SURFACE SOLUTIONS

TYPE IL WHITE PAPER · FOR ARCHITECTS & SPECIFIERS

Type IL Cement: What Architects and Specifiers Need to Know About Slabs That Receive Flooring

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

Type IL cement is now the default in U.S. concrete. When a floor fails on a Type IL slab, the cause is usually how the slab was finished and cured, and those are decisions the contract documents tend to leave open. A spec that says "wet cure or curing compound" lets the lowest bid make the most important call on the job. This paper shows how to close that gap with performance requirements and submittals, not means and methods.

The short version:

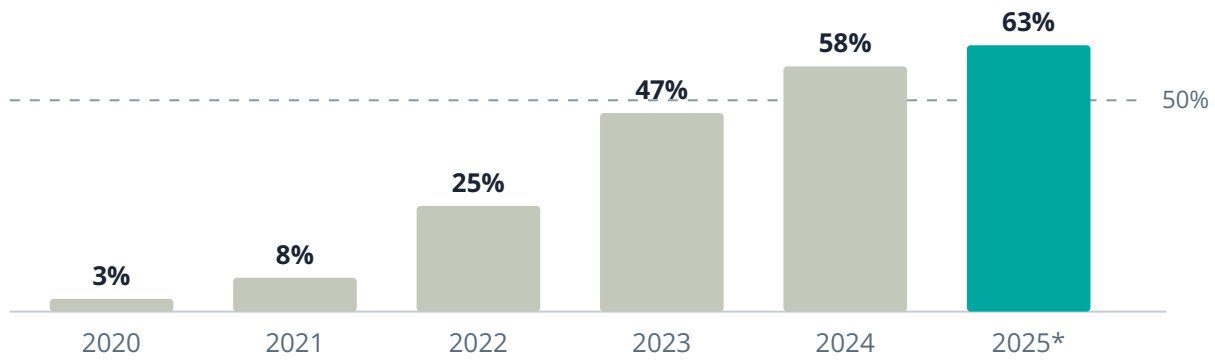
- Require the cement mill certificate with every mix submittal, and written notice of any source change.
- In areas receiving flooring, specify the finish and cure by performance: no burnishing, no densifier, and a cure the flooring adhesive manufacturer accepts in writing.
- Put testing, acceptance limits and a moisture-mitigation allowance in the documents, and reconcile Division 03 with Division 09.

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. Where the specs leave the gap

Most Type IL flooring problems start where Division 03 and Division 09 meet. The two are often written by different people, and nobody reconciles them.

- **Cure:** the concrete section allows "wet cure or curing compound," while the flooring section requires a clean, film-free surface. The contractor picks the cheapest cure, and the flooring installer inherits the film.
- **Finish:** a hard steel-trowel or burnished finish is called for throughout, including areas that will be covered with adhesive.
- **Surface treatments:** a densifier or hardener specified for exposed areas gets applied to the whole slab.

- **Acceptance limits:** the flooring section cites a generic 75% RH or 3 lb MVER instead of the adhesive manufacturer's limits, and sets no surface pH limit.
- **Testing:** who tests, when, at what density, and who pays are not stated.
- **Money and schedule:** there is no allowance for moisture mitigation and no dry-down time, so both arrive later as a change order and a delay.

5. What to put in the specifications

The language below is a starting point. Adapt it to the project, and confirm limits with the specified flooring and adhesive manufacturers.

Division 03 (03 30 00 Cast-in-Place Concrete, 03 35 00 Concrete Finishing, 03 39 00 Concrete Curing)

- **Submittals:** "For each placement, submit the mix design with the cement mill certificate (ASTM C150 or C595, type and limestone content), SCM type and percentage, w/cm, and coarse aggregate source with absorption. Notify the Architect in writing of any change in cement, SCM or aggregate source."
- **Finish:** "In areas scheduled to receive adhered flooring, provide a soft steel-trowel finish without burnishing. Do not apply densifiers, hardeners or sealers in these areas."
- **Curing:** "In areas scheduled to receive adhered flooring, cure for not less than 7 days by a method that leaves no film. Curing compounds are permitted only with written acceptance from the flooring adhesive manufacturer, or shall be removed by mechanical means before flooring."
- **Mockup:** "Provide a finishing and curing mockup under conditions representative of the placement season."

Division 09 (09 05 61 Flooring Preparation, 09 65 19 Resilient Tile Flooring, 09 68 13 Tile Carpeting)

- **Testing:** "Test in-situ RH per ASTM F2170 and surface pH per ASTM F710 after the building has operated at service conditions for 48 hours. Acceptance limits are the flooring and adhesive manufacturers' published limits."
- **Mitigation:** "Include an allowance (or unit price per square foot) for moisture and pH mitigation where test results exceed acceptance limits."
- **Pre-installation meeting:** "Before slab placement, convene the concrete contractor, flooring installer and adhesive manufacturer's representative to confirm finish, cure, testing and schedule."

Where a pH-neutralizing or salt-sequestering cure is wanted, specify it by performance (non-silica, film-free, accepted in writing by the adhesive manufacturer) and allow "or approved equal."

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

6. Submittal review checklist

- ☐ The mill certificate matches the cement type specified (C150 vs. C595/Type IL).
- ☐ w/cm, SCM percentage, and aggregate source with absorption are listed for every placement, including elevated slabs.
- ☐ Finish method and cure product are named, with data sheets and the adhesive manufacturer's acceptance letter.
- ☐ A vapor retarder (ASTM E1745) is shown directly under slabs on ground that receive moisture-sensitive flooring.
- ☐ The testing agency, timing, density and responsibility are named.
- ☐ The mitigation allowance or unit price is carried in the bid form.

7. Before flooring: acceptance testing

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

> **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; hollow spots or spider cracks; remediation put off "until later."

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 slabs?

Usually because of how the slab was finished and cured. Type IL holds high surface pH longer; a 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.

Where do specifications usually leave the gap?

Where Division 03 and Division 09 meet: the concrete section allows "wet cure or curing compound" while the flooring section requires a film-free surface; a hard-trowel finish or densifier is applied in flooring areas; acceptance limits cite a generic 75% RH with no pH limit; and testing responsibility and a mitigation allowance are missing.

What should Division 03 require for areas that receive flooring?

The cement mill certificate with every mix submittal and notice of source changes; a soft steel-trowel finish without burnishing and no densifiers, hardeners or sealers; at least 7 days of cure by a method that leaves no film, unless the adhesive manufacturer accepts the curing compound in writing; and a finishing and curing mockup in placement-season conditions.

What should Division 09 require?

In-situ RH testing per ASTM F2170 and surface pH per ASTM F710 after 48 hours of HVAC at service conditions, judged against the flooring and adhesive manufacturers' published limits; an allowance or unit price for moisture and pH mitigation; and a pre-installation meeting before slab placement.

Are standard moisture tests enough on a Type IL slab?

No. ASTM F2170 and F1869 measure moisture, not how long surface alkalinity persists, and their usual limits were set on Type I/II concrete. In ASCC mockups Type IL passed moisture tests nearly as well as Type I/II and still bonded weaker, so test surface pH, hardness and absorption too.

Does Type IL perform as well as Type I/II cement?

Research from the ACI Foundation (April 2026) found Type IL performs comparably to Type I/II when it is properly finished and cured. The specification's job is to make sure that condition is met.

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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