

When Two Become One: Working with Two-part "Reactive" Adhesives

by Christopher Capobianco

Posted: June 10, 2008



For easier and more thorough mixing in less time, use an electric drill with a mixing paddle.

I saw some new adhesives at the FCICA convention in Savannah this past March that are being marketed as one-part products with some of the same performance characteristics as 2-part epoxy or polyurethane adhesives. If this is true it will be good news for installers but like anything new, it will probably take a while for these new products to get out into the pipeline and develop a

track record, so for many installations it is still necessary to use 2-part "reactive" adhesives. They are called reactive because the two parts undergo a chemical reaction when they are mixed together that forms a new product with unique characteristics among adhesives. These characteristics include excellent resistance to extremes of temperature, resistance to water, hardness and very good holding power. I'd like to first talk about those characteristics and then cover what installers need to know when using these products.

Reactive adhesives have excellent resistance to extremes of temperature which makes them great for uses in very cold or very hot areas. However, while working with them, maintain room temperature of 70 degrees Fahrenheit (plus or minus 5 degrees or so) because under cold conditions these adhesives will take much longer to set up and under very warm conditions they can go fast. That's not to mention that resilient flooring products are also temperature sensitive, so that 70 degree temperature is important for more reasons than just the adhesive.

Reactive adhesives' resistance to water is often misunderstood. I have heard people say that a concrete slab moisture problem can be corrected with epoxy or polyurethane adhesive under the floor, which is not true. What is true is that floors that get wet a lot, such as in bathrooms, entrance areas, and other floors



Never is it more important to roll a sheet resilient flooring installation than when you use epoxy adhesive. A 100-pound roller helps remove air bubbles and make sure the floor covering, the adhesive and the substrate are all in contact with each other.

subjected to "topical" moisture will perform better with a reactive adhesive. Concrete moisture problems are another issue altogether.

The hard setting nature of these adhesives is why their use has increased over the past ten years ago in health care settings such as hospital rooms. The types of wheels that are used on many hospital beds create a lot of pressure on the floor and softer adhesives get "displaced" or pushed out from under the weight of the wheel. The result is a small dent where the bed sits, caused not by the flooring itself being indented, but by adhesive displacement.

The great holding power of epoxy and polyurethane adhesives has been proven over and over again for a variety of products besides resilient flooring. The fact is, in a high traffic area, these adhesives will hold the floor in place firmly while resisting temperature extremes, water on top of the floor and indentation from standing and rolling loads. They really do work!

Before we get into how to work with these products, I have to say that in most cases, the adhesive selection will be made by someone else so the installer does not have a lot to say about it. However, when you do have something to say about it, remember what I have said here. Yes, these adhesives are tougher to work with and take more time. But they really do work. I have discussed this with architects, flooring dealers and installers many times and told them that despite the added time and cost, these adhesives are still the best choice in many applications and are worth it.

For installers, there are some key things to know when working with reactive adhesives. First, as I said before, are temperature conditions. If the adhesives are cold, they will take a lot longer to set up and vice versa if they are hot.

Ideal job conditions are around 70 degrees Fahrenheit but knowing you don't always get those conditions, you can help yourself in warm weather by keeping adhesives in a cool place so they don't set up so fast. And, if you get a bubble soon after you set the flooring into adhesive, a little heat can speed things along and help the floor lay flat.



"Combing" the adhesive across the width when using epoxy on sheet goods is another way to minimize bubbling. After setting the product into the adhesive, first roll across the width in the same direction as the trowel notches, then roll in the other direction.



Soft setting adhesives can displace from heavy loads, causing indentations to appear in the surface of the floor covering.

As far as substrate testing and preparation, the same rules apply as they would for any other adhesive application. The floor needs to be dry, smooth and flat. The trowel notch size is important too, so make sure you have the right trowel before you get started. Get everything ready for adhesive, double sweep the floor, have the material you are installing ready to go and double check that everything is ready before you actually open the can and start mixing. Once you mix it, you need to be ready to go, so this bit of preparation is important. Most two part adhesives come in two containers. Check the label instructions for which part goes into which, such as "Pour Part A into Part B." Make sure all of the material from part A is out of the container. Do not mix partial units, because the mix is not always a "50/50" measure of the two parts. I have often seen the cans opened from the bottom with a can opener in order to completely empty the can. . Once the two parts are in one can, they must be thoroughly mixed. The product should come with wooden paddles similar to paint stirrers, but I prefer to use a slow speed electric drill (not much more than 200 RPM) and a metal mixing paddle. If you mix by hand, you need to mix for at least five to seven minutes - with an electric drill, three to five minutes. The color of the new mixture has to be completely uniform with no streaks. It's very important that the material is mixed thoroughly. After mixing, immediately pour the mix onto the substrate and don't leave it in the can because it can generate heat and start to harden quickly if you do. Using the correct trowel, start spreading the adhesive immediately. Open time is usually short - probably about fifteen minutes so make sure you have a watch. If you spread an entire gallon by yourself, chances are 15 minutes will have gone by from the time you start until you finish. Once the open time is up, start setting the flooring right away. This is a wet lay type of installation and reactive adhesives don't get "tacky" so don't expect a strong bond right away. Don't work on top of the flooring you are laying or you risk adhesive oozing, shifting flooring, or indentation from your knees moving the adhesive around. If you have to work on top of the new floor, use kneeling boards - either large pieces of plywood or Styrofoam insulation panels so that you are not right on top of the new floor. If the adhesive stays open for too long - usually about one hour is the most - it will harden and nothing will adhere to it. If this happens, scrape it up off of the floor using a razor scraper. Don't try to lay flooring into it and don't apply a new mix on top of the old one. Remove the hardened adhesive from the substrate and start again.

Once the material is set into the adhesive, it must be rolled in both directions with a 100-lb roller. Roll immediately after the floor covering has been installed into the adhesive and once more about 30-45 minutes later. Lift the flooring to ensure proper transfer of the adhesive from the substrate to the floor covering. The back of the flooring should be covered with adhesive after rolling the floor. If it is not, the adhesive may have "gone over" or hardened. If there are any curled edges or bubbles after the first rolling, these need to be corrected right away by using small sandbags or other weight to hold the flooring down while the adhesive sets.

Sheet flooring is challenging for this type of installation, but more and more sheet goods is being installed with epoxy, especially in hospitals. One helpful hint for sheet goods came from a column Ray Thompson did here in FCI a while back (Using Epoxy Adhesives for Resilient Sheet Vinyl by Ray Thompson, FCI September 28, 2000). That is, when you spread the adhesive for a sheet good installation, "comb" the adhesive across the width of the flooring in straight continuous lines of adhesive without swirls, voids or puddles. Once the rolls are set in to the adhesive, start rolling from side to side in the same direction as the trowel notches. This seems to minimize air bubbles by forcing the air out to the sides. Then, roll the floor in the other direction. Again, avoid kneeling or walking on flooring that has not been rolled.

Clean up of reactive adhesives from the face of the floor covering must be done while the adhesive is still wet. Once it hardens, it can be very difficult, if not impossible to remove. Once the floor is done, it should not even be walked on for twelve hours. Rolling loads and furniture should stay off for two days. Check with the adhesive manufacturer to see what their guidelines are.

To review, reactive adhesives cure time and bond strength can be affected by too much adhesive (wrong trowel), improper mixing, cool substrates (below 60 degrees F), warm conditions, improper rolling, contaminated substrates, excessive vapor emissions, or traffic on the floor too soon after installation. If you take your time and pay attention to details, the finished installation will be one that is there for many years of hard use.

Christopher Capobianco