

**FIVE STAR GROUT PLUS  
MIGRATING CORROSION INHIBITORS**

- AIR RELEASE TECHNOLOGY PER ACI 351.1R
- 95% EFFECTIVE BEARING AREA (EBA)
- PROVIDES PLACEMENT VERSATILITY: POUR, PUMP OR DRY PACK
- 30 MINUTE WORKING TIME
- OPTIMUM CORROSION PROTECTION WITH MCI
- PERMANENT SUPPORT FOR MACHINERY REQUIRING PRECISION ALIGNMENT
- DOES NOT CONTAIN GAS GENERATING ADDITIVES, SUCH AS ALUMINUM POWDER
- NON-SHRINK FROM THE TIME OF PLACEMENT

**PRODUCT DESCRIPTION:**

Five Star Grout is the industry's leading cement-based, non-metallic, non-shrink grout for supporting machinery and equipment. It is formulated with Air Release technology that combines high performance with the greatest reliability. When tested in accordance with ASTM C827, Five Star Grout exhibits positive expansion. Five Star Grout meets the performance requirements of ASTM C1107-02 Grades A, B and C, ASTM C1107-07 and CRD-C 621-93 specifications for non-shrink grout over a wide temperature range of 4°C to 32°C.

**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
- For structural concrete repair, when modified with Pro-Struct 53-MC Aggregate to form a micro concrete and placed into pre-assembled formwork

**PACKAGING & COVERAGE:**

25kg Polyethylene lined bag yielding 14 litres  
18 Litres when extended with 12.5kg Pro-Struct 53-MC Aggregate.

**SHELF LIFE:**

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

**TYPICAL PROPERTIES AT 25°C**

<b>Early Height Change, ASTM C827</b>	0.0 to 1.5%	
<b>Hardened Height Change, ASTM C1090</b>	0.0 to 0.3%	
<b>Effective Bearing Area</b>	95%	
<b>Bond Strength, ASTM C882, 28 Days</b>	13.8 MPa	
<b>Pull-out Strength – Y16mm Deformed Bar, 7 Days</b>	16.6 MPa	
<b>Compressive Strength, ASTM C942 (C109 Restrained)</b>	<b>Minimum Water psi (MPa)</b>	<b>Maximum Water psi (MPa)</b>
1 Day	27.6	17.3
3 Days	38.0	24.1
7 Days	44.9	34.5
28 Days	55.2	44.9
<b>Working Time</b>	30 Minutes	

# APPLICATION INSTRUCTIONS

These instructions are not intended to show product recommendations for specific service. They are issued as an aid in determining correct surface preparation, mixing instructions and application procedure. It is assumed that the proper product recommendations have been made. These instructions should be followed closely to obtain the maximum service from the materials.

## PLACEMENT GUIDELINES

### SCOPE OF WORK (BOQ):

Apply Pro-Struct 531-MCI under machine baseplates to maintain precision alignment with a minimum clearance of 25mm and up to a maximum clearance of 150mm. (Measurement – litres or m<sup>3</sup>).

### SURFACE PREPARATION:

- 1) Concrete Surfaces  
Completely remove all loose, delaminated and weak concrete, oil, grease, laitance and other contaminants. Prepare concrete using acceptable mechanical means to obtain clean, sound and rough concrete surfaces exposing coarse aggregate.
- 2) Metal Surfaces  
Where bond to metal surfaces is not required, coat with a bond breaker such as paste wax or duct tape. Where bond to metal surfaces is required, the surface shall be clean, free of oil, grease, rust and other contaminants. Provide 6mm to 12mm air relief holes where baseplate configuration and high spots will entrap air.

### PRIMING:

Prior to placement, the roughened concrete surfaces must be pre-soaked with clean potable water for a minimum of 8 hours. Concrete shall be saturated, but free of standing water.

### FORMWORK:

1. Formwork shall be constructed of rigid non-absorbent materials, securely anchored, caulked, liquid tight and strong enough to resist forces developed during grout placement.
2. Formwork shall be constructed so that the grout is placed across the shortest distance whenever possible. The clearance between formwork and the baseplate shall be sufficient to allow for the head box with the clearance on the remaining sides being from 25 to 50mm.
3. Height of the formwork shall extend a minimum of 25mm above the bottom of the baseplate, grout forms shall have 25mm chamfer strips on all vertical corners and top edges of grout shoulders.
4. All formwork shall be coated with a bond breaker such as two coats of paste wax, with care being taken not to contaminate the grouting surface where bond is required. Form release oils is not acceptable.
5. All baseplates shall be set to final alignment prior to grouting. Shims and wedges that are to be removed shall be covered with a bond breaker such as paste wax or duct tape. When shims and wedges are to remain in place, their distance from the plate edges shall be a minimum of 50mm. A minimum radius of 50mm on all shims and wedge corners should be provided.

