SURFACE SOLUTIONS

TYPE IL WHITE PAPER · FOR GENERAL CONTRACTORS

Type IL Cement: What General Contractors Need to Know About Finishing, Curing and Flooring

By Jack Aspenson, S3 Surface Solutions · October 7, 2026 · Updated November 16, 2026

Type IL cement is now the default in U.S. concrete, and it changes what happens to the floor installed on top of it. The concrete is sound. The risk is in how the slab is finished and cured, decisions made on pour day by trades that leave before the flooring arrives.

The short version:

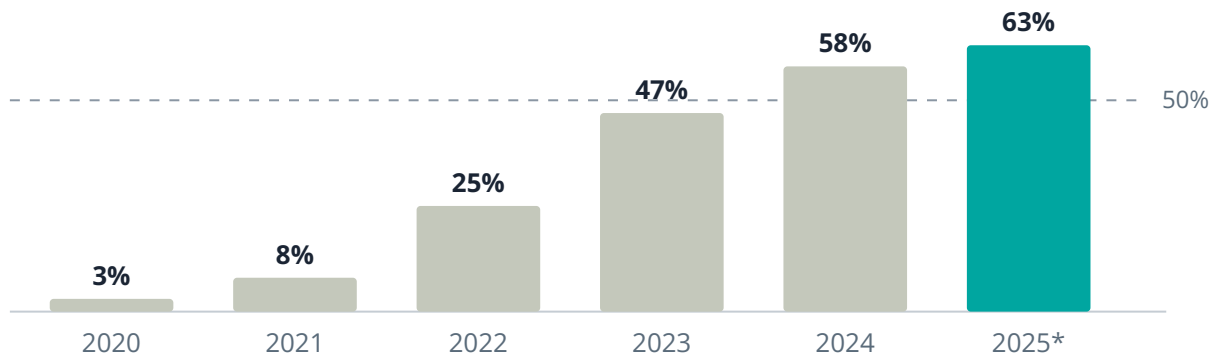
- Finish the slab open: a soft steel trowel, never a hard trowel or burnish, and no densifier where flooring goes.
- Choose the cure before the pour, and get the flooring adhesive maker's written approval of it.
- Test before flooring goes down (RH, surface pH, hardness, absorption) against the adhesive maker's limits, not Type I/II rules of thumb.

1. What changed in the cement

Type IL (portland-limestone cement, ASTM C595) replaces 5–15% of the clinker with raw limestone, ground finer than the cement around it. ASTM added it in 2012, and by June 2023 it outsold ordinary portland. It meets the same strength, set and soundness requirements as Type I/II (ASTM C150), and all 50 states and the District of Columbia approve it for DOT work. What the cement spec never evaluated is how the top few millimeters behave under a flooring adhesive, and most adhesive data sheets were still written for C150 concrete.

Blended cement went from 3% to 63% of U.S. shipments in five years

Share of U.S. cement shipments that is blended cement; about 95% of it is Type IL



2020: 3% · 2021: 8% · 2022: 25% · 2023: 47% · 2024: 58% · 2025*: 63%

* 2025 = January to September. Type IL passed ordinary portland in monthly shipments in June 2023.
Sources: USGS Mineral Commodity Summaries 2025 and 2026; PCA/ACA shipment data · 2020–2025

Research from the ACI Foundation (April 2026) found Type IL performs comparably to Type I/II **when it is properly finished and cured**. The rest of this paper is about meeting that condition.

2. What your crews will see on pour day

Type IL gives the finisher less margin. Expect these tendencies, not guarantees:

- **Bleed water:** less of it, and the sheen is hard to see. Don't wait for the old cue; the finishing window opens earlier.
- **Set time:** slower in cold (slag slows it further), faster in heat. Get set-time data and mock up in pour-season weather.
- **Surface:** crusts on top while still plastic below. Protect it from strike-off on, and never trowel a crust.
- **Wind and heat:** the top dries with little bleed water to replace it. Have retarder and windbreaks ready before the pour.
- **Drying and pH:** the slab holds water longer, and surface pH stays high longer because a wet surface can't carbonate. Test; don't use Type I/II dry-down schedules.

> **Field evidence:** in a 2024 ACI-ASCC survey of 173 contractors, 77% saw higher water demand and 43% more plastic-shrinkage cracking. In 2023 mockups, six of seven Type IL slabs crusted or tore at evaporation rates as low as 0.03–0.09 lb/ft^2/h. In ASCC side-by-side mockups, water-based adhesives bonded weaker over Type IL than over Type I/II.

