



## Technical Bulletin: Cold Weather Grouting

First, there is no industry standard for cold weather grouting. In the Dayton Superior TDS, we refer to ACI-306R Cold Weather Concreting when grouting in cold ambient conditions. Dayton Superior grouts are cement-based material and would fall under ACI-306R when grouting in cold weather. Cold weather conditions are outlined in ACI 306R, Guide for Cold Weather Concreting, as ‘cold weather’ existing “when air temperatures have fallen below 40°F (4°C) during the protection period”, where the ‘protection period’ is defined as “the time required to prevent concrete from being affected to cold weather”. ACI 306R continues to state that “the necessary degree of protection increases as the ambient temperature decreases”.

The ideal ambient temperature during placement of grout is 45°F (7°C) to 90°F (32°C). Grouts can be placed in temperatures below 45°F and not have any effect on the performance of the grout when certain procedures are followed. Freshly mixed grouts are cold-blooded and will take on the temperature of the contact area soon after being placed. Pre-conditioning the contact area is as important as pre-conditioning the material.

### Material Storage:

- Material should be pre-conditioned so that the grout mix temperature is between 45°F and 90°F.
- It can take up to 72 hours to pre-condition a full pallet of material.

### Surfaces:

- Maintain contact area temperatures between 45°F (7°C) and 90°F (32°C) before grouting and during the protection period.
- All surfaces to be grouted should be in a saturated surface-dry (SSD) condition with no standing water on the surface.
- Surfaces to be in contact with grout should be free of snow, ice, and standing water before placement.

- There are many techniques for warming contact areas including heated enclosures, electric blankets, hydronic heating systems, or other acceptable means. Refer to ACI 306R for means and methods

### Mixing Water:

- Mix water can be heated to 90°F.

### Placement of Grout:

- Provide protection from excessive wind to reduce rapid drying and evaporation of water from exposed grout surfaces.
- When placing grout in cooler temperatures, the setting times and compressive strength of the grout will take longer to achieve than the published data.
- Maintain the temperature of the grout and contact area at 40°F to 90°F for a minimum of 24 hours.
- If ambient temperatures are going to drop below 40°F, the grout and contact area temperatures will need to be maintained for up to 48 hours.

### Curing:

- Curing methods and procedures during cold weather grouting are variable depending on what type of cold weather protection is used (blankets, heated enclosures, or internal heating).
- If insulated blankets are used there is not a concern as there would be if a heated enclosure was used where the temperature was warm, the humidity typically low and the surface prone to rapid drying; therefore in heated enclosures a membrane forming curing compound or other curing methods meeting ACI 308 is recommended.