Triangle Tech Tips
References and resources from Triangle Ready Mix
Publication # 24-11-087

# Essential Tips for Using Concrete in Cold Weather


Placing concrete in cold weather presents unique challenges. But, with the right preparations, you can ensure a durable and strong result. When temperatures drop, concrete's curing process slows, which can compromise its strength and longevity if not properly managed. This reaction slows significantly when temperatures fall below 50°F and nearly stops around freezing. If concrete freezes before it gains enough strength, the expanding water inside can cause cracking and structural damage. The goal in cold weather is to maintain the concrete's internal temperature and optimize conditions for curing.

## 1. The Role of Heated Mix Water

Heated mix water is one of the most effective ways to maintain the proper temperature of concrete during cold weather. By heating the water used in the mix, you can:

- **Start with a Warmer Mix:** Heated water raises the overall temperature of the concrete, helping to counteract heat loss during transportation and placement.
- **Accelerate Hydration:** Warm concrete cures faster, reducing the risk of freezing before it reaches critical strength (approximately 500 psi, usually within 24 hours).
- **Improve Workability:** A warm mix remains more pliable during placement, making it easier to work with.

### How Hot Should the Water Be?

The temperature of the heated water depends on the ambient conditions and the desired concrete temperature. Producers must be cautious, as excessively hot water (above 140°F) can cause flash setting, which is rapid hardening of the mix. Experienced concrete producers like Triangle Ready Mix will ensure that heated mix water is used at the proper temperature.

## 2. Admixtures for Cold Weather Concrete

Admixtures are essential for optimizing concrete performance in cold conditions. Two common types used during cold weather are accelerators and air-entraining admixtures.

### Accelerators

Accelerators speed up the hydration process, allowing concrete to gain strength more quickly. This is particularly important in cold weather, where the curing process naturally slows down.

- **Calcium Chloride Accelerators:** These are cost-effective and commonly used. However, they may not be suitable for projects involving steel reinforcement, as calcium chloride can promote corrosion.
- **Non-Chloride Accelerators:** A safer choice for reinforced concrete, providing similar benefits without the risk of corrosion.

#### Benefits of accelerators include:

1. Reduced time needed for initial set.
2. Faster strength gain, allowing earlier removal of forms or blankets.
3. Lower risk of damage from freezing temperatures.

### Air-Entraining Admixtures

Air-entraining admixtures introduce tiny, evenly distributed air bubbles into the concrete. These bubbles improve the concrete's resistance to freeze-thaw cycles by providing space for water to expand as it freezes.

- Air-entrained concrete is especially important for outdoor surfaces like sidewalks, driveways, and bridges.
- It also enhances workability, which is helpful in cold weather when the mix can become stiffer.

## 3. The Importance of Low Water-Cement Ratio Mixes

A low water-cement ratio is critical for durable concrete, especially in cold weather. The water-cement ratio refers to the amount of water compared to the cement in the mix. Lower ratios result in stronger and less permeable concrete.

### Benefits in Cold Weather:

- **Reduced Freezing Risk:** Less water in the mix means less water that could potentially freeze and cause cracking.
- **Improved Durability:** Low water-cement ratios produce denser concrete, which is better able to resist the damaging effects of freeze-thaw cycles.
- **Faster Strength Gain:** Less water means the concrete reaches its intended strength more quickly.

### How to Achieve a Low Water-Cement Ratio:

- Use plasticizers or superplasticizers to improve workability without adding extra water.
- Be precise during mixing to avoid over-watering.

## Key Takeaways

When it comes to ordering and placing concrete in cold weather, success depends on maintaining the right temperature and optimizing curing conditions. Here's how Triangle Ready Mix can help you get the job done right:

1. **Order heated mix water** to ensure your concrete maintains the necessary temperature for proper curing, even in the coldest conditions. At Triangle Ready Mix, we can provide heated water to give your mix the best start.
2. **Specify admixtures** like accelerators for faster curing or air-entraining admixtures for superior freeze-thaw resistance. Our expert team can guide you in selecting the right combination to meet the unique demands of your project.
3. **Request a low water-cement ratio** to reduce freezing risks and improve strength. Triangle Ready Mix ensures precision in every batch, delivering a consistent and high-quality mix that performs under pressure.

Triangle Ready Mix is experienced at producing concrete during cold weather and provides several important resources to help with your cold weather concrete project. From heated mix water to expertly tailored admixtures, we ensure your concrete is prepared to perform, even in challenging conditions. Our precision batching process guarantees a consistent, high-quality mix with the right water-cement ratio to reduce freezing risks and enhance durability — and does so with far more precision and consistency than most other concrete batch plants. With Triangle Ready Mix, you get more than concrete. You get the expertise and reliability needed to pour with confidence, no matter the temperature.

## *See these titles also:*


### The Benefits of Inline Aggregate Blending

Explains how Triangle Ready Mix's batching process produces concrete of superior strength and consistency.

*Publication # 23-10-025*


### Air Entraining Admixtures for Concrete

Explains the benefits of Air Entraining Admixtures in cold weather climates that are subject to freeze-thaw cycles.

*Publication # 24-06-064*


### The Importance of Heated & Chilled Mix Water

Explains why heaters and chillers are important during hot and cold weather.

*Publication # 24-07-071*


### Placing Concrete During Cold Weather

Explains how cold weather affects concrete placement and provides tips and strategies for successful projects.

*Publication # 24-01-042*