

# Joint Filler Separation; Causes; Corrections

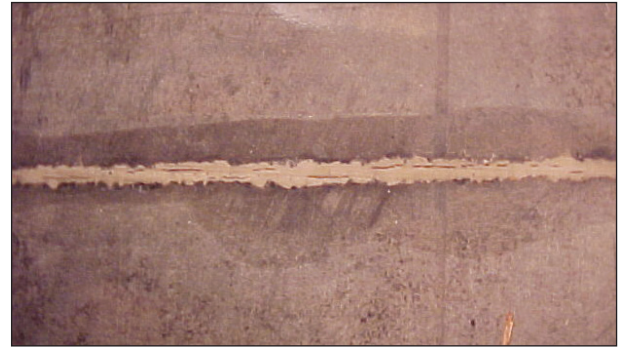


## THE MYTH

There is sometimes a misconception that semi-rigid epoxy floor joint fillers are expected to expand with the joint as the joint opens. This is not true of our fillers, nor can it be true of any filler claiming to be a spall-preventative material.

## THE FACTS

The primary function of a joint filler must be to facilitate the flow of hard-wheeled vehicles across the joint while protecting the edges of the joint from impact and wear. In simpler terms, the filler must recreate the original continuous surface of the floor by supporting hard wheel traffic that crosses. To accomplish this, the filler must obviously be fairly firm thus the term semi-rigid. But the filler must also accommodate the unique characteristics of new concrete, especially shrinkage.



opening is likely in excess of its expansion capability. Given the fact that the filler is barely flexible, and that it will be installed before the joints have opened to their maximum, what can we expect?

## CONCRETE SHRINKS!

All concrete shrinks! The reason concrete shrinks is that it is placed containing more water than is needed to hydrate the cement. This extra water is used to make the mix workable. As the water gradually leaves the slab through evaporation, the concrete mass shrinks. This shrinkage is linear, meaning the placed panel shortens in length. The result is that joints become wider.

## SEPARATION IS NORMAL AND PLANNED

Metzger/McGuire fillers accept that joints will continue to open after filling. Our fillers compensate by having a relatively low adhesive and tensile strength. If the joint opens, we want the filler to separate adhesively, cohesively or both. **This separation is both normal and planned, and is no more a failure than shrinkage is a failure of the concrete.** Simply stated, filler separation is a fact of life, for all spall-preventing semi-rigid epoxy.

### JOINTS WIDEN GRADUALLY

Concrete shrinks gradually, usually taking a year or more for most of it to occur. PCA cites the following rate of shrinkage:

<b>First 30 days</b>	<b>30%</b>	The actual shrinkage rate is probably even slower, depending on water/cement ratio, etc.
<b>Next 335+ days</b>	<b>60%</b>	This means that on almost any given project, the concrete is still shrinking when the joint filler is installed.
<b>TOTAL, one year</b>	<b>90%</b>	

## HOW MUCH OPENING IS NORMAL?

Each floor is a totally unique entity. There are literally hundreds of variables including temperature, humidity, personnel, design, cement type, aggregate type and size, admixture, etc. In some floors the construction joints may open more, while on another floor the contraction (sawn control) joints may open more. Sometimes two joints may not open while the third joint opens dramatically. There are no definite in concrete (other than shrinkage), there are only guidelines we can follow.

One accepted guideline is that a concrete pad 6m long will shrink approximately 3mm or 12mm per end. If we begin with a 3mm saw cut between panels, and each side shortens by 12mm, we have a joint opening of 3mm or 100%. This is far greater than the expansion capability of even a soft flexible sealant, let alone a firm filler. With a semi-rigid filler, any

