



TECHNICAL BULLETIN CP-23

USING EPOXY COATINGS IN COLD WEATHER

Epoxy coatings can be used at cold temperatures but must be handled and applied with special techniques adapted to the environment. Mixing an epoxy resin and hardener together starts a chemical reaction that produces heat. The ambient temperature and the temperature of the concrete both affect the epoxy's rate of reaction and degree of cure. If the temperature is too low, the epoxy may eventually harden, but will not reach a complete cure or achieve its designed physical properties. Although an epoxy coating applied in cooler conditions may look and feel like it has hardened sufficiently, it could fail prematurely. However, with advanced planning and by observing the following precautions, most of these problems can be overcome and their consequences avoided.

1. Warm resin and hardener before using. If Part A and Part B are kept warm (70–90°F/21–32°C) before using, the initial chemical reaction will get off to a better start and result in better curing even if the material cools after it is applied. The warmer mixture will also flow out smoother and saturate concrete surfaces better.

Warm the resin and hardener with heat lamps or keep them in a heated building before use. A small portable epoxy storage box can be built out of rigid sheets of foil-backed insulation, with a regular light bulb or an electric heating pad inside to maintain a temperature of 70–90°F (21–32°C). This method will keep the warm resin and hardener near the work area and prevents the material from cooling off before it can be mixed and applied.

The area must be kept heated during the epoxy's full cure time. If the manufacturer's literature says that the epoxy cure time is 8 hours, assume that means 8 hours at 70°F (21°C). If the substrate and environment is lower, the cure time will be longer. As a general rule of thumb, for every 18°F drop in temperature below 70°F, the cure time doubles. So, if the substrate and environment can only be heated to 50°F, the typical 8 hour cure epoxy will require about 18 hours to cure. Keep in mind that most epoxies, unless specifically formulated for cold weather use, will never fully cure at temperatures below 50°F.

2. Ensure that the resin and hardener are used in the proper mix ratio. Mixing Part A and Part B "off ratio" will seriously compromise the epoxy's ability to cure properly and achieve ultimate strength. Always mix the full kit of epoxy; do not attempt to break it down and mix smaller volumes.

3. Mix the resin and hardener thoroughly. As always, pre-mix Part A and Part B before combining. Mix A and B together a little longer than normal (two minutes minimum) with a slow speed drill & paddle mixer. NEVER MIX BY HAND. Scrape the sides and bottom of the mixing container during mixing. A smaller volume mixing vessel will improve the chemical activity because the limited surface area will not dissipate heat produced by the chemical reaction. For example, mix a 2 gallon unit of epoxy in a 3 gallon.

4. Prepare surfaces carefully before re-application. When coating at cold temperatures, the slower cure can result in the formation of an "amine blush" on the epoxy surface. The blush feels like a waxy film on the surface of the cured epoxy. If a second coat is necessary, immediately before applying the second coat,



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wash the surface with warm water using a 3-M Scotchbrite™ pad. Before the water evaporates, dry the surface with clean, lint-free towels and sand any remaining glossy areas with medium grit sandpaper. Remove all sanding residue before applying the coating.

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