JOINT FILLER SEPARATION; CAUSES, CORRECTIONS

THE MYTH

There is sometimes a misconception that semi-rigid 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.

ALL 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.

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:

The actual shrinkage rate is probably even slower, depending on water/cement ratio, etc. This means that on almost any given project, the concrete is still shrinking when the joint filler is installed.

First 30 Days	30%
Next 335+ days	60%
Total, One Year	***90%***

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, admixtures, etc., 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 definites in concrete (other than shrinkage), there are only guidelines we can follow.

One accepted rule of thumb is that a conventional concrete slab will shrink 1/8" (0.125) in 20 feet (6 m). This means that a 1/8" saw cut will eventually widen to 1/4" (0.250), a 100% expansion. If a joint is filled when 50% of the slab shrinkage has taken place, the remaining 50% will cause a 1/16" (0.063) separation void.

SEPARATION IS NORMAL AND PLANNED

Metzger/McGuire fillers accept that the joint 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 epoxies and polyureas.

MINIMIZING SEPARATION

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

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

WARNING: A COMMON MYTH ABOUT POLYUREAS AND JOINT FILLER SEPARATION

Many polyureas have been promoted as having a "superior" ability to accommodate joint movement and "stretch" with the joint as it opens. Polyureas have no greater inherent ability to accommodate lateral expansion than epoxies, but many achieve greater movement because they are softer and do not meet ACI & PCA minimum hardness criteria (Shore A80+). Products exhibiting a Shore hardness of less than A80 may "stretch" more, but may also deflect under load, leading to joint edge deterioration (spalling).

METZGER/McGUIRE

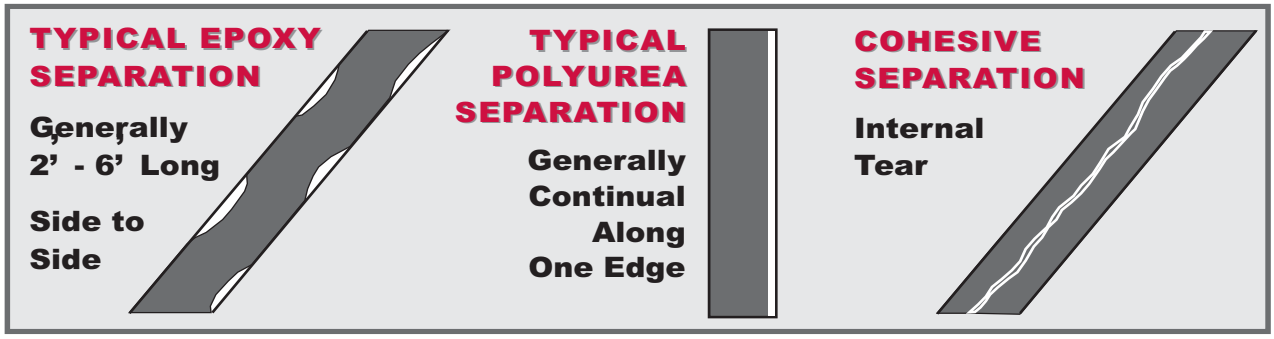
P.O. Box 2217 Concord, NH 03302 • Fax: 603/224-6020 • E-Mail: specmm80@aol.com

800/223-MM80 www.metzgermcguire.com

JOINT FILLER SEPARATION; CAUSES, CORRECTION

HOW FILLERS SEPARATE

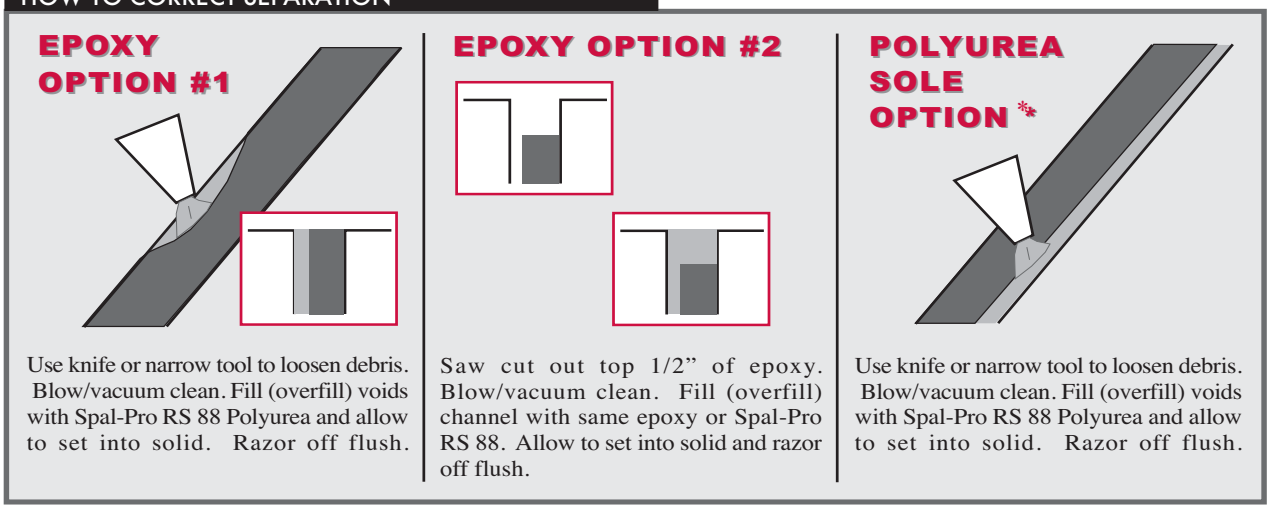
Semi-rigid fillers generally tend to separate adhesively (filler-to-concrete), although cohesive separation (within the filler) is not uncommon when joint preparation is above average. Epoxies generally separate in a "leap-frog" pattern (jumping back and forth across joint) while polyureas tend to separate contuinually along only one side.



MUST SEPARATION BE CORRECTED?

The function of a semi-rigid filler is to support wheeled loads as they cross the joint. As a rule-of-thumb, separation compromises load support (and thus joint edge protection) only when the separation becomes wider than credit card thickness. Once credit card width or greater separations occur, repair should be considered, especially if loads are very heavy, if vehicle wheels are hard and of small diameter, or if joint spalling is beginning to occur. If filler has become loose to touch, replacement should be performed.

HOW TO CORRECT SEPARATION



** Polyureas, due to their chemical nature, cannot be easily saw-cut out. Thus filling separation void is the only viable option.*

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 IS RESPONSIBLE FOR CORRECTION?

Since the sole cause of filler separation is concrete slab shrinkage, the installer should not be held responsible for the cost of correction unless such responsibility is clearly defined in the filler specification/contract. On the other hand, most owners chafe when informed that they should bear the cost of correction on a new floor. It is important that separation correction issues are considered in the design stage so that later disputes do not result in joint edge deterioration pending resolution.

METZGER/McGUIRE

P.O. Box 2217 Concord, NH 03302 • Fax: 603/224-6020 • E-Mail: specmm80@aol.com

800/223-MM80

www.metzgermcguire.com