3. Why it matters at the floor

A Type IL slab can look ready to bond before it is. Fresh portland concrete is placed at pH 12.5–13.5. In S3's field testing, Type IL slabs have held high surface pH for up to 24 months after the pour:

1. Fine limestone packs the paste, so the top few millimeters densify and dry slowly.
2. Wet pores keep out the CO_2 that would normally carbonate and neutralize the surface.
3. High surface pH persists, and returns after the surface is sealed and re-wetted.
4. Low-VOC, water-based adhesives tolerate less alkalinity than the solvent products they replaced, so the bond fails, often a year or more after installation.

A hard-troweled or burnished finish, a densifier, or a film-forming cure closes those same pores further. That is why finishing and curing decide the outcome more than the mix does.

Moisture tests can miss it. ASTM F2170 (RH) and F1869 (MVER) measure moisture, not how long surface alkalinity persists, and their usual limits were set on Type I/II concrete. In the ASCC mockups, Type IL passed moisture tests nearly as well as Type I/II and still bonded weaker. Test surface pH, hardness and absorption too.

4. Finish it open

Finishing is the biggest lever: a closed surface traps water and alkali under the floor.

- **Do** use a soft steel-trowel final finish: flat, but not closed.
- **Do** trowel only after bleed water clears, never on a crust.
- **Do** mock up in the season you'll pour and agree on the finish standard.
- **Don't** hard-trowel or burnish in flooring areas; it risks spider cracking, delamination and trapped moisture.
- **Don't** apply densifiers or silicate hardeners where flooring goes.
- **Don't** add jobsite water, in the truck or on the surface.

5. Cure and seal: choose before the pour

Pick the cure before the pour, get the flooring adhesive maker's written approval, and cure at least 7 days (ACI 308); S3 recommends 10 or more for Type IL.

- **Wet cure:** best hydration, no residue. Adds water to the building and lengthens dry-down; labor-heavy.
- **Curing paper or sheet (ASTM C171):** holds mix water without adding more, no residue. Must stay lapped and weighted; can mottle exposed concrete.
- **Curing compound (ASTM C309/C1315):** fast and cheap, but many leave a film that blocks adhesive, and silica-based products add bond breakers. Use only with the adhesive maker's written OK, or remove by mechanical prep.
- **Spray-on, non-silica, salt-sequestering cure:** applied at final finish, dry in about 1.5–2 hours, designed to keep pores open and limit surface alkalinity. Require a written adhesive compatibility letter.
- **Exposed concrete:** confirm the cure suits that finish and any sealer over it.

Disclosure: *S3 Surface Solutions makes a product in the salt-sequestering category; its data sheet is available on request.*

6. What goes wrong, and what it costs

Most Type IL flooring failures trace back to finishing and curing, and every fix after the pour costs more:

- **Delamination:** troweling a crust traps bleed water. Found by a hollow sound on chain drag; fixed by removing to sound concrete.
- **Spider cracking:** wind or heat dries the top too fast. Fill and grind; it can telegraph through resilient flooring.
- **Dusty, chalky surface:** fast surface drying, or unvented heaters in cold weather. Rub test leaves residue, Mohs below 5; grind before flooring.
- **Slow dry-down:** Type IL and slag hold water, and a closed surface traps it. Means schedule delay or moisture mitigation, typically $1.50–3.00/sf.
- **Adhesive failure:** high surface pH plus moisture at the bond line, often a year or more after install. Means tear-out and reinstall.

> **Stop and check if you see:** a mill cert reading C595/Type IL where C150 was specified; w/c at or above 0.45; no vapor retarder; a chalky surface or Mohs below 5; a water drop that beads instead of soaking in (ASTM F3191); hollow spots or spider cracks; HVAC not running at install; remediation put off "until later."

7. Weather and supply: plan for the season you pour in

The season decides what goes wrong first.

