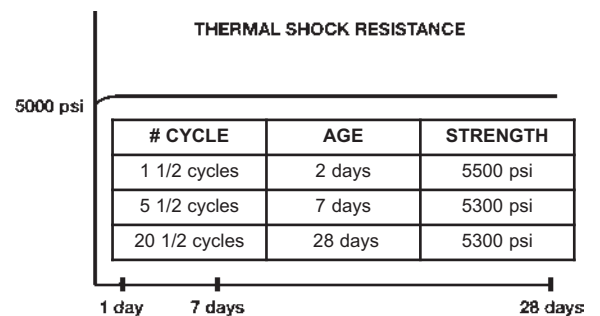
PACKAGING AND YIELD

Five Star HTR Grout is packaged in heavy-duty polyethylene lined bags containing 50 lb (22.7 kg) yielding approximately 0.42 cubic feet (11.8 liters) of hardened material at maximum water.

SHELF LIFE

One year in original unopened packaging when stored in dry conditions. Higher humidity will reduce the shelf life.

TYPICAL PROPERTIES AT 73°F (23°C)	
Working Time	20 Minutes
Early Height Change, ASTM C 827	Positive Expansion
Compressive Strength, ASTM C 942 (C109 Restrained)	
1 Day	4000 psi (27.6 MPa)
7 Days	5500 psi (38.0 MPa)
28 Days	6500 psi (44.9 MPa)
Bond Strength, ASTM C 882, 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 24 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® HTR Grout shall be free of oil, grease, laitance and other contaminants. Concrete must be clean, sound and roughened to ensure a good bond. Soak concrete surface for 8 to 24 hours prior to application with liberal quantities of potable water, leaving the concrete saturated and free of standing water.
2. **MIXING:** Mix Five Star HTR Grout thoroughly for four to five minutes to a uniform consistency with a mortar mixer. A drill and paddle mixer is acceptable for single bag mixes. For optimum performance, condition between 60°F and 80°F (16°C and 27°C). Mix Five Star HTR Grout with 3 to 3 1/2 quarts potable water per 50 lb. bag. Working time is approximately 20 minutes at 73°F (23°C). Working time is approximately 30 minutes at 73°F (23°C). Follow printed instructions on the package.
3. **METHODS OF PLACEMENT:** Five Star HTR Grout may be poured into place. Minimum placement thickness for Five Star HTR Grout is one inch. For pours over 3 inches in depth Five Star HTR Grout should be extended with a clean damp coarse aggregate meeting the requirements of ASTM C 33. NOTE: Coarse aggregate must be suitable for high temperature exposure.
4. **POST-PLACEMENT PROCEDURES:** Five Star HTR Grout shall be wet cured for a minimum of 30 minutes. Approximately three 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™ installation guidelines or call the Five Star Products Technical Center at (800) 243-2206.

LIMITATIONS

- At time of placement, if temperatures of equipment and surfaces are above 90°F (4°C and 32°C), refer to Design-A-Spec™ for cold and hot weather grouting procedures.
- Substrate shall be free of frost and ice.
- Grout shall be protected from freezing until it reaches 1000 psi (6.9 MPa).
- Never exceed the maximum water content stated on the bag.
- Construction practices dictate concrete foundation should achieve its design strength before grouting.
- Do not hand mix Five Star HTR Grout.

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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