

Owner's Manual

For Concrete Driveways and Sidewalks

(Not applicable to decorative concrete)

Iowa Ready Mixed Concrete Association

...representing the ready mixed concrete industry

(515) 965-4575

3. APPROPRIATE CURING

If using a concrete contractor, your contractor should provide appropriate curing for development of strength in your new concrete driveway or sidewalk. Strength is essential for obvious reasons, but it also is important for resistance to the disruptive effects of freeze/thaw cycles and de-icing chemicals. The appropriate curing procedure will change depending upon the prevailing weather conditions.

Warm Weather

(Mid-April through Mid-September)

Use commercial grade, spray-applied curing compounds according to the manufacturer's and the local ready mix producer's recommendations.

Cool Weather

(Temps over 40°F - Mid-September through Mid-April)

Use single use curing mats, wet burlap, or plastic for three to preferably seven days with temperatures over 40°F. Note: Plastic may cause surface discoloration.

Cold Weather

(Temps below 40°F - September through April)

Very specific and technical provisions apply to concreting practices during cold weather which must be followed to ensure quality and durability. These provisions are too lengthy to list in their entirety here. Contact the Iowa Ready Mixed Concrete Association for information on cold weather concreting.

4. FIRST YEAR CARE

Concrete continues to gain strength throughout its service life. Early in this life, special care must be taken by the owner to enable strength gain and to ensure the greatest long term durability possible. The following guidelines will help you get the most from your concrete investment.

- Do not drive on or over new concrete for at least seven days.
- Do not allow drain water to undermine the slab and cause settlement cracks.
- Do not allow snow or ice to accumulate on the slab during the first winter after it is placed. Snow should never be piled or plowed onto a new concrete slab. Plow or shovel snow off of new concrete as soon as possible.
- Do not use deicing chemicals on new concrete during first winter. Traction can be provided by using sand.
- Never use deicers containing calcium chloride or magnesium chloride or fertilizer ingredients such as ammonium sulfate or ammonium nitrate.
- If deicers must be used, use rock salt or sodium chloride sparingly. After the snow and ice have melted, remove the excess salt immediately. Do not allow parked vehicles on the concrete as they will drip deicers onto the concrete.
- A commercial grade, penetrating, breathable concrete sealer, compatible with the method of curing, could be applied per the manufacturer's recommendations for an additional level of protection from deicers and water intrusion.

COMMON CONCERNS

Concrete can be an investment that lasts a lifetime and, therefore, many owners become concerned when they see imperfections in new concrete. Three common concerns are scaling, pop-outs, and non-uniform color.

Scaling: This is also called flaking and can typically be prevented through the following.

- Air-entrained concrete should be used as directed in this publication under the heading "Proper Concrete Mix."
- Proper timing of the finishing operations and adherence to the guidelines under the heading "Proper Placement and Finishing" will help avoid scaling. This is especially true regarding the use or presence of excess water on the concrete surface.
- Inappropriate curing can cause drying and shrinking on the surface of concrete. Refer to the guidelines under the section "Appropriate Curing."
- Avoid the use of de-icing chemicals and follow guidelines under the section "First Year Care," especially those guidelines addressing protection of the concrete over the first winter.

Popouts: Concrete is a blend of natural materials. Therefore, it may have some natural imperfections. Certain lightweight or absorptive rock and sand particles will find their way into the mix. This can cause chips or "popouts" in the surface of the finished product. Fortunately, these imperfections rarely effect long-term durability.

Non-Uniform Appearance (Discoloration): The use of varying amount of calcium chloride to accelerate the set time of concrete can result in color variations. Concrete normally changes color as it cures and matures. Variations of light and dark areas over the first month are normal. In many cases, the color will lighten and even out over time.

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Concrete: An Investment That Can Last A Lifetime

Your concrete driveway and sidewalk can last throughout the rest of your lifetime. But, you need to follow four simple guidelines if you want your driveway and sidewalk to meet this goal.

1. Select the proper concrete mix.
2. Properly place and finish the concrete.
3. Appropriately cure the finished concrete.
4. Follow special care requirements for the first year after placement.

