

# Exterior concrete guideline & maintenance program

Midwest Region | Ready Mixed Concrete



## CONTRACTOR GUIDELINES

### MIX SELECTION

According to *ACI 318: Table 4.2.2*, Minnesota's weather exposes concrete to freezing and thawing in a moist condition or to deicing chemicals. Therefore the following specifications should be followed for exterior horizontal concrete (Driveways, Steps, Sidewalks, Patios, etc.):

1. Minimum Strength (PSI) = 4500
2. Maximum Water-to-Cement Ratio = 0.45
3. Air Entrainment Range = 5-8%
4. Slump Range = 4-5" (without Superplasticizer), 6-7" (with Superplasticizer)
5. Cementitious Replacement = See *ACI 318, Chapter 4, Table 4.2.3*
6. Please refer to *ACI 318: Chapter 4* for concrete exposed to corrosion, salt, seawater, sulfate, etc., or call 1-800-CONCRETE

**Based on the above specifications, Aggregate industries recommends the mix: SUPEREX**

### CURING NEW CONCRETE

There are three main reasons why to cure concrete. First, ultimate **strength gain** can be achieved with proper curing. Almost half the potential strength can be lost if not cured. Second, well-cured concrete **improves durability** against moisture, harmful chemicals, surface wear, and abrasion. Last, proper curing enhances the **serviceability and appearance** by reducing crazing, dusting and scaling. Below are two of the basic and effective options for curing gray concrete (Also see *Table 1.1 on Cure & Seal Quality / Cost Summary*):

**Option 1:** Liquid-Membrane Curing Compound – Retains 97.3% Hydration Water

**Method 1: SUPER ONE or SUPER GLAZE for Decorative Concrete (Acrylic Based)** – Immediately after surface water dissipates and the finishing process is complete, apply uniformly at specified rate of coverage (see attached product data sheet).

**Recommended Sealer:** See **SEALING NEW CONCRETE - Method 1**

**Method 2: TK-DISSIPATING CURE (Water Based)** – Immediately after surface water dissipates and the finishing process is complete, apply uniformly at specified rate of coverage (see attached product data sheet). – Note\* yellowing may occur prior to applying sealer as cure breaks down.

**Recommended Sealer:** See **SEALING NEW CONCRETE - Method 2**

**Option 2:** Wet Cure – Retains 100% Hydration Water

Immediately after final finishing, the concrete surface must be kept continuously wet to prevent evaporation for a period of at least several days after finishing.

**Systems to keep concrete wet include:**

1. Burlap used with soaker hose or sprinkler
2. Ponding
3. Sprinkling on a continuous basis
4. NEW – HyrdoCure ([www.pna-inc.com](http://www.pna-inc.com))
5. NEW – UltraCure ([www.mctechgroup.com](http://www.mctechgroup.com))

**Recommended Sealer:** See **SEALING NEW CONCRETE - Method 1 or Method 2**

## SEALING NEW CONCRETE

It is essential to seal concrete in Minnesota's harsh winter climate. Sealers, (especially siloxane sealers), protects the surface against high saturation, deicing chemicals, freeze-thaw exposure, and other damaging applications from penetrating into the concrete.

### Method 1: SUPER ONE or SUPER GLAZE

Re-apply approximately 30 days after initial installation and/or prior to October 1st. This method is a topical sealer and is not highly recommended to resist attacks against salt and deicing chemicals. Reference attached product data sheet for coverage rate and application methods.

**Recommended cure:** See **CURING NEW CONCRETE** - See **Option 1: Method 1** or **Option 2**

### Method 2: TK-SILOXANE (if dissipating cure was applied), TK-FINAL SEAL (if Acrylic was initially applied)

Apply approximately 30-days after initial installation and/or prior to October 1st. This method is highly recommended to resist attacks from salt and deicing chemicals. Reference attached product data sheet for coverage rate and application methods.

**Recommended cure:** See **CURING NEW CONCRETE** - See **Option 1: Method 2** or **Option 2**

Table 1.1 on Cure & Seal Process

Cure	Seal	Cost	Recommended Application
TK-Achro Cure & Seal	TK-Achro Cure & Seal	\$\$	Non-Decorative Patios/Sport Courts/Pool Decks
TK-Dissipating Cure	TK-Siloxane	\$	Driveways, Walks, Steps, Garages
TK-Achro Cure & Seal	TK-Final Seal	\$\$\$	Driveways, Walks, Steps, Garages
Wet Cure	TK-Siloxane	\$\$	All Areas
Bright Kure & Seal	Bright Kure & Seal	\$\$\$	Decorative - All Areas
Wet Cure	Bright Kure & Seal	\$\$	Decorative - All Areas

## HOT WEATHER CURING & SEALING

**NRMCA CIP 12** – Hot Weather Concreting is “defined as any period of high temperature in which special precautions need to be taken to ensure proper handling, placing, finishing and curing of concrete.” Minnesota summers can at times get extremely hot, windy and dry which equals plastic shrinkage cracking. However, most of Minnesota's summers are hot and humid with a slight breeze which creates an excellent atmosphere for concrete. Please see attached **NRMCA CIP 12** for Hot Weather Concreting and other available references.

## COLD WEATHER CURING & SEALING

**NRMCA CIP 27** – Cold Weather Concreting is “defined as a period when the average daily temperature falls below 40°F for more than three successive days.” During cold weather concreting it's important to keep the concrete temperature above 50°F for two days after placement or when 500 PSI is achieved. NRMCA states, “The concrete surface should not be allowed to dry out while it is plastic as this causes plastic shrinkage cracks. Subsequently, concrete should be adequately cured. Water curing is not recommended when freezing temperatures are imminent. Use membrane-forming curing compounds for concrete slabs.” Please see attached **NRMCA CIP 27** for Cold Weather Concreting and other available references.



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