AGGREGATE INDUSTRIES

Delivering Value

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 = 5-7%
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: TK-ACHRO CURE & SEAL – Immediately after surface water dissipates and the finishing process is complete, apply uniformly at specified rate of cove rage (see attached product data sheet).
Recommended Sealer: See **SEALING NEW CONCRETE** - Method 1

Method 2: TK-DISSIPATING CURE – 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 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)
5. NEW – UltraCure (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: TK-ACHRO CURE & SEAL OR TK-FINAL SEAL (SILOXANE)

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, TK-FINAL SEAL

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 Quality / Cost Summary

Quality	Cure	Seal	Cost	Application
Satisfactory	TK-Achro Cure & Seal	TK-Achro Cure & Seal	$$	Walks
Moderate	TK-Dissipating Cure	TK-Siloxane	$	Steps, Walks
High	TK-Achro Cure & Seal	TK-Final Seal	$$$	Driveways, Steps, Walks
Excellent	Wet Cure	TK-Siloxane	Ask Contractor	All Areas
High	Bright Kure & Seal	Bright Kure & Seal	$$$	Decorative - All Areas
Excellent	Wet Cure	Bright Kure & Seal	Ask Contractor	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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OWNER GUIDELINES

SEALING EXISTING CONCRETE

After your Professional Concrete Installer properly placed, cured and sealed your product, the next step to protect your investment is to periodically apply a sealer. Depending on the agreement, either the Installer will return to apply the sealer or the owner will apply the sealer. Aggregate Industries prefers that the Installer applies the initial sealer application prior to the first winter. Reason being, proper application of the sealer is critical prior to the first winter service of concrete when the surface is most vulnerable to damaging chemicals. Aggregate Industries recommends the following care maintenance program for the first five years of service to ensure optimum durability, serviceability, and appearance.

Year 1:	**Installation**:	Prior to October 1st of the current year concrete was installed
	Applicator:	Professional Concrete Contractor
	Preparation:	Sweep or lightly pressure wash area and let dry prior to applying
	Product:	TK-Siloxane for Gray Concrete, TK Bright Kure & Seal for Decorative
Year 2:	**Spot Check**:	Prior to October 1st sweep area and apply small amount of water. If water dissipates continue with installation of sealer or water beads, spot check next October 1st
	Applicator:	Professional Concrete Contractor or Owner
	Preparation:	Sweep or lightly pressure wash area and let dry
	Product:	TK-Siloxane for Gray Concrete, TK Bright Kure & Seal for Decorative
Year 3-5:	**Spot Check**:	Prior to October 1st sweep area and apply small amount of water. If water dissipates continue with installation of sealer or water beads, spot check next October 1st
	Applicator:	Professional Concrete Contractor or Owner
	Preparation:	Sweep or lightly pressure wash area and let dry
	Product:	TK-Siloxane for Gray Concrete, TK Bright Kure & Seal for Decorative

WINTER CONDITIONS

Minnesota winter's brings ice and rain which can potentially cause home and business owner's physical and financial headaches. Therefore, it's imperative that ice and snow be removed and/or maintained throughout the winter season. Again, concrete is most vulnerable the first winter of service so it's crucial that:

- NO SALT OR DEICING CHEMICALS is used during this time
- A safe and effective alternative is SAND which will not melt the ice but will provide traction
- NEVER use deicers or fertilizers containing ammonium sulfate, ammonium nitrate, calcium chloride, and magnesium chloride
- Never use hot water to wash away ice or snow