



# Weatherwise

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# Cold Weather Concrete Installation Guidelines

Since weather conditions can change rapidly in the winter, good concrete practices and proper planning are essential for a high quality product. Temperatures are falling again and getting below 40°F consistently at night in most of our project locations. Special precautions are required when placing, finishing, curing, and protecting concrete against the effects of the cold weather.

Also, please request a curing box from your concrete testing agency, as the weather will directly affect your cylinder's testing performance.

**Please have your concrete contractor provide their procedures for pouring and protecting concrete when cold weather concrete is applicable.**

**&  
Have them fill out our Cold Weather Concrete Checklist**

## Bulletin is based on ACI 306r-2016

1. When the average daily ambient temperature falls below 40°F for three (3) successive days and when the temperature is to fall below 40°F during the protection period (+500 psi, typically 48 hours).
2. Newly placed concrete should be insulated in order to retain the cement hydration's heat. *See Blanket Bulletin.*
3. Newly poured concrete will freeze at 25°F.
4. Newly poured concrete that freezes can lose more than 50% of its design strength.
5. A 20°F drop in concrete temperature will double the setting time, which might effect the strength.
6. If difference between the interior temperature of the concrete and the surface temperature exceed 35°F, cracking and excessive curling will occur. *(According to the Ready Mix Concrete Association & PCI)*
7. Cooler initial concrete temperature will result in a stronger ultimate strength.
8. The relative percentage of fly ash may be reduced, increasing the amount of Portland cement, which will increase the rate of set and strength. However, durability will likely be compromised  
**\*ALWAYS SEEK A/E APPROVAL FIRST.**
9. Concrete should be placed at the lowest practical slump, as this reduces bleeding and setting time. **We should NOT be adding water.** *Adding 1-2 gallons of water/cy will delay the set time by 1-2 hours which will increase the setting and strength gain and MUST BE APPROVED BY THE A/E OF RECORD.*

### Cold Weather Requirements:

1. Snow, ice and frost must be removed prior to pour.
2. Have all insulating materials ready and convenient. Do not store in a de-icer location.
3. **We must protect concrete from freezing until the concrete reaches about 500 psi, which is typically 2 full days at 50°F (concrete temp).** *This will be longer if the concrete temperature is lower.*
4. Exterior concrete needs to be 6-8% air-entrained and be at least 3,500psi for freeze thaw durability and 5,000psi for de-icer durability.
5. We need to "gradually" remove the insulation from the surface to avoid thermal shock.
6. Non-chloride, non-corrosive accelerators can be used to accelerate the rate of setting and strength gain.  
**\*THESE MUST BE APPROVED BY THE ENGINEER OR ARCHITECT OF RECORD.**
7. Rebar needs to be above 32°F prior to pour, which will require insulating the rebar prior to the pour.
8. Corners and edges are most susceptible to heat loss and will need special attention.
9. If fossil fuel is being used to heat the space, the space must be vented in order to prevent carbonization of the slab, which will cause dusting.
10. Do not use a "jitterbug" or vibrating screed as this will produce a weak layer of paste on the surface.

### Maturity Meters (ACI 306r-2016, section 8.2—NEW REQUIREMENT):

1. "Field cured cylinders can cause confusion and unnecessary delays in construction"
2. "The use of field cured cylinders is inappropriate and should not be allowed in cold-weather concreting"
3. In-place maturity meters should be used. Quantity to be determined by Manufacturer.
4. Most maturity meters are wireless output for the entire team to get up-to-date information via Mfr phone App.

### Concrete Cylinder Requirements (when used as check for Maturity Meters):

**Special care is required for cold weather concrete cylinders:**

1. Field-cured cylinders are to be used only to estimate concrete strength for form stripping purposes.  
*(Field-cured cylinders are not to be used for quality control and strength testing.)*
2. Cylinders should be stored in an insulated box which maintains a temperature of 60°F to 80°F. (a light bulb)
3. A thermostat is required for the box.
4. Determine who will be providing the box prior to the pour.
5. If fossil fuel is being used to heat the box, the box must be vented.
6. Locate the box in a place where construction traffic cannot damage the box.

**CONCRETE CONTRACTOR TO PROVIDE PROCEDURE LETTER NO LESS THAN 3 DAYS PRIOR TO POUR**

Excessive amounts of added water or early finishing will most likely result in a weak top of slab and will have the high probability of surface defects which will demand a surface repair in order to properly finish the floor.

### **RECOMMENDED CONCRETE**

#### **TEMPERATURES:**

(based on concrete thickness)

Less than 12" → 55°

(Slabs & Footings)

12" - 36" → 50°

(Foundation wall)

36" - 72" → 45°

(Piers & Footings)

The concrete slump & test cylinders should be taken at the location of placement, this includes at the end of a pump.

The pump should be accounted for in the slump design.