### MIXING:

Provide an adequate number of mortar mixers (stationary barrel with moving paddles) in good operating condition for uninterrupted placement. Do not exceed one half the maximum capacity of the mortar mixer. Concrete or cement mixers are not recommended, except for when extending grout with coarse aggregate.

For maximum strength, use the minimum amount of water for placement. For **High Fluidity**, add 3,8 litres of water per 25kg dry grout. Adjust the consistency if necessary, but to not exceed 4,5 litres or a quantity which will cause aggregate segregation. For **Moderate Fluidity**, add 3,5 litres and adjust consistency to the desired slump. For **Ramming** purposes, add 3 litres of water and adjust consistency such that the grout does not crumble when squeezed into a ball by hand.

Do not mix more material than can be placed within the working time of the grout (approximately 30 minutes). Do not re-temper the mix by adding additional water. Transport the mixed material by wheelbarrow or buckets, taking care not to allow material to segregate. For pours requiring aggregate extensions, add clean, damp coarse aggregate before final water adjustment.

### APPLICATION:

Pro-Struct 531-MCI may be dry packed, poured or pumped into place.

1. Dry Pack  
Dry pack placement should be limited to small plates that have sufficient access and clearance.
  - A dry pack consistency is achieved when the mixed grout can be squeezed into a ball by hand without crumbling. Only enough water should come to the surface to moisten the hands.
  - Use a ram with a square-cut end and hammer to evenly compact the grout against solidly braced backing boards, combing each layer (approximately 12mm thick) to the previously placed layer over its entire surface.
  - Each placed layer shall be visually inspected for placement uniformity.
  - Striking force should be sufficient for compaction of the grout without affecting plate alignment.
  - Placement shall be continuous until grouting is complete.

**CAUTION: MAY CONTAIN FLAMMABLE SOLVENTS. KEEP AWAY FROM SPARKS AND OPEN FLAMES. IN CONFINED AREAS WORKMEN MUST WEAR FRESH AIRLINE RESPIRATORS. HYPERSENSITIVE PERSONS SHOULD WEAR GLOVES OR USE PROTECTIVE CREAM. ALL ELECTRONIC EQUIPMENT AND INSTALLATIONS SHOULD BE MADE AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. IN AREAS WHERE EXPLOSION HAZARDS EXIST, WORKMEN SHOULD BE REQUIRED TO USE NON-FERROUS TOOLS AND TO WEAR CONDUCTIVE AND NON-SPARKING SHOES.**

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## 2. Pouring

- A headbox or similar device is required for a continuous pour to avoid air pockets under the baseplate. All grouting shall take place from one side to the other, maintaining contact with the bottom of the plate at all times, thereby maximising the effective bearing area (EBA).
- When pouring through grout holes, placement shall proceed continuously with a headbox until the grout has risen in the next hole. Maintain head pressure at the initial hole so that grout stays in contact with the bottom of the baseplate at all times. Commence grouting at the next hole with an additional headbox. Continue the process, alternating headboxes until grouting is complete.
- Care must be taken during grouting to keep the headbox at least half full of material to ensure even grout flow. If necessary to assist the flow, a plunger may be used. This procedure shall continue until the grout rises above the bottom edge of the baseplate on the opposite side.
- Throughout the pour, forms shall be constantly checked for leaks. All leaks shall be sealed immediately.

