

Specifying the Proper Joint Filler-Epoxy or Polyurea

There is much confusion among designers and owners as to whether they should specify an epoxy or a polyurea. Since we manufacture both, and since both are acceptable to ACI and PCA, we hope the following comparison will provide the guidance needed to select the right filler for your next industrial floor project.

Physical Properties

Hardness: The load support offered by both products is determined by their respective Shore A hardness. The higher the reading, the stiffer the filler. ACI and PCA call for a minimum hardness of A80. All Metzger/McGuire fillers exceed A80.

Adhesion: All Metzger/McGuire epoxies and polyureas have adhesive strengths of 250-400 psi. Higher adhesive strengths can result in tearing of concrete joint edges.

Expansion: Most epoxies will accommodate 5-10% joint widening before they begin to separate adhesively or cohesively (internally). Most polyureas can handle 5-15% expansion before separating. It should be assumed that both filler types will separate since joints open 50-100% during slab shrinkage. Do not be misled by high elongation readings. Installed fillers expand "laterally," thus elongation is not a measure of expansive capability.

Initial Set/Cure: Epoxies take 4-8 hours to convert into a solid at 70°F. Colder temperatures will slow set times, warmer temperatures will shorten set time. Polyureas are much faster setting and are little affected by temps. Set times can range from 10-30 minutes depending on the product.

Installation Considerations

Preparation: All fillers require joints be cleaned back to bare concrete. Epoxies are more tolerant of moisture in the joint. Polyureas may foam/bubble if joints are wet or damp, and proper or thorough cure can be compromised.

Fill Depth: ACI and PCA both call for all semi-rigid fillers to be installed full depth in saw cut joints or a minimum of 2" deep in joints exceeding 2" depth. Shallower depths, such as over compressible backer rods, will compromise a filler's load-carrying and edge-protecting capability.

Dispensing: Epoxies can be dispensed with manual guns or power pump systems. Due to their faster set, polyureas must be power pump dispensed.

Flushness: The finished profile (flushness) of a filler has a direct effect on joint edge protection. A flush filler surface is achieved by overfilling the joint, then razoring off the excess once the filler has cured. Epoxies typically razor off very flush with the floor surface. Polyureas may tend to have a slight concaveness (dishing) after razoring.

Staining: Overfilling results in fillers spreading out on the floor surface, often leaving a "stain." Both epoxy and polyurea fillers can stain. Stains can be minimized or prevented by using a stain-preventing film like our "SPF." The degree of potential stain is influenced by the finished density and porosity of the slab surface.

Durability: Epoxies and polyureas of comparable Shore A hardness both provide excellent long term durability (load support, abrasion resistance, etc.).

Cost: Epoxy and polyurea material costs are generally comparable. Power pump dispensing will generally reduce labor costs for both. Second day razoring, which is often necessary with slower setting epoxies, may add nominally to the installed cost.

Post-Installation Considerations

Separation: All joint fillers separate, either adhesively or cohesively, as joints open due to slab shrinkage. Epoxies tend to separate in a leap-frog manner, while polyureas usually separate continually along only one side. Leap-frog separation often means the filler is still bonded and held in place. The continual separation of a polyurea leaves it more vulnerable to being dislodged by hard wheel impact. Conversely, continual line separation is easier to repair (refill) than leap-frog separation.

Removal: If the filler was improperly installed (filled less than full depth, has concave profile, etc.), or if the filler must be removed for other reasons, epoxies are easily removed by sawing. Most polyureas are not easily sawn and may shred or revert back to an oily liquid.

Discussion

Here are some generally accepted criteria to consider when choosing between semi-rigid epoxies or polyureas:

Use A Polyurea When:

- Installation temperatures will be lower than 35°F. (See [Technical Bulletin T6](#) for complete details).
- Areas must be opened to traffic within a few hours.

Use An Epoxy When:

- Filling early in a project (i.e. significant joint widening may require substantial filler removal/replacement).
- Joints are likely to be damp or actually wet.

When none of the above conditions exist, you can feel secure in specifying either an epoxy or a polyurea manufactured by Metzger/McGuire. Our technical staff is always available to help you, should you have questions not addressed in this bulletin.

V2-14