



Separation of Semirigid Concrete Floor Joint Fillers

CPC Position Statement #4

Because of today's fast-track construction schedules, early installation of joint fillers is more the rule than the exception. Concrete Polishing Council (CPC) contractors are frequently required to fill joints earlier than the minimum 28-day cure recommended by most filler manufacturers or the 90-day cure recommended by ACI 302.1R-15, "Guide to Concrete Floor and Slab Construction." As the slabs shorten due to concrete shrinkage that occurs over time, the joint filler is stretched. The slab shortening is accelerated when the building's HVAC system is activated. When joint filler separation inevitably occurs due to the specified early installation, contractors are told the joint filler is "failing" and to repair the joints or risk not getting paid. This demand, however, ignores well-established limitations of semirigid fillers and the reality that the contractor has no control over the conditions that lead to separation.

The function of a semirigid polyurea or epoxy joint filler is to protect saw cut contraction or construction joint edges from spalling or degrading under wheel impact from material-handling vehicles, pallet jacks, or even shopping carts. For the joint filler to provide proper joint edge protection and effect load transfer across the joint, the filler needs to be relatively stiff or rigid as compared to a floor joint "sealant." Accordingly, semirigid joint fillers have minimal lateral expansive capabilities and do not "stretch" as joint opening occurs.

Because semirigid fillers also have relatively high tensile strengths, they are formulated to have lower range adhesive strengths to prevent restraint or the "welding" of the two independent concrete slab panels separated by the joint. As a result of these inherent properties, the filler by design will "tear" or lose bond when substantial joint opening resulting from concrete drying shrinkage occurs. This separation, as



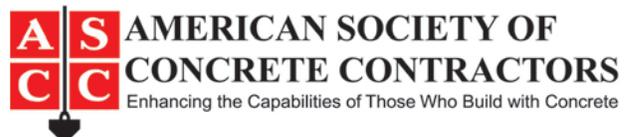
Adhesive joint filler separation (joint wall)



Cohesive joint filler separation (internal)

shown in the photos, occurs in two ways: adhesively (filler adhesion to joint wall is compromised) or cohesively (the filler tears internally). It is common to see both types on a given floor project.

A multitude of factors in the design and construction of a concrete floor slab can impact the degree to which joint filler separation occurs, including concrete mixture design, joint spacing, surface preparation prior to filling, ambient building conditions, and the installation timing of the filler in relation to the concrete's cure. The amount, type, and depth location of reinforcing steel through the joints, along with subgrade friction (which will be affected by the profile of the base and the presence of a vapor retarder and/or slip sheets) can also have a significant impact upon joint widening.



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CPC Position Statement #4 (cont.)

Aside from the profile of the base and the quality of the surface preparation, few of the factors leading to filler separation are within the contractor's control.

Joint filler installation timing is the most important factor impacting the likelihood of joint filler separation occurring on a flooring project. ACI 302.1R-15 discusses the timing of joint filling and sealing in Section 11.10.1 and notes the following:

Concrete slabs-on-ground continue to shrink for years; most shrinkage takes place within the first 4 years. The most significant shrinkage takes place within the first year, especially the first 90 days. It is advisable to defer joint filling and sealing as long as possible to minimize the effects of shrinkage-related joint opening on the filler or sealant.

Similar guidance is offered by “Guide to Decorative Concrete (ACI 310R-13)” and “Guide to the Design of Slabs-on-Ground (ACI 360R-10).” All three documents are consistent in noting:

- Filler or sealant separation should be expected when joints are filled early in the concrete's drying shrinkage process;

- Filler separation does not indicate a failure of the filler or installation; and
- Construction documents should identify parties responsible for filler separation repair and address payment requirements such as requiring the contractor to return at a pre-established date to refill separation or setting funds aside to address separation remediation. Consequently, if the CPC contractor is required to fill joints prior to 28 days after concrete placement, repair or remediation of joint filler separation is a floor maintenance issue and not an installation or material warranty issue. CPC contractors will communicate with owners, general contractors, and construction managers to discuss the implications of choosing to fill floor joints early and can aid in developing strategies to minimize the likelihood of separation. CPC contractors will also discuss separation repair options including necessity, methods, and timing.

If you have any questions, contact your CPC contractor or the CPC Technical Hotline at +1.888.483.5288 or at cpchotline@asconline.org.