

# Cold-weather Concreting

## TIPS FOR PROTECTING CONCRETE IN COLD WEATHER



Photo courtesy of AMETEK

1. Contact ready mix producer to discuss heating water and aggregates, increasing cement content, using Type III cement, or adding an accelerating admixture.
2. Use air entrainment if concrete is exposed to freeze-thaw in service or during construction.
3. Warm subgrade, reinforcing, and forms; don't place concrete on frozen subgrades.
4. Provide sufficient insulation blankets or heaters for the scheduled concrete placement.
5. Use insulation blankets to retain the internal heat concrete generates; provide triple insulation at slab and wall corners and edges.
6. Use heated enclosures to block wind, keep out cold air, and conserve heat; don't store flammable liquids in enclosures.
7. Don't use unvented combustion heaters for the first 24 hours; the carbon dioxide from the heater can cause soft, dusting floors.
8. Remove protection so the concrete cools gradually—no more than a 50°F drop in 24 hours.

### Cold Weather:

- Freezes mix water, reducing concrete strength up to 50%
- Increases concrete set time up to one-third for each 10°F decrease in air temperature
- Retards concrete stiffening, causing increased pressures on vertical forms
- Slows concrete strength gain
- Requires precautions to be taken when the air temperature drops below 40°F

### Properly Cure Concrete To:

- Protect against freezing until it reaches 500-psi compressive strength
- Allow form removal, post-tensioning, or further construction
- Protect against multiple freeze-thaw cycles until it reaches 3500-psi compressive strength

### To Prevent Freezing and Ensure Safe Form Stripping:

- Place and maintain concrete at a temperature above 50°F by insulating or heating it for three days
- Use high-early-strength concrete to reduce the protection period to two days
- Achieve high-early-strength concrete: Replace Type I with Type III cement, add 100 extra pounds of cement, or use an accelerator

Concrete Basics are one-page technical notes designed to assist in on-the-job training of workers. A different topic is featured each month. Poster-size copies are available in single or bulk quantities. For more information, call 708-543-0870, ext. 219.