



Concrete Care

Residential Flatwork Guide



**CONCRETE
ONTARIO**



**Cement
Association
of Canada**

Quality Residential Concrete Flatwork: A Lasting Investment

Concrete flatwork such as driveways, porches, stairs, and garage floors represents both a functional and aesthetic feature of many homes in Ontario. When properly installed and maintained, these surfaces are built to perform under the stresses of seasonal weather and daily use, providing long-term service and value to homeowners.

Properly executed concrete work is more than just a construction activity; it is a long term investment in the value and functionality of a home. Quality starts with choosing a certified concrete producer and an experienced contractor who follow industry best practices and recognized performance standards. The success of concrete flatwork relies on careful planning, an appropriate mix design, and skilled workmanship. With the right team of professionals who bring certification, experience, and a commitment to excellence, homeowners can expect durable, high quality results that will last for years.

The following guidelines outline the responsibilities of the concrete producer, contractor and homeowner to help ensure durable, long-lasting residential concrete flatwork.





Concrete Producer

The concrete producer is responsible for designing concrete mixes that meet the workability, strength and durability requirements specified by the contractor. These parameters can be verified through plastic and hardened concrete testing.

Using concrete from certified producers helps ensure consistent quality and operational standards. Concrete Ontario maintains a list of certified concrete producers on its website at www.rmcao.org.

Concrete

Concrete used for residential flatwork must be properly specified to ensure it meets the required strength and durability standards for long-term performance. According to CSA A23.1, Tables 1 and 2, Class C-2 concrete is required for exterior flatwork that is exposed to chlorides (such as de-icing salts) and subject to freezing and thawing cycles without reinforcement. This class of concrete provides the necessary compressive strength, durability, low permeability, and resistance to freeze/thaw damage, making it suitable for harsh Ontario climates and ensuring the longevity of the concrete surface.

Performance Requirements for Exterior Flatwork (CSA A23.1 Class C-2)

**Compressive
Strength –
32 MPa**

**Maximum water-to-
cementitious materials
ratio (w/cm) – 0.45**

**Plastic air content –
5% to 8% (when using
20mm aggregate)***

*See CSA A23.1 Table 4 for plastic air content when alternate aggregate sizes are utilized.

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In addition to strength and durability, concrete must be workable enough for proper placement and finishing. Contractors should coordinate with concrete suppliers to confirm the appropriate slump (a measure of concrete's workability) before the project begins. Job site water addition can negatively impact the concrete durability and may exceed the maximum water-to-cementitious materials ratio allowed for the application.

Concrete is only as durable as the care it receives on site. **Correct placement, finishing, protection, and curing** are therefore essential to the long-term performance of any residential concrete flatwork. The next section details the contractor's responsibilities for executing these steps and handling and protecting the concrete from the moment it leaves the truck to the end of the curing period.

Concrete is only as durable as the care it receives on site.

Contractor

Given the complexity of proper installation, most homeowners will need professional expertise to ensure the job is done right. It is strongly advised to **hire a qualified contractor** who has the knowledge and experience to deliver a high-quality result and avoid common installation challenges. Before any concrete work begins, the contractor's previous project experience should be requested and thoroughly reviewed. The contractor is responsible for placing, consolidating, finishing, protection and curing of the concrete. Proper construction practices are critical to ensure the long-term durability of the concrete.



Scheduling and Environmental Conditions:

CSA A23.1 requires that freshly placed concrete must be protected against adverse conditions such as high wind, precipitation, freezing, high and low temperatures, low humidity, and large temperatures differentials, until curing can be commenced.

During summer months, scheduling concrete pours early in the morning will minimize moisture loss and will allow for more ideal placing conditions. Concrete is only as durable as the care it receives on site.

Placement of concrete for exterior flatwork late in the fall and early winter should be avoided, if possible, as concrete needs adequate time to cure followed by an air dry period in order to develop the strength and durability necessary to withstand multiple freezing and thawing cycles, especially when de-icing salts or chemicals are in use.

Grading:

The base must be properly graded and compacted to provide uniform support to the concrete slab and avoid settlement which may lead to uncontrolled cracking and tripping hazards to the public. In hot weather, the base material should be dampened before concrete is placed, being careful to avoid puddles and standing water.

Equipment:

All equipment used must be consistent with the product being placed, avoiding segregation, and impact on air void structure and overall surface durability. Air entrained concrete should never be steel trowelled as it may cause significant surface durability issues.

✓ What to use:

Come-alongs, square-ended shovels, magnesium and aluminum floats (Keeping floats as flat as possible)



✗ What to avoid:

Garden rakes, steel trowels, fresnos and rollerbugs



Finishing:

Minimal finishing is recommended to maintain the surface durability of the concrete. The surface work must be completed after screeding, and care must be taken to prevent the addition of any water to the surface of the concrete as a finishing aid or due to adverse weather conditions. After the concrete is placed and consolidated, the general procedure is followed by bullfloating and a final surface finish which may vary depending on the application and requirements. (Ex. Coloured concrete, stamped, exposed aggregate, etc.) **Over finishing using hand tools may compromise the surface durability and should be avoided.**

Surface Moisture Retention

Proper finishing techniques help maintain the surface paste, which is essential for long-term concrete durability. To achieve this, contractors must prevent the concrete surface from drying too quickly during the finishing process. Methods such as light misting, fog spraying, or the use of approved evaporation reducers can be employed. However, care must be taken not to incorporate standing water into the surface using finishing tools, as this can introduce excess moisture that weakens the cement paste and leads to premature deterioration. For optimal results, minimal passes with appropriate floats should be used, followed by the application of the selected final texture. This approach helps balance moisture retention with the desired surface quality.



Curing:

According to CSA A23.1, concrete curing is the process of maintaining adequate moisture and temperature in the concrete for a defined period after placement and finishing, allowing it to achieve the desired properties. Curing should begin immediately after finishing and continue for at least 7 days for exterior flatwork. During this time, the concrete gains strength and durability, provided it retains moisture and the temperature stays above 10°C.

Curing techniques include curing compounds that completely cover the surface of concrete, polyethylene sheeting, and wet burlap. Sprinklers may also be used to provide water during the curing period once the concrete has sufficiently hardened and when the cement paste and sand cannot be washed away from the surface of the concrete. Protection and initial curing are essential to prevent surface drying and ensure optimal concrete performance.

Jointing:

Concrete shrinks as it dries and expands with temperature changes, so planned joints are essential. Contraction joints should be placed at the correct locations and to a depth of at least one quarter of the slab thickness before uncontrolled cracking occurs. Joints may be hand tooled in the fresh concrete or, where appropriate, cut with a mechanical saw. Full depth isolation joints will also be required where concrete abuts other structures. Proper spacing, layout, and timely joint installation keep cracks predictable, and reduce trip hazards.

Maintaining Residential Concrete

Sealing the surface of concrete after it has been properly cured is highly recommended to preserve its long-term durability, appearance, and overall performance—especially for exterior applications like driveways and porches. A high-quality concrete sealer acts as a protective barrier against moisture, de-icing salts, chemicals, and the effects of freeze-thaw cycles, all of which can cause premature deterioration if left unchecked.

Homeowners should have a clear understanding of the required maintenance procedures, which should be discussed in detail with the contractor prior to project completion. Particular attention should be given to driveways, as they are exposed to frequent vehicle traffic, road salt, and harsh weather conditions.



Homeowner

While concrete is designed to last, on-going maintenance is required to ensure overall long-term performance.

Routine sealing—typically every 1-2 years, depending on environmental exposure and product type—is recommended to maintain the integrity of the concrete surface. In regions where de-icing salts are commonly used during winter, sealing becomes even more critical to prevent surface scaling and other forms of damage. By investing in a proper maintenance routine, homeowners can significantly extend the service life of their concrete flatwork and continue to enjoy its strength and aesthetics for many years to come.

Salt Usage

Avoid using de-icing chemicals, particularly during the first winter season, as some salts can chemically damage the surface of the concrete and increase scaling and deterioration over time. Safer alternatives to traditional salts, such as sand or fine grit, are readily available during the winter months. These materials provide traction without harming the concrete, helping to protect and extend its durability for years to come.

Concrete curing

Homeowners can contribute to the strength development of concrete by talking to their contractors and agreeing on a proper curing plan for their concrete flatwork. Concrete needs constant moisture to develop its strength and durability. Homeowners can provide this moisture by using sprinklers to keep concrete's surface wet during the first 7 days after placement.



The CSA A23.1 standard outlines all necessary requirements for concrete materials and methods of concrete construction and should be consulted in addition to this document.

Please contact Concrete Ontario at info@concreteontario.org for more information.