



Installing AB Fence in Cold Weather Conditions

This tech sheet summarizes the proper procedures for concrete when installing the AB Fence System in cold weather conditions. For the purpose of the AB Fence System, “concrete” work involves pile footing construction and grout used to fill the cores of the AB Post Block and AB Panel Block. Additional information is available by contacting the AB Engineering Department at (800) 899-5309.

AB Fence Advantage

One of the unique benefits that sets the AB Fence System apart from other concrete fence products is that the post and panel are independent of each other. The AB Panel Blocks actually are keyed into the AB Post Blocks (Figure 1). The independence of the panels and posts eliminates the necessity of constructing the panels below the frost line. Therefore, using the AB Fence System in cold weather regions is very advantageous; however, proper installation of the concrete used in the AB Fence construction must be maintained. This means protecting the concrete from freezing before it has a chance to cure.

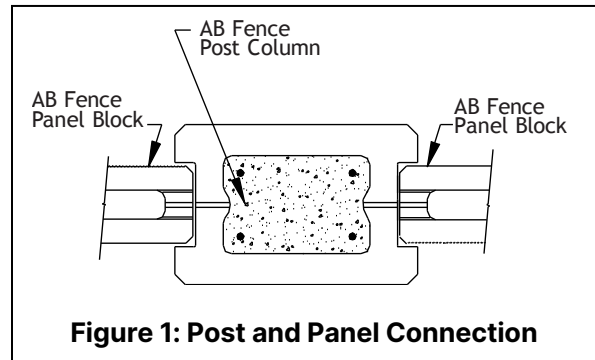


Figure 1: Post and Panel Connection

At what temperature must concrete be protected?

The American Concrete Institute (ACI) Standard 301 says: “When the mean daily outdoor temperature is less than 40°F (5°C), the temperature of the concrete shall be maintained between 50°F (10°C) and 70°F (21°C) for the curing period.

Use good judgment and protect concrete whenever there is a possibility of freezing. It is important to protect the concrete surfaces from freezing for the first 24 hours after placement.

How does air temperature affect the way concrete cures?

Freshly mixed concrete is a plastic liquid. In fact, as soon as water is mixed with Portland cement, hydration, which is a chemical reaction, begins. During this reaction, microscopic crystals start to form and grow between the sand and gravel aggregates to lock them together. The more crystals that grow the harder the concrete becomes. This chemical reaction is the key to the durability of the concrete, but it is also very temperature sensitive. In cold weather the reaction slows down and the water that is used to hydrate the cement can actually freeze.



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How to protect concrete:

ACI 306 recommendations to protect fresh concrete from freezing can be broken down into two categories:

1. Modify the mix design so the concrete will gain the necessary strength before freezing, or
2. Protect the concrete from freezing by external means (i.e., blankets, enclosures, or heaters).

In general, there are many things you can do to ensure the AB Fence you install will last for many years. First, according to ACI 318 all concrete materials and all reinforcement, forms, fillers, block and ground with which concrete is to come in contact shall be free from frost. In fact, it would be ideal to suspend tarps or build enclosures over the fence and ground area and run a heater or use heating tubes to raise the temperature - the warmer the ground, block and reinforcement the better.



Second, the ready-mix concrete company will very likely mix concrete with hot water. The aggregate, sand and gravel, used in the concrete mix could be pre-heated as well. Special Portland cement or accelerating admixtures such as calcium chloride can be used to develop the strength of the concrete faster. This may inflate the price of the concrete mix slightly, but for the amount of concrete used in the fence the additional cost is minimal. It is also important to be sure air is added to the mix as well. For the fine-grained aggregate mix of concrete used in for the AB Fence installation you should have a total air content in percent by volume of 6 to 10 percent (ACI 318).

Finally, insulated blankets must be placed over the concrete to take advantage of the heat produced by the hydration process. By keeping this heat trapped under the blankets the fresh concrete can be kept from freezing. ACI 318 states that normal concrete shall be maintained above 50°F (10°C) and in moist conditions for at least the first 7 days after placement. When High-early strength concrete is used, the concrete shall be maintained above 50°F (10°C) and in moist conditions of at least the first 3 days. This may require keeping the enclosures and/or tarps over the fence with heaters or heating tubes to maintain the temperature.

By following these steps and taking additional precautions, you can ensure the concrete placed in the AB Fence system cures properly and adequate strength is achieved. Extra attention and work during the construction phase will mean an AB Fence that will last for years to come.

Supplemental Hot Weather Requirements

ACI 318: "During hot weather, proper attention shall be given to ingredients, production methods, handling, placing, protection, and curing to prevent excessive concrete temperatures or water evaporation that may impair required strength.