## 3. Pumping

- Pumping raises the grout temperature and shortens the working time while reducing its consistency. Keep the mix temperatures as cool as necessary, except in cold weather.
- The grout shall be mixed to a consistency that will not segregate while pumping.
- The grout shall be passed through a screen prior to placement into the hopper.
- Before pumping, determine the working time under jobsite conditions. Pumpability shall be determined by field testing.
- The pump shall be positioned to minimise the pumping distance. Keep the discharge line as close to horizontal as possible.
- Immediately prior to pumping, the pump and lines shall be primed with a priming slurry leaving the hopper empty to prevent over-watering.
- Once the pumping has begun, it is important not to use any of the priming slurry from the discharge lines. Grout shall not be used until a uniform consistency is obtained at the discharge nozzle.
- Provide an adequate volume of mixed grout to keep the hopper at least half full. The grout shall be placed into pump hopper in a manner to prevent air entrapment.
- The discharge nozzle shall be withdrawn only while pumping, keeping it submerged within the grout at all times.
- When a pump is needed to transport grout and the nozzle cannot be inserted into the cavity being grouted, a headbox is required. The headbox will allow the pour to be continuous, avoiding air pockets under the plate. The grout shall be discharged from the nozzle into the headbox in a manner to avoid air entrapment. The headbox shall be kept at least half full at all times.
- All grouting shall take place from one side of the plate to the other. Maintain contact with the bottom of the plate at all times to maximise the effective bearing area (EBA).
- When pouring through grout holes, placement shall proceed continuously until the grout has risen in the next hole. Maintain head pressure at initial hole so that grout stays in contact with the bottom of the baseplate at all times. Commence grouting at the next hole with an additional headbox.

## 4. Large Pours / Micro Concrete

In large pours or concrete repair application, add 1 x 12,5kg bag of Pro-Struct 53MC aggregate to 1 x 25kg bag of Pro-Struct 531-MCI (yields 18 litres). Should an alternative source of 6mm stone be suggested, a sample must be submitted to a local testing authority prior to its use to determine its characteristics and performance.

## FINISHING AND CURING:

### 1) Finishing

Cut grout back from bottom of baseplate to the foundation at approximately 45° angle or flush with baseplate as directed by the engineer. Formwork can be removed for cutback when the grout offers stiff resistance or when cut with a steel trowel, stands up without support. Finish exposed grout surfaces. Grout shall not be allowed to remain above the bottom edge of the baseplate.

### 2) Curing

- Grout shall be wet cured for a minimum of three days or coated with an approved curing compound after a minimum of 24 hours wet cure. Grout shall be protected from excessive evaporation with wet rags prior to set.
- The grout shall be protected from wind, rain, freezing and vibration until a minimum compressive strength of 6.9MPa is achieved.

## SPECIAL CONDITIONS:

- 1) Do not hand-mix Pro-Struct 531-MCI.
- 2) Never exceed the maximum water content as stated on the packaging.
- 3) Low temperatures delay the set, increase working time and delay the strength development of cement-based products. The procedure below will compensate for these conditions:
  - Materials shall be conditioned as necessary so that the mixed grout is between 4°C and 27°C. Store grout in an indoor or a tarped and heated area where required.
  - All surfaces in contact with grout must be pre-conditioned and maintained at a temperature between 4°C and 32°C for at least 24 hours.
  - Heating shall be accomplished by indirect exposure. Heated enclosures must be windproof and weatherproof. Combustion heaters must be vented and shall not be permitted to heat and dry the concrete locally. **Caution: Exhaust gases may contaminate or cause carbonation within the enclosed environment.**

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- Grout temperature shall be maintained above 4°C until the grout reaches 6.9MPa or the required strength.
  - Gradually reduce temperature of grout to ambient temperature to avoid thermal shock.
- 4) High temperatures accelerate the set, decrease the working time and accelerate the strength development of cement-based products. The procedure below will compensate for these conditions:
- Materials shall be conditioned as necessary so that the mixed grout is between 10°C and 35°C. Store grout in a shaded area out of direct sunlight.
  - All surfaces in contact with grout shall be pre-conditioned and maintained below 35°C for a minimum of 24 hours. Pre-soaking of surfaces, mixing equipment and wheelbarrows with cold iced water will facilitate cooling of surfaces.
  - Mix grout using cold or iced water. Do not put ice directly in with grout during mixing.
  - Provide shading during grout placement and where feasible, place grout when temperatures are decreasing at night or early morning. Provide protection from excessive wind to reduce rapid drying and evaporation of water from exposed grout surfaces.
  - Begin wet cure immediately after grout takes initial set and continuously wet cure all exposed grout surfaces using wet rags or burlap. Place plastic sheeting over material used for wet cure to ensure continuous wet cure. Monitor condition of material used wet cure to ensure drying does not occur.
  - After a minimum of 24 hours continuous wet cure, continue wet cure for an additional 48 hours or coat all exposed grout surfaces with an approved curing compound.

## PRECAUTION:

Contains cementitious material and crystalline free silica. 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 THE MATERIAL SAFETY DATA SHEET.

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