

### What is Curing?

Curing is the process of maintaining adequate moisture and temperature in concrete after placement and finishing to ensure proper strength and durability. Without sufficient moisture, the cement cannot fully hydrate, resulting in lower-quality concrete. Temperature also affects hydration, as the reaction rate is temperature dependent. For exposed concrete, factors like humidity and wind are important, as they influence how quickly moisture is lost.

### Why Cure Concrete?

Several important reasons are:

- a. Predictable strength gain. Laboratory tests show that concrete in a dry environment can lose as much as 50% of its potential strength compared to similar concrete that is moist cured. Concrete placed under high temperature conditions will gain early strength quickly but later strengths may be reduced. Concrete placed in cold weather will take longer to gain strength, delaying form removal and subsequent construction.
- b. Improved durability, especially of non air entrained concrete slabs that may be subject to freezing conditions during construction. Well cured concrete has better surface hardness and therefore is more watertight.
- c. Better serviceability and appearance. A concrete slab that has been allowed to dry out too early may have a soft surface or cracking with poor resistance to wear and abrasion. Proper curing reduces crazing, dusting, and scaling.

### How to Cure Concrete?

The concrete surface must be kept continuously wet or sealed to prevent evaporation for a period of at least several days after finishing.

Systems to keep concrete wet include but are not limited to:

a. Burlap or materials used with a soaker hose or sprinkler. Care must be taken not to let the coverings dry out and adsorb water from the concrete. The edges should be lapped and the materials weighted down so that they are not blown away.

b. Ponding of water on a slab is an excellent method of curing. The water should not be more than 10 C cooler than the concrete and the dike around the pond must be secure against leaks.

Sealing materials include:

a. Liquid membrane forming compounds must conform to ASTM Specifications at the rate of application that is specified. Do not apply to concrete that is still bleeding or has a visible water sheen on the surface. While a clear liquid may be used, a white pigment will give reflective properties, and allow for inspection of coverage. A single coat may be adequate, but where possible a second coat, applied at right angles to the first, is desirable for even coverage. If the concrete will be painted, or covered with vinyl or ceramic tile, then a liquid compound that is nonreactive with the paint or adhesives must be used, or a compound that is easily brushed or washed off. On floors, the surface should be protected from the other trades with scuff proof material after the application of the curing compound.

b. Plastic sheets either clear, white reflective or pigmented. Plastic should conform to ASTM Standards. The plastic should be laid in direct contact with the concrete surface as soon as possible without marring the surface. The edges of the sheets should overlap and be fastened with waterproof tape and then weighted down to prevent wind from getting under the plastic. Plastic will make dark streaks wherever a wrinkle touches the concrete so plastic should not be used on concretes where appearance is important.

Additional information on curing can be found in CSA A23.1:24 Section 7 on Placing, finishing and curing concrete.

### Three Rules to Consider:

1. Keep concrete moist and at the right temperature to ensure full hydration and strength gain
2. Proper curing improves durability, surface hardness, and resistance to cracking or wear
3. Use wet coverings, ponding, or approved sealing methods to prevent moisture loss during the curing period

#### **References**

1. CSA A23.1 A23.2 2024. *Concrete materials and methods of concrete construction Test methods and standard practices for concrete.* CSA Group
2. *Design and Control of Concrete Mixtures. 9<sup>th</sup> Edition.* Cement Association of Canada

#### **Disclaimer**

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