## MINIMIZING SEPARATION

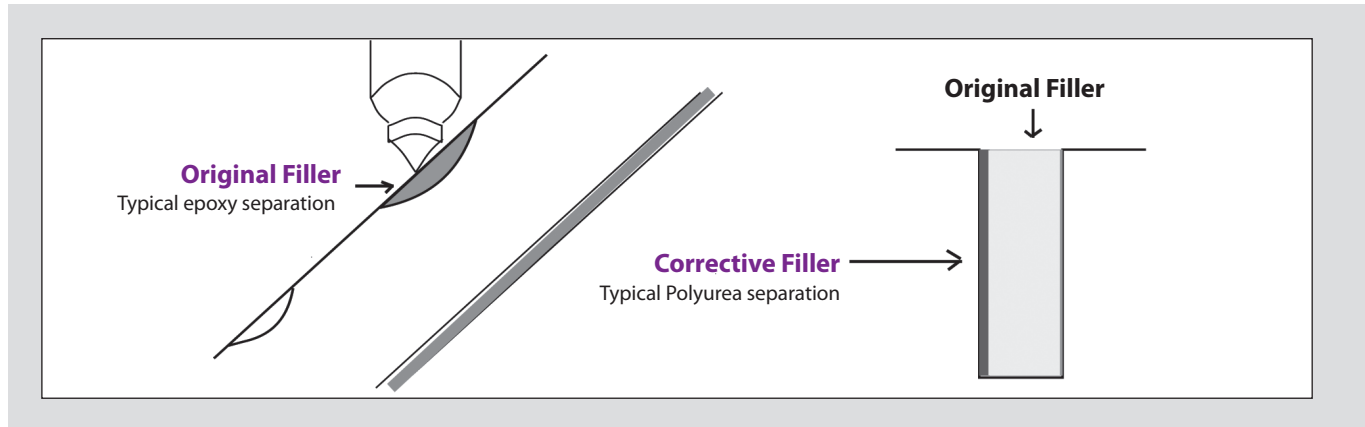
There is no practical way to avoid separation for most industrial floors. All we can do is minimize the amount of separation that occurs. Various practical measure include:

- Defer filling as long as possible
- Provide concrete that shrinks less
- Place joints closer together
- Bring building under heat or A/C control to expedite shrinkage prior to filling.

## HOW METZGER/MCGUIRE FILLERS SEPARATE

As stated earlier, Metzger/McGuire semi-rigid fillers will separate adhesively, cohesively, or both. This is true of both our epoxies and polyureas. But epoxies and polyureas will generally separate differently. Epoxies will tend to separate in a side-to-side manner, while our polyureas will usually separate continually along one side. Both types of separation are normal (see sketch).

To refill a separation void, use a knife or other narrow tool to loosen debris. Vacuum or blow clear. Apply filler to the void and allow it to flow in. Re-apply as necessary until the filler remains above the void. Allow to cure until hard, then razor off flush. In the event of future separation, repeat the same process. If filler has become loose-to-the-touch, it should be removed and replaced following standard instructions for new applications. If the filler becomes loose in a through-slab construction joint, it can be removed or driven into the joint to be used as a base for subsequent refilling.



## HOW TO CORRECT SEPARATION

- Width of Separation**  
 If the separation is less than credit card width, we feel treatment is not required for most facilities, unless sanitary conditions are critical.
- Loose or Firm**  
 If the separation is wider than credit card thickness and the filler is not moveable, the voids can simply be refilled. If the filler is totally loose, removal is necessary.
- Loading and Wheels**  
 If loads are extremely heavy ( i.e. steel coils, etc.) and wheels are small and hard, joints should be treated promptly to prevent spalling.
- Facility Function**  
 If sanitation is a critical concern, such as in an area with exposed food, joints should be treated promptly and possibly several times.

Fillers need not be removed if held firmly in place. The goal is to fill the voids and re-establish a smooth, interruption-free floor surface. The voids should be filled with more of the original filler or with our Spal-Pro 2000 polyurea. Spal-Pro 2000 is ideal for separations due to its relatively thin viscosity and rapid cure time. Spal-Pro 2000 is chemically compatible with all of our joint fillers.

## WHEN TO CORRECT SEPARATION?

There is no one answer to this question. It is clearly wise to wait as long as possible before filling separations, allowing more shrinkage to occur. A few weeks after heat/AC is turned on you will usually start noticing more separation. Cold weather also brings on more separation since slabs shrink from both thermal contraction and moisture loss. Occupancy date is always a factor. The bottom line is to fill the voids before edge damage occurs!

## WHO SHOULD FILL THE SEPARATIONS?

The refilling of shrinkage-opened joints is often of questionable responsibility. Ideally it should be clearly defined in the project specifications. It can be made part of the applicator's contractual warranty or described as part of the owner's normal maintenance. The cost will be higher if the contractor is liable since he will bid with a "worst case" situation in mind. On the other hand, the owner may lack adequate manpower. Regardless of who is designated, the refilling should be done to insure continued joint protection. Metzger/McGuire semi-rigid will provide edge support for a long period of time despite voids; but a completely filled joint will always offer maximum edge protection.

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