



HYBRID GROUT

Ultra High Performance Precision Non-Shrink Grout

PRODUCT DESCRIPTION

Five Star® Hybrid Grout is a fusion of many key properties found in Five Star® specialty grouts. It achieves superb flowability while reaching high early and ultimate compressive strengths. Its ability to be installed over a wide temperature range (35-100°F/2-38°C) lets you extend your installation season by allowing you to grout during cold and hot weather months. Five Star® Hybrid Grout reaches one of the highest effective bearing areas (EBA) in the industry with the use of Air Release Technology per ACI 351.1 R. Five Star® Hybrid Grout meets the performance requirements of ASTM C 1107-02 Grades A, B and C, ASTM C 1107-14a, and CRD-C 621-93 specifications.

ADVANTAGES

- Ultra-high 1, 7, and 28 day compressive strengths
- 95% EBA is typically achieved following proper grouting procedures
- Highly flowable; can be pumped or poured
- Non-shrink from time of placement
- Nonmetallic
- Formulated with Air Release Technology for reduced voids and increased bond
- Can be installed over a wide temperature range (35°-100°F/2°-38°C)
- Experienced field engineering and technical support

USES

- Permanent support for high-load machinery
- Light vibratory equipment
- Structural steel and precast concrete
- Support for tanks, vessels, generators and small pumps
- Wind turbines
- Seismic applications
- High-load rebar, anchors and dowels
- High-load infrastructure

PACKAGING AND YIELD

Five Star® Hybrid Grout is packaged in heavy-duty, 45 lb. (20.4 kg) polyethylene lined bags yielding approximately 0.39 cubic feet (11 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			
	35°F (2°C)	72°F (22°C)	100°F (38°C)
Compressive Strength, ASTM C 942 (C109 Restrained), psi (MPa)			
8 Hour	-	4,000 (27.6)	5,000 (34.5)
1 Day	2,000 (13.8)	7,500 (51.7)	8,000 (55.2)
7 Days	8,000 (55.2)	13,000 (89.6)	13,000 (89.6)
28 Days	12,000 (82.7)	16,500 (113.8)	17,000 (117.2)
Bond Strength, ASTM C 882 / 28 Days, concrete failure, psi (MPa)	4,000 (27.6)	4,000 (27.6)	4,000 (27.6)
Early Height Change, ASTM C 827	0.0 to 2.0%	0.0 to 2.0 %	0.0 to 2.0%
Hardened Height Change, ASTM C 1090	0.0 to 0.2%	0.0 to 0.2%	0.0 to 0.2%
Effective Bearing Area, ASTM C 1339	≥ 95%	≥ 95%	≥ 95%
Flow, ASTM C 1339, 1" height, seconds	≤ 60	≤ 60	≤ 60
Consistency Flow Test, 2 x 4 in. (50 x 100 mm) cylinder, inches (mm)	8 - 12 (200-300)	8 - 12 (200-300)	8 - 12 (200-300)
Freeze/Thaw, ASTM C 666, Durability Factor	≥95%	≥95%	≥95%
Chloride Permeability, ASTM C 1202 28 days, rating (coulombs)	Very low (<1,000)	Very low (<1,000)	Very low (<1,000)
Set Time, Initial, ASTM C 191, minutes	180	120	60
Modulus of Elasticity, ASTM C 469 / 28 Days 3 x 6 in. (75 x 150 mm) cylinder, Neat, psi (GPa)	-	4.5 x 10 ⁶ (31.0)	-

The data shown above reflects 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® Hybrid Grout shall be free of oil, grease, laitance and other contaminants. Concrete must be clean, sound and roughened to a Concrete Surface Profile (CSP) of 8 to 10 per International Concrete Repair Institute Technical Guideline 310R.2R to ensure a good bond. Continuously 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 1 to 2 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® Hybrid Grout thoroughly for four to five minutes to a uniform consistency with a mortar mixer (stationary barrel mixer with moving blades). For optimum performance, maintain grout before and during placement at temperatures between 60°F and 90°F (16°C and 32°C). Use heated or chilled water to help adjust working time. Start by adding 6.9 lbs (3.3 qts / 3.13 L) per bag of potable water to mixer. Due to the nature of this material, an electric mortar mixer is not recommended for multiple bag mixes (use gas, diesel, or hydraulic mixers). Add Five Star® Hybrid Grout SLOWLY while mixing and mix for two minutes. Be careful not to overwhelm the mixer and allow the material to be too dry. Add additional water as needed up to a max of 0.60 lbs (0.29 qts / 0.27 L) per bag for a max total of 7.5 lbs (3.6 qts / 3.4 L) per bag and continue to mix for two to three minutes to achieve maximum flow. Working time is approximately 30 minutes at 70°F (21°C); do not mix more grout than can be placed within that time. Follow printed instructions on the package. Always add mixing water to the mixer first, followed by grout.

For single bag mixes, a heavy-duty power drill, shear mixing paddle and 7-gallon pail should be used. Start by adding 6.9 lbs of water (3.3 qts / 3.13 L) to the pail. Add grout SLOWLY being careful not to overwhelm the drill. Mix for two minutes until all material is fully wet and incorporated. Add additional water as needed up to a max of 0.60 lbs (0.29 qts / 0.27 L) per bag for a max total of 7.5 lbs (3.6 qts / 3.4 L) per bag and continue to mix for two to three minutes.

- 4. METHODS OF PLACEMENT:** Five Star® Hybrid Grout may be pumped, wet set or poured into place. Minimum placement thickness for Five Star® Hybrid Grout is ¾ inch (19 mm). For pours over 6 inches (150 mm) in depth Five Star® Hybrid Grout should be extended with a clean damp coarse aggregate meeting the requirements of ASTM C 33. Refer to the Five Star® Technical Bulletin "Cement Grout Aggregate Extension" for guidelines.
- 5. POST-PLACEMENT PROCEDURES:** Five Star® Hybrid Grout shall be wet cured for a minimum of three days, or coated with an approved curing compound meeting the requirements of ASTM C 309 after a minimum 24 hour wet cure. In-service operation may begin immediately after the required grout strength has been reached.

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

- At time of placement, if temperatures of equipment and surfaces are not between 35°F and 100°F (2°C and 38°C), refer to the Five Star® Design-A-Spec™ for cold and hot weather grouting procedures or call Five Star Products' Engineering and Technical Service Center.
- Never exceed the maximum water content as stated on the bag or add an amount that will cause segregation.
- Construction practices dictate concrete foundation should achieve its design strength before grouting.
- Cold temperatures will delay strength development.
- For high-temperature operating environments above 600°F (316°C) contact Five Star Products' Engineering and Technical Service Center.

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
25600	Five Star® Hybrid Grout	56	45 lb. (20.4 kg) Bag

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