

Best Practices for Dispensing Two-Part Structural Adhesives

- 1 Store Cartridges in an Upright Condition and at Room or Normal Factory Temperature**

- 2 Always Acclimate the Cartridge and Substrates to Room Temperature**

- 3 Balance the Pistons**

- 4 Uniform Hardening of Adhesives is Dependent on Uniform Flow of Adhesives**

- 5 Dispense Two Small Beads instead of One Large Bead**

- 6 Dispensing Adhesive Through a Used or Gelled Tip** (Bad Idea)

- 7 When Finished Dispensing, Remove Tip (while still liquid), and Reinsert Nose Plug**

- 8 After Use — Store Cartridges in an Upright Position and at Room Temperature**

Please contact our expert team of sales technicians @ 1-800-220-1966 or sales@chemical-concepts.com

1 Store Cartridges in an Upright Condition and at Room or Normal Factory Temperature

Most successful fabricators will store their adhesives upright with the nose (dispensing end) of the cartridge pointed up. All of the adhesive boxes are marked with UP arrows, so you don't have to open the box to see which way is up for adhesive storage. These products are reactive, so when it comes to shelf life, temperature is your enemy. Storage of adhesives at warm temperatures has the effect of reducing the shelf life of the adhesive, as the activator or catalyst has what is called a half-life, which means that at any temperature, it takes a certain number of hours before only half of the catalyst is active. Therefore, higher temperature exposure, shorter half-life. Less active activator or catalyst, longer or no reaction, and the product won't gel or harden. Simply storing a cartridge on your dashboard of your car on a warm day can reach temperatures of 150F, which can be enough to cause this phenomena, so watch how you store the adhesive. Likewise, storage at cooler temperatures will extend the shelf life, but will cause the adhesive to thicken if dispense at a cooler temperature, so be sure to acclimate the adhesive to room temperature before dispensing. Most adhesives are rated for a one-year shelf life, if stored properly at room temperature, which is 75°F. Most adhesive suppliers recommend that you do not freeze the cartridge, as there may be water added to the formulation for various reasons.

2 Always Acclimate the Cartridge and Substrates to Room Temperature

Adhesives are tested and approved for their performance attributes at room temperature (75°F). When adhesives and substrates are at these normal shop temperatures, they are expected to perform according to their stated conditions. So, before fