



Guide to Curing

The term “Curing” can be used to describe the process by which hydraulic-cement concrete matures and develops hardened properties, over time, as a result of the continued hydration of the cement in the presence of sufficient water and heat.

“Curing” is also used to describe action taken to maintain moisture and temperature conditions in a freshly placed concrete so that the potential properties of the concrete may develop (ACI).

Standards & Specifications

ACI 308 *Guide to the External Curing of Concrete* addresses all acceptable methods of curing including water, plastic film, reinforced paper as well as liquid membrane-forming compounds. The use of ACI 308, rather than the ASTM C309, allows the constructor to use the appropriate method of curing based upon the floor finish and the environmental conditions.

ASTM C309 “Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete”

ASTM C309 Overview

- Must for a membrane on the surface of the concrete
- Application rate of 200 ft²/gallon
- Per ASTM C156 Maximum moisture loss of 0.55kg /m² of water in 72 hours.
- The white pigmented compound shall exhibit a reflectance of at least 60% of that of a standard magnesium oxide reference plate.
- Divided into types and classes

ASTM C309 Types

Type 1: Clear or translucent without dye.

Type 1D: Clear or translucent with fugitive dye.

Type 2: White pigmented.

ASTM C309 Types

- Class A – no restrictions on the vehicle solids material in the curing compound – typically, wax based materials.
- Class B – the vehicle solids material in the curing compound must be all resin.

***According to the ASTM Committee on Curing, sodium silicate products do not meet ASTM C309 specifications.**

Wax vs Resin

Wax curing membranes, though softer membranes, do not dissipate and will be present until removed.

Resin based curing compounds such as the Dayton Superior Clear Resin Cure J11W will normally oxidize and begin to wear off in 30 to 60 days when exposed to weathering, UV and abrasion. There are special resin-based cures such as the Clear Cure VOC J7WB which are designed to begin to dissipate in 7-10 days without UV exposure.

Application overview

It is very important to cure the concrete immediately either after the bleed water has left the concrete or after final finishing. Don't wait! If concrete is not cured, its strength can be reduced by up to 40% and can result in surface cracking, curling, crazing, and dusting.

Always apply the curing compound uniformly at the specified application rate (typically 200 ft²/gallon, 4.9 m²/L).

A major problem on most jobsites is the spraying of the curing compounds at extremely high application rates, i.e., the material is applied at 300-400 ft²/gallon, rather than 200 ft²/gallon. As a result, the quality of the concrete goes down dramatically!



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Note:

Water based products should be agitated or stirred before use to bring the solids back into suspension. However, do not over agitate them or use high speed mixing equipment.

Secondary Coatings & Cleaning

Curing compounds will have to be removed before application of a liquid hardener, a sealer like an epoxy or urethane, or a water repellent like a silane or siloxane.

Resin-based curing compounds will dissipate; however, this process depends on the amount of sunlight and traffic the curing compound receives. Additional cleaning of the surface by high pressure water blasting (2000 psi, 13.8 MPa), scrubbing, chemical removal, or light abrasion (sandblast/ sanding) may be necessary.

A good test to see if the curing compound has been removed is a visual inspection and to place a few drops of water on the surface. Dissipating cures have a mottled, yellow, and dusty appearance. If the water is not readily absorbed into the concrete, then additional cleaning may be necessary.

Wet burlap, water spray and plastic sheets are effective methods of curing only if the concrete is kept constantly damp for 7 days. Otherwise, membrane-applied curing compounds are preferred.

Cold Weather "Alert"

Colder weather does not lessen the importance of proper curing techniques and materials. Cold weather requires the same, if not more, urgency for curing than in the summertime

Concrete, in the cold weather and low humidity, also undergoes a loss of moisture & thus the

need for proper curing techniques to prevent the loss of water that could cause distress, deterioration and aesthetic problems.

Dayton Superior Curing Membranes

Resin-Based

Clear Resin Cure 7WB

- ASTM C309 Type I, Classes A & B
- Dissipation typically begins in 7-10 days
- Compliant per CDPH V1.2
- **MAS** "Certified Green"

Clear Resin Cure J11W

- ASTM C309 Type I, Classes A & B
- Dissipation typically begins in 60-90 days
- Compliant per CDPH V1.2
- **MAS** "Certified Green"

Resin Cure with Dye J11WD

- ASTM C309 Type ID, Classes A & B
- Dissipation typically begins in 60-90 days
- Compliant per CDPH V1.2
- **MAS** "Certified Green"

White Resin Cure J10W

- ASTM C309 Type 2, Classes A & B
- White pigmented
- Dissipation typically begins in 60-90 days

Wax-Based

City White Cure J8

- Meets ASTM C309 Type 2, Class A except daylight reflectance
- White pigmented
- Does not dissipate



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- Predominately municipal applications
(sidewalk, curb & gutter)

White Wax Cure J9A

- ASTM C309 Type 2, Class A
- White Pigmented
- Does not dissipate
- Predominately DOT applications

White Wax Cure CRD300

- ASTM C309 Type 2, Class A,
- Meets USACE CRD C-300 requirements
- White Pigmented
- Does not dissipate