



# **FIVE STAR® GROUT**

High Performance Precision Non-Shrink Cementitious Grout  
For Nuclear Safety Zone Applications

## **PRODUCT DESCRIPTION**

Five Star® Grout is the industry's leading cement-based, nonmetallic, non-shrink grout for supporting machinery, equipment and steel structures. It is formulated with Air Release technology that combines high performance with the greatest reliability. When tested in accordance with ASTM C 827, Five Star® Grout exhibits positive expansion. Five Star® Grout meets the performance requirements of ASTM C1107-02 Grades A, B and C, ASTM C1107/C1107M-20, and CRD-C 621-93 specifications for non-shrink grout over a wide temperature range, 40°F - 95°F (4°C - 35°C). This specialized version of Five Star® Grout is compliant with NRC 10CFR50 Appendix B and ASME NQA-1 Quality Programs.

## **ADVANTAGES**

- Air release technology per ACI 351.1 R
- 95% Effective Bearing Area (EBA) is typically achieved following proper grouting procedures
- Provides placement versatility: pour, pump or dry pack
- 45 minute working time
- Permanent support for machinery requiring precision alignment
- Does not contain gas generating additives, such as aluminum powder
- Non-shrink from the time of placement
- Suitable for bulk mixing applications

## **USES**

- Grouting of machinery and equipment to maintain precision alignment
- Non-shrink grouting of structural steel and precast concrete
- Grouting of anchors and dowels
- Support of tanks and vessels

## **PACKAGING AND YIELD**

Five Star® Grout is packaged in heavy-duty, polyethylene lined bags and is available in 50 lb. (22.7 kg) units yielding approximately 0.5 cubic feet (14.1 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.

<b>TYPICAL PROPERTIES AT 70°F (21°C)</b>	
<b>Early Height Change, ASTM C827</b>	0.0 to 4.0%
<b>Hardened Height Change, ASTM C1090</b>	0.0 to 0.3%
<b>Effective Bearing Area ASTM C1339</b>	95%
<b>Bond Strength, ASTM C882, 28 Days</b>	2,000 psi (13.8 MPa)
<b>Compressive Strength, ASTM C942 (C109 Restrained)</b>	
1 Day	2,500 psi (17.3 MPa)
3 Days	3,500 psi (24.1 MPa)
7 Days	5,000 psi (34.5 MPa)
28 Days	6,500 psi (44.9 MPa)
<b>Working Time at 70°F (21°C)</b> May be affected by colder & warmer temperatures <sup>1</sup>	45 minutes

<sup>1</sup>Refer to Five Star® Technical Bulletins 101 & 102: Cementitious Grouting in Cold Weather; Cementitious Grouting in Hot Weather

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

<b>Mixing Ratio</b>	3½ to 5½ qts (3.3 - 5.2 L) potable water per 50 lb. bag	<b>Minimum Plate Clearance</b>	1 in (25 mm)
<b>Maximum In-Service Temperature</b>	400°F (204°C)	<b>Placement Depth</b>	1 in - 6 in (25 mm - 150 mm) > 6 in, contact Five Star

## PLACEMENT GUIDELINES

For optimum performance, install at temperatures between 40°F and 95°F (4°C and 35°C). Maintain grout and substrate above 40°F (4°C) until grout reaches 1,000 psi (6.9 MPa) compressive strength. Refer to Five Star® Technical Bulletin (TB) 101 and 102 *Cementitious Cold and Hot Weather Grouting* for extreme weather conditions.

- SURFACE PREPARATION:** Construction practices dictate a concrete foundation should achieve its design strength before grouting. All surfaces in contact with Five Star® Grout shall be clean and free of oil, grease, laitance, and other bond-inhibiting contaminants. To maximize bond, concrete surfaces should be prepared by acceptable means to coarse aggregate exposure. Presoak concrete surfaces with potable water for a minimum of 8 hours (optimum 24 hours), continuously and consistently, via wet rags, wet burlap, ponding, or similar method to obtain a Saturated Surface Dry (SSD) condition. Refer to Five Star® TB103 *Cementitious Grout Concrete Surface Preparation* and TB104 *Cementitious Grout Baseplate Preparation* for further details.
- FORMWORK:** Formwork should be constructed 24-hours prior to the pour. 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 to be placed between the edge of the baseplate and the form. The clearance for the remaining sides shall be 1 to 2 inches (25 - 50 mm). Formwork and areas where bond is not desired must be treated with form oil, paste wax, or similar material. Isolation/construction joints may be necessary depending on pour dimensions. Refer to Five Star® TB410 *Grout Formwork* for further details.
- MIXING:** Use of a mortar mixer (stationary barrel with moving blades) is required to completely mix the grout. A portable mixer and paddle are acceptable for single bag mixes. Start with approximately 4.5 quarts potable water per 50 lb. bag. Add Five Star® Grout and mix for approximately 2 – 3 minutes to a uniform consistency. To achieve desired flow, add additional potable water and mix for an additional 2 minutes. Do not exceed the maximum recommended amount of potable mixing water as directed. Do not allow the grout to segregate. Refer to Five Star® TB108 *Cementitious Grout Mixing* for further details. For bulk mixing applications, contact Five Star Products.
- PLACEMENT:** Five Star® Grout may be dry packed, poured, or pumped into place. Placement should always be across the shortest distance. A headbox is recommended for pouring applications. Refer to Five Star® TB412 *Grout Placement* for further details. For pours over 6 inches (150 mm) refer to Five Star® TB105 *Cementitious Grout Aggregate Extension* for further guidelines.
- POST-PLACEMENT:** Five Star® Grout shall be wet cured with potable water for a minimum of 24 hours. After initial 24-hour wet cure, grout shall be coated with an approved curing compound. If a curing compound is not used, grout shall be wet cured for an additional 48 hours totaling 3 days. During the curing process, protect the grout from direct sun and wind exposure. Do not allow grout to freeze until it reaches 1,000 psi (6.9 MPa) compressive strength. In-service operation may begin immediately after the required grout compressive strength has been reached. Refer to Five Star® TB110 *Cementitious Grout Curing* and Five Star® TB413 *Grout Finishing* for further details.
- CLEAN UP:** All tools and equipment may be cleaned with soap and water before the material hardens.

For additional Five Star® Technical Bulletins, visit [FiveStarProducts.com](http://FiveStarProducts.com). For further questions, or if additional information is required, contact your local Five Star® Technical Sales Representative at 1-800-243-2206.

**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.**

SKU/PRODUCT CODE	DESCRIPTION	#UNITS/PALLET	UNIT SIZE
25500N	Five Star® Grout for Nuclear Safety Zone	56	50 lb. (22.7 kg) Bag

Compliant with NRC 10CFR50 Appendix B and ASME NQA-1 Quality Programs

**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](http://FiveStarProducts.com)

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