

## Joint Filler Protrusion in Covered Floors

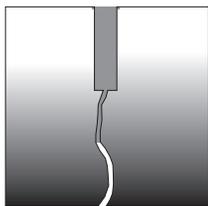
From time to time, we receive calls indicating that our semi-rigid filler is bulging beneath tile or floor coatings. The first assumption by the involved parties is that there is a problem with the filler itself. While it is theoretically possible that a faulty filler installation could be to blame, in our years of experience the problem has rarely been found to be the filler. Rather, the bulging nearly always has been the result of normal concrete slab dynamics.

Concrete contains more water than is needed to hydrate the cement in the mix. This moisture is trapped within the slab until it can find a means of escape. If you were to take a core sample of a relatively new slab, you would find that the top portion is fairly dry, while the bottom portion is very damp. That's because moisture in the upper slab portion has escaped through the surface via evaporation, but moisture near the bottom is trapped by an already damp base. And, if there is a vapor retarder/barrier sheet beneath the slab, there is no place for the moisture to go but upward.

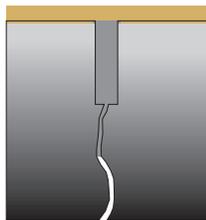


As concrete loses moisture it shrinks in linear dimension. This shrinkage is exhibited at contraction and construction joints, which widen as the slab ages. As long as the slab stays dry on the upper portion, the joints will stay in their widened dimension. However, circumstances change when the floor is covered with a non-breathable surface such as VCT or a film-building coating.

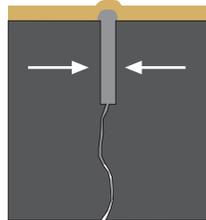
When a floor covering is applied the slab is encapsulated. Since nature always seeks equilibrium, the moisture on the bottom gradually migrates upward. When moisture is added to the dry upper portion, it results in an expansion of the concrete. When sufficient expansion takes place, the semi-rigid filler is compressed. Since the filler is restrained on the bottom, it is literally extruded upward and out of the joint. This is the bulging callers describe.



**Filled joint condition prior to floor covering installation. Top of slab has less moisture than base of slab.**



**After floor covering is installed, moisture begins to equalize thru the slab with moisture from base moving upwards.**



**As moisture equalizes, slab panel expands in linear direction, reducing joint opening and driving filler upward.**



*Example of filler protrusion under coated floor*

Slab re-expansion can be verified by removing the VCT or coating and examining the filler. If the filler is thoroughly cured and of consistent hardness, you can be certain that the bulging is slab-related.

Correction of filler bulging is an inexact science. If you razor off the protruding filler flush with the floor surface, and replace the surface covering, there is a reasonable chance that the problem will not recur. However, we have encountered floors where protruding fillers had been removed, only to have bulging recur several weeks or months later. There is no way to predict successful correction, since it all depends on how much moisture remains in the lower portion of the slab and/or the potential that external moisture sources (i.e. drainage) are playing a role.

It should be noted, that joint filler protrusion can occur with both epoxies and polyureas from any manufacturer. It should also be mentioned that geography is not a factor. We have encountered filler protrusion in dry and humid climates, as well as typically warm and cold regions.

We estimate filler protrusion occurs in less than 5% of all covered floors. The problem is that no one can predict when, or why, it will occur. Accordingly, it has become our standard recommendation that joints under floor covering NOT be filled with a semi-rigid epoxy or polyurea. Instead, we suggest that joints be filled with a material that will yield to compressive forces without extruding upward. Some contractors have found a weak mortar suitable.

If there is a compelling reason to fill joints under coatings, tile or other coverings with a semi-rigid, we recommend that filling be performed 10-20 days after slab placement. In this way the filler will separate early, leaving a gap that can accommodate some joint closure before the filler is placed in compression. Contact our technical staff for advice on which Metzger/McGuire filler to use and how/when to install.

*Additional Resources: The American Concrete Institute has a publication available entitled "302.2R-06: Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials" that goes into great detail on the subject of covered floors, including a discussion on slab re-expansion. Contact ACI at (248)848-3800 or [www.concrete.org](http://www.concrete.org).*

V1-14