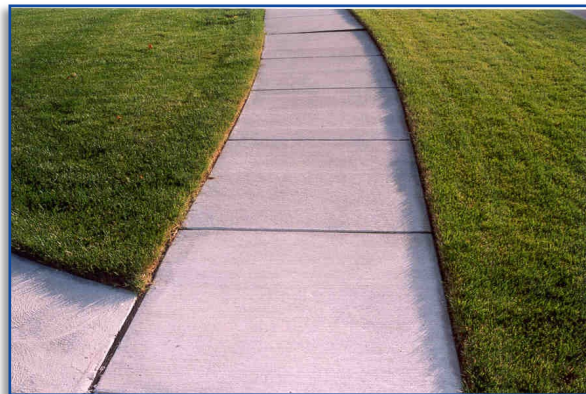


1. PROPER CONCRETE MIX

Concrete is a combination of rock, sand, water, cement, and an air-entraining agent. These materials are mixed to different proportions depending on the job that the finished product will have to perform. Your local ready mix producer will have several “recipes” for mixing the materials to suit your needs. This is why it is important to consult your local ready mix producer when selecting the right mix for your particular job.

For driveways, your local ready mix producer will generally design concrete mixes to meet the following guidelines:

- Strength of at least 4,000 psi (28 day compressive strength).
- Air content of 6.0%-8.5% as placed.
- Stiffness or workability of 4” Maximum slump as placed (except in the approved presence of certain admixtures).
- Coarse aggregates of IDOT Class 2 or better.



2. PROPER PLACEMENT AND FINISHING

Improper placement or finishing of concrete can seriously detract from the durability and life of your driveway or sidewalk. The steps, that should be followed for proper placement and finishing are:

Preparation of the Grade (ground beneath the concrete)

- Remove sod, leaves, and other organic material.
- The grade must consist of uniform material that has been uniformly compacted. In areas where the ground consists of more than one type of clay or dirt, 4 to 6 inches of compacted granular subbase can be placed to provide uniform support for the new concrete slab and assist with drainage.
- The grade must be sloped away from the house or other buildings to ensure good drainage.
- Grade must be damp immediately before the concrete is poured with no standing water or frozen material.

Placing and Sceding (Striking Off)

- Concrete must be placed within 90 minutes from the time the truck was loaded at the plant. In hot weather, the purchaser should shorten this time limit as the concrete will tend to set faster and lose workability. In addition, prolonged mixing time at the jobsite while waiting to unload should be avoided in order to prevent loss in air content. When striking off the concrete, vibration of the concrete is beneficial to removed entrapped air and properly consolidate the concrete. Excessive vibration can cause fines or lightweight material to float to the surface and remove the beneficial entrained air. The surface of the concrete should also be sloped a minimum of 1/8” per ft. but preferably 1/4” per ft. for good surface drainage. If reinforcing steel is used, it must be set above the grade in a manner that will result in its suspension near the center of the slab thickness.(e.g. use plain concrete blocks, plastic chairs, or wire bar supports).

Bull Floating

Magnesium bull floats or highway straightedges are recommended for this operation. No finishing should be performed if there is excess moisture (or bleed water) on the surface of the concrete. No water should be added to the concrete surface to aid finishing.

Waiting

After bull floating, time must be allowed for the resulting water sheen to disappear and the concrete to reach “initial set” or stiffen before final floating. Steel troweling (e.g. a fresno trowel) is not recommended.

Applying Texture

A broom texture typically provides an economical, durable, and safe final finish for most exterior concrete slabs.

Edging and Jointing

Control joints (also called contraction joints) are so named because they attempt to control cracking by giving the concrete a weakened plane at which to crack. For concrete slabs, control joints should be placed in accordance with the table below.

Thickness, in.	Maximum Joint	Preferred Joint
4, 4.5	10	8
5, 5.5	12	10
6	15	12

The joints should be cut or grooved to a depth a depth at least 1/4 of the slab thickness (1/3 of the slab thickness is preferred if the slab is reinforced). As an alternative, an early entry saw can be used to cut a slab to a depth of 1-1/4” ± 1/4”. Early entry saws , as the name implies, must be typically be used within 1 to 4 hours after final finishing to assure the shallow saw cut activates. For all sawing operations, sawing too soon will ravel or show tearing at the joint and sawing too late may not control the cracking. In general, panels should be as close to square as possible. No panel should be more than 1.5 times as long as it is wide and no sharp angles.

Isolation joints serve a much different purpose than control joints. These joints are meant to protect the new slab by separating it from other fixed or immovable structures. Isolation joints, therefore, must be used where the new concrete slab meets existing slabs, buildings, other fixed objects, or mismatched joints. Isolation joints must be constructed to the full depth of the new concrete slab.