



HTR GROUT

High Temperature Exposure Nonshrink Grout

PRODUCT DESCRIPTION

Five Star® HTR Grout is a unique cement based grout for supporting equipment and structural base plates in high temperature environments. Five Star HTR Grout can be poured into place, gains strength rapidly and can be exposed to 1,000°F (538°C) in 24 hours and up to 2,400°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 per ACI 351.1 R
- Thermal shock resistance
- High temperature resistance
- High 24-hour compressive strength

USES

- Areas of high temperature exposure
- Thermal cycling up to 2,400°F (1316°C)
- Rapid turnaround during shutdowns
- Coker, kiln and foundry applications

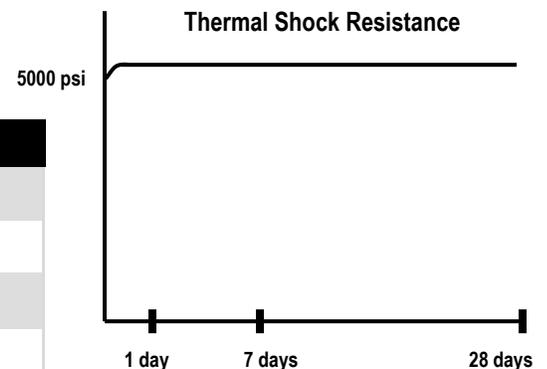
PACKAGING AND YIELD

Five Star® HTR Grout is packaged in heavy-duty polyethylene lined bags and is available in 50 lb. (22.7 kg) units yielding approximately 0.42 cubic feet (11.9 liters) of hardened material at maximum water content.

SHELF LIFE

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

TYPICAL PROPERTIES AT 70°F (21°C)	
Early Height Change, ASTM C 827	Positive Expansion
Compressive Strength, ASTM C 942 (C109 Restrained)	
1 Day	4,000 psi (27.6 MPa)
7 Days	5,500 psi (38.0 MPa)
28 Days	6,500 psi (44.9 MPa)
Bond Strength, ASTM C 882, 7 Days	2,500 psi (17.3 MPa)
Thermal Coefficient of Expansion, ASTM C 531	5.0×10^{-6} in/in/°F (9.0×10^{-6} mm/mm/°C)
Working Time at 70°F (21°C)	20 minutes



# CYCLE	AGE	STRENGTH
1 1/2 cycles	2 days	5300 psi
5 1/2 cycles	7 days	5300 psi
20 1/2 cycles	28 days	5300 psi

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 reflects typical results based on laboratory testing under controlled conditions. Reasonable variations from the data shown 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 surfaces for 8 to 24 hours prior to application with liberal quantities of potable water, leaving the concrete saturated and free of standing water.
- 2. FORMWORK:** Formwork shall be constructed of rigid non-absorbent materials, securely anchored, liquid-tight and strong enough to resist forces developed during grout placement. The clearance between formwork and baseplate shall be sufficient to allow for a headbox. The clearance for remaining sides shall be one to two inches (25 - 50 mm). Areas where bond is not desired must be treated with form oil, paste wax or similar material. Isolation joints may be necessary depending on pour dimensions. Contact Five Star Products' Engineering and Technical Service Center for further information.
- 3. MIXING:** Mix Five Star® HTR Grout thoroughly for four to five minutes to a uniform consistency with a mortar mixer (stationary barrel with moving blades). 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 70°F (21°C). Follow printed instructions on the package. Always add mixing water first to mixer followed by grout.
- 4. METHODS OF PLACEMENT:** Five Star® HTR Grout may be poured into place. Minimum placement thickness for Five Star® HTR Grout is one inch (25 mm). For pours over three 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. Refer to the Five Star® Technical Bulletin "Cement Grout Aggregate Extension" for guidelines.
- 5. POST-PLACEMENT PROCEDURES:** Five Star® HTR Grout shall be wet cured for a minimum of 30 minutes. Approximately 24 hours after placement, material can be brought up to an operating temperature of 1,000°F (538°C). For operating temperatures up to 2,400°F (1,316°C), wet cure for 3 days followed by dry cure for 4 days. Then slowly apply heat up to 2,400°F (1,316°C).

NOTE: PRIOR TO APPLICATION, READ ALL PRODUCT PACKAGING THOROUGHLY. For more detailed placement procedures, refer to Five Star® Design-A-Spec™ installation guidelines or call Five Star Products' Engineering and Technical Service Center at 1-800-243-2206.

CONSIDERATIONS

- If temperatures of equipment and surfaces are not between 40°F and 90°F (4°C and 32°C) at time of placement, refer to Five Star® Design-A-Spec™ for cold and hot weather grouting procedures, or call Five Star Products' Engineering and Technical Service Center at 1-800-243-2206.
- Substrate shall be free of frost and ice.
- Grout shall be protected from freezing until it reaches 1,000 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.

CAUTION

Contains cementitious material and crystalline silica. International Agency for Research on Cancer has determined 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 SAFETY DATA SHEET.**

For worldwide availability, additional product information and technical support, contact your local Five Star® distributor, local sales representative, or call Five Star Products' Engineering and Technical Service Center at 1-800-243-2206.

SKU/PRODUCT CODE	DESCRIPTION	# UNITS/PALLET	UNIT SIZE
28830	Five Star® HTR Grout	56	50 lb. (22.7 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."

Specifications Subject to Change.

For most current version of datasheet, go to FiveStarProducts.com

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