



HYBRID GROUT

Precision Non-Shrink Ultra-High Performance
Cementitious Specialty Grout

PRODUCT DESCRIPTION

Five Star® Hybrid Grout is a highly flowable, high strength, cement-based, sulfate resistant, non-shrink precision grout. It achieves superb flowability while reaching high early and ultimate compressive strengths. It can be installed over a wide temperature range (35 - 100°F / 2 - 38°C) allowing you to extend your installation season by letting you grout during cold and hot weather months. 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 and meets the performance requirements of ASTM C1107-02 Grades A, B and C, ASTM C1107/C1107M-20, and CRD-C 621-93 specifications. It can be exposed to temperatures up to 600°F (315°C).

ADVANTAGES

- Ultra-high 1, 7 and 28 day compressive strengths
- 95% EBA (effective bearing area)
- 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)
- Can be exposed to temperatures up to 600°F (315°C)
- Sulfate resistant

USES

- Permanent support for high static load machinery
- Low vibration equipment
- Structural steel and precast concrete
- Support for tanks, vessels, generators and small pumps
- Seismic isolators
- 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 C942, (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 C882/28 Days, concrete failure, psi (MPa)	4,000 (27.6)	4,000 (27.6)	4,000 (27.6)
Early Height Change, ASTM C827	0.0 to 2.0%	0.0 to 2.0 %	0.0 to 2.0%
Hardened Height Change, ASTM C1090	0.00 to 0.20%	0.00 to 0.20%	0.00 to 0.20%
Effective Bearing Area, ASTM C1339	≥ 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, Procedure A, Durability Factor	≥95%	≥95%	≥95%
Chloride Permeability, ASTM C1202, 28 days, rating (coulombs)	Very low (<1,000)	Very low (<1,000)	Very low (<1,000)
Set Time, Initial, ASTM C191, minutes	180	120	60
Modulus of Elasticity, ASTM C469 / 28 Days 3 x 6 in. (75 x 150 mm) cylinder, psi (GPa); Neat	-	4.5 x 10 ⁶ (31.0)	-
Sulfate Resistance Wet Expansion at 1 year, ASTM C1157, 1x1x11" bars cured as per ASTM C157, conditioned as per ASTM C1012	-	≤ 0.1%	-
Working Time, Minutes May be affected by colder & warmer temperatures¹	45	30	20

¹ Refer to Five Star® Technical Bulletin 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 above may result. Test methods are modified where applicable.

APPLICATION INFORMATION

Mixing Ratio	3.3 to 3.6 qts (3.0 - 3.5 L) potable water per 45 lb. (20.4 kg) bag
Maximum In-Service Temperature	600°F (316°C)

Minimum Plate Clearance	¾ in (19 mm)
Placement Depth	¾ in - 6 in (19 mm - 150 mm) > 6 in, contact Five Star

PLACEMENT GUIDELINES

For optimum performance, install at temperatures between 35°F and 100°F (2°C and 38°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® Hybrid 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. A minimum ½ inch (12 mm) peak to valley surface profile is recommended. 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. Any existing cracks shall be brought to the project engineer's attention prior to grout installation. 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 Five Star® Hybrid Grout. Due to the nature of this material, an electric mortar mixer is not recommended for multiple bag mixes (use gas, diesel, or hydraulic mixers). For single bag mixes, a heavy-duty power drill, shear mixing paddle and 7-gallon pail should be used. For optimum performance, maintain grout before and during placement at temperatures between 60°F and 90°F (16°C and 32°C). Mix Five Star® Hybrid Grout thoroughly for four to five minutes to a uniform consistency. Use heated or chilled water to help adjust working time. Never exceed the maximum water content or add an amount that will cause segregation.

Start by adding 3.3 qts (3.0 L) (6.9 lbs) per bag of potable water to mixer. 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 and continue to mix for two to three minutes to achieve maximum flow. Do not exceed the maximum recommended amount of potable mixing water as directed. Do not allow the grout to segregate. Do not mix more grout than can be placed within that time. Always add mixing water to the mixer first, followed by grout. Refer to Five Star® TB108 *Cementitious Grout Mixing* for further details.

For pours over 6 inches (150 mm) refer to Five Star® TB105 *Cementitious Grout Aggregate Extension* for further guidelines.

- PLACEMENT:** Five Star® Hybrid Grout may be pumped, wet set, or poured into place. Placement should always be across the shortest distance. A headbox is recommended for pouring applications. Finish as necessary. Refer to Five Star® TB412 *Grout Placement* for further details. If field testing of the grout is required, refer to Five Star® TB109 *Cementitious Grouts Proper Compressive Strength Testing*.
- POST-PLACEMENT:** Five Star® Hybrid 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 *Cementitious Grout Finishing* for further details.

For additional Five Star® Technical Bulletins, visit 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
25600	Five Star® Hybrid Grout	56	45 lb. (20.4 kg) Bag

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