



CONCRETE GUIDE FOR RESIDENTIAL EXTERIOR FLATWORK

CONCRETE PROPERTIES AND PROPORTIONS OF MATERIALS

Compressive Strength and Water/Cement Ratio

- The recommended specified compressive strength shall be 4,500 psi (28 days).
- The maximum in-place water to cement (w/c) or water to cementitious ratio (w/cm) shall be 0.45 or less.

Slump

- The slump at the point of placement shall not exceed 4 inches, plus or minus 1 inch.
- The maximum slump may be increased by using a mid-range or high-range water reducing admixture.

Air Content

- Exterior concrete shall be designed with a total air content by volume at 6.0% +/- 1.5%.

PREPARATION

Subgrade/Sub-base Preparation

- The subgrade shall be free of organic and uncompacted material. Unstable materials shall be removed to a minimum depth of 6 inches.
 - Replace with suitable sub-base materials, such as crushed stone or gravel, and compact to 95% density.
 - Sub-base material should have a minimum compacted thickness of 4 inches.
- Dry sub-base shall be dampened prior to placing concrete.
- No standing water should be present when concrete is placed.
- In no case shall concrete be placed on frozen sub-base.

Drainage

- A minimum slope of 1/4 inch per foot should be provided to promote positive drainage.

CONCRETE THICKNESS

- The minimum recommended concrete thickness for residential flatwork is 4 inches.
- Where traffic is expected to include delivery vehicles or other heavy loads, the minimum recommended concrete thickness is 5 inches.
- Concrete placed within the public right-of-way (including driveway apron) may be subject to local municipal or county requirements. Contractors should verify thickness and construction requirements with the appropriate jurisdiction before construction begins.

PLACING AND FINISHING

- Any water added at the jobsite should be minimized and documented on the delivery tickets, as excessive water can reduce strength, durability, and surface quality.
- The recommended sequence for finishing includes strike-off, bull floating, edging, and texturing.
 - **DO NOT** perform finishing operations while bleed water is still visible.
 - **DO NOT** use steel trowels, fresnos, roller tamper, or other tools that may seal the surface prematurely, or bring excessive paste to the surface.
 - **DO NOT** sprinkle water onto the surface (blessing the concrete) or finish any liquid into the surface.
 - Edge the concrete around the perimeter with a max. radius of 1/2 inch.
 - California steel trowel finish is NOT recommended in freeze-thaw environments.
 - Use a stiff-bristle broom to create a uniform, slip-resistant surface texture on exterior concrete - applied perpendicular to the direction of traffic after proper finishing.
 - It is recommended that at least one certified ACI Flatwork Finisher be involved in the finishing process.
- Actively manage evaporation during hot, dry, or windy conditions.
 - Use sunshades or windbreaks, apply fogging, and/or evaporation retarders.
 - Finishing aids (integral or topical) may be used per manufacturer recommendations to help maintain surface moisture.

JOINTING

Control Joints

- Proper jointing helps control the location of unavoidable concrete cracking.
- Control joints should be placed as soon as possible.
- Control joints should be spaced at intervals equal to 2 to 2.5 times the slab thickness (in inches) converted to feet.
 - 8'x8' to 10'x10' - for a 4" slab.
- Panels should be as square as possible and shall not have a length to width ratio exceeding 1:1.5
 - 6' x 9' for a 4" slab



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(continued...)

- Control joints shall have a minimum depth of 1/4 of the slab thickness.
 - 1" minimum depth for 4 in. slab
- Control joints may be installed by pre-formed grooving tools, hand tooling, or by saw cutting.
 - The window for saw cutting can vary with weather and concrete mix designs.

Isolation Joints

- Isolation joints (also called expansion joints) are made of compressible filler materials that allow concrete to expand, contract, and move without bearing against another element.
- Isolation joints shall be installed at points of restraint to isolate freshly placed concrete from fixed structures/objects.
 - i.e. existing walls, foundations, steps, etc...
- Isolation joints shall extend the full depth of the slab.

CURING

- Curing involves the maintenance of adequate moisture and temperature conditions for the concrete to develop properties such as strength and durability.
- Curing can be accomplished by different methods:
 - Covering the concrete with polyethylene.
 - Applying spray-on curing compound in accordance with ASTM C309.
 - Wet curing is the most effective: it consists of a continuous application of water that should begin immediately after final finish and last a minimum of 1 day, and up to 7 days (if less than 3 days of wet curing, a subsequent application of spray-on curing compound is recommended).



Scan QR code for
more information on
curing best practices

SEALING (recommended)

- Sealers protect the concrete by minimizing water and de-icing salt penetration.
- Integral sealer is an option and is added directly into the concrete mix rather than applied to the surface. Their purpose is to reduce permeability and add durability to the slab. The use of integral sealer **DOES NOT** eliminate the need for proper curing.

SEALING (cont...)

- A silane or siloxane based penetrating sealer can be applied 30 days after initial concrete placement and needs to be reapplied, depending on traffic (follow the manufacturer's recommendations). Note: if a spray-on curing compound is used, it must be worn off or removed prior to applying the sealer.

OPENING TO TRAFFIC

- Under normal conditions, concrete may be opened to foot traffic after 48 hours. Keep vehicles off for 7 days.

CONCRETE POURS IN HOT/COLD WEATHER

- There are many considerations when pouring concrete in hot or cold weather. Please scan the QR code to learn best practices for various weather conditions.



Do's, Don'ts & Expectations

- Stay off for 48 hours; keep vehicles off for at least 7 days.
- Avoid heavy loads for a min. of 28 days (i.e. dumpsters, RVs, heavy equipment, etc...)
- If sealing the concrete, apply according to manufacturer's recommendations.
- Clean concrete gently with water and mild soap.
- Expect normal variations in color, texture, and appearance during curing.
- Slight color differences and small hairline cracks are common and do not necessarily indicate a problem.
- Proper jointing helps control where cracking occurs, but they do not guarantee that all cracking will occur within the joints.
- **DO NOT** use salt or deicers for at least the first winter, if not forever (use sand instead).
- Hose or sweep off salts deposited by cars or from street salting, when conditions permit and as soon as possible.
- Never use de-icers containing fertilizer ingredients such as magnesium chloride, calcium chloride, or ammonium based products.
- Local municipal specification requirements may supercede these recommendations.

Concrete is one of the most durable and cost-effective paving materials available. When properly designed, placed, and maintained, it provides an attractive, low-maintenance surface that can perform for many years.

The Illinois Ready Mixed Concrete Association recommends to follow these best practices for Quality Exterior Concrete Flatwork and are key to achieving a durable, long-lasting pavement that delivers maximum value over its lifetime.