- **Cold (air at or below 40°F, ACI 306):** Type IL with slag sets slowly. Enclose and heat first, use vented (indirect-fired) heaters only, never place on frozen subgrade, and extend the cure. Direct-fired heaters put CO_2 on fresh concrete and dust the surface.
- **Wind:** low bleed plus wind means crusting, shrinkage cracks and dusting. Close openings, have retarder ready at strike-off, and check the evaporation rate (ACI 305) at every pour; Type IL mockups crusted far below ACI's general 0.2 lb/ft^2/h trigger.
- **Heat:** fastest set and shortest window. Pour early, staff extra finishers, and start the cure right after the final pass.
- **Supply:** the mix submittal names a cement type, not a plant, and limestone content runs 5–15% by plant. Ask for the mill certificate for the cement actually delivered, the slag percentage, and the coarse aggregate source with its absorption, and require notice if any source changes mid-job.

8. Questions to answer before the pour

The general contractor is the only party on site from pour to flooring, so these answers belong in the GC's file before the first truck arrives.

Ask the ready-mix supplier

- [ ] Which cement plant is supplying this job? Send its mill certificate.
- [ ] For each pour: slag %, w/c, and the coarse aggregate source with its absorption %.
- [ ] Will you notify us if the cement or slag source changes mid-job?

Ask the concrete contractor

- [ ] What finish, and how many trowel passes? Any burnishing or densifier?
- [ ] Which cure product, applied when, and for how long?

- [ ] What is the wind and cold-weather plan, and who logs pour-day temperature, wind and finish times?

Answer as the GC

- [ ] When does permanent HVAC start, and when does testing start?
- [ ] Has the flooring adhesive maker approved the cure in writing?
- [ ] Is moisture mitigation budgeted, and who makes the go/no-go call before flooring?

Before flooring: test, don't assume

1. Run HVAC at service conditions for 48 hours.
2. Test RH per ASTM F2170: 3 tests in the first 1,000 sf, plus 1 per additional 1,000 sf.
3. Test surface pH (F710), hardness (Mohs 5 or above) and absorption (F3191 water drop).
4. Judge every reading against the adhesive maker's limits, not a generic 75% RH.

Sources

- Klinger, Neuber, Ondo and Suprenant, "Minimizing the Risk for PLC Concrete Slabs," *Concrete International*, January 2024 (Joint ACI-ASCC survey and Neuber mockups)
- ASCC Type IL vs. C150 side-by-side mockups, 2023–24
- ACI Foundation / Temple University PLC industrial floors study, April 2026
- USGS Mineral Commodity Summaries 2025 and 2026: Cement
- PCA, Roadmap to Carbon Neutrality (2021); ASTM C150 and C595

Education only. The project specifications and the flooring manufacturer's written requirements govern.

Frequently asked questions

Why do floors fail on Type IL concrete slabs?

The concrete is sound; the risk is in how the slab is finished and cured. Type IL holds high surface pH longer, a hard-troweled or burnished finish, densifier or film-forming cure closes the pores further, and low-VOC water-based adhesives tolerate less alkalinity, so the bond can fail a year or more after installation.

How should a Type IL slab be finished where flooring will go?

Finish it open: a soft steel-trowel final finish, troweled only after bleed water clears and never on a crust. Don't hard-trowel or burnish, don't apply densifiers or silicate hardeners, and don't add jobsite water. Mock up in the season you'll pour.

How long should Type IL concrete be cured?

At least 7 days per ACI 308; S3 recommends 10 or more for Type IL. Pick the cure method before the pour and get the flooring adhesive maker's written approval of it.

Which cure methods work under flooring?

Wet cure and curing paper or sheet (ASTM C171) leave no residue. Curing compounds (ASTM C309/C1315) often leave a film that blocks adhesive and need the adhesive maker's written OK or mechanical removal. A spray-on, non-silica, salt-sequestering cure needs a written adhesive compatibility letter.

What does a Type IL flooring failure cost?

Slow dry-down means schedule delay or moisture mitigation, typically $1.50–3.00 per square foot. Adhesive failure, often a year or more after install, means tear-out and reinstall. Delamination, spider cracking and dusty surfaces each need grinding or repair before flooring.

What should be tested before flooring goes down?

After 48 hours of HVAC at service conditions: RH per ASTM F2170 (3 tests in the first 1,000 sf plus 1 per additional 1,000 sf), surface pH (F710), hardness (Mohs 5 or above) and absorption (F3191 water drop), judged against the adhesive maker's limits, not a generic 75% RH.

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About the author

Jack Aspenson founded S3 Surface Solutions in 2015 and has spent more than 35 years in business development, technical sales and materials engineering. His work centers on concrete moisture mitigation, flooring failure forensics and substrate chemistry, and he consults on concrete and installation problems. More about Jack · jack@s3surfaces.com