



Precision CEMENTITIOUS Grouts Cold Weather Grouting

Cold temperatures delay set time and strength development of cementitious grouts. Cementitious grouts must be allowed to attain a minimum compressive strength before being subjected to freezing temperatures. The following guidelines should be used for cold temperature placement.

A. Environmental Conditioning

1. Temperature is a critical factor in the installation of cementitious grouts. The temperature of the environment and the materials being used must be controlled throughout the installation and curing process using heaters, tenting, insulating materials, etc. as required.

B. Product/Placement Pre-Conditioning

1. Materials shall be preconditioned/stored as necessary, so the mixed grout is between 40°F and 90°F (4°C and 32°C). Due to the mass of palletized (bagged) material, up to 72 hours of preconditioning may be required. Store grout in an indoor or a tarp and heated area when required.
2. All surfaces in contact with grout shall be preconditioned and maintained at a temperature between 40°F and 90°F (4°C and 32°C) for 8 - 24 hours. Presoaking concrete with hot water may aid in raising concrete surface temperatures. Mixing grout with warm or hot water should also be considered. Ensure water used for presoaking does not freeze on concrete surfaces.

C. Post-Placement

1. Grout temperature shall be maintained above 40°F (4°C) until the grout reaches a minimum compressive strength of 1000 psi (6.9 MPa). Depending upon grout mix temperature and grout thickness, this may take upwards of 48 hours. Curing grout at temperatures below 40°F (4°C) will delay grout strength development.
2. Field test samples, as needed, shall be maintained at the same installation temperature conditions to monitor strength development.
3. Begin wet cure immediately after product takes initial set and continuously wet cure all exposed grout surfaces using wet rags, burlap, wet hessian, or burlene saturated with potable water for a minimum of 24 hours. Place plastic sheeting over material used for wet cure to protect against evaporation. Monitor condition of material used for wet cure (i.e. rags) to ensure drying does not occur.
4. After initial 24-hour wet cure, grout shall be coated with an approved curing compound or wet cured for an additional 48 hours totaling 3 days
5. During the 3-day curing process, protect the grout from direct sun and wind exposure. Do not allow grout or curing materials to freeze.
6. Heating shall be accomplished by indirect exposure (radiant heat recommended). Do **NOT** blow heat directly onto newly placed product surfaces. Heated enclosures must be windproof and weatherproof. **Caution: Combustion heaters must be vented. Exhaust gases may contaminate or cause carbonation in the material within the enclosed environment and create a health and safety hazard.**
7. Gradually reduce the temperature of the grout to ambient temperature to avoid thermal shock.
8. In-service operation may begin immediately after the required grout compressive strength has been reached.

When rapid strength gains at low temperatures are required, consider Five Star® Instant Grout which is specifically formulated for cold weather installations.

For additional information, contact your Five Star® Technical Sales Representative.

Five Star Products follows standard industry practices. For more information, refer to ACI 306R-16: *Guide to Cold Weather Concreting*; ACI 351.4M-14 *Specification for Installation of Cementitious Grouting between Foundations and Equipment Bases*; ASTM C942/C942M-21 *Standard Test Method for Compressive Strength of Grouts for Preplaced-Aggregate Concrete in the Laboratory*; ASTM C309-19 *Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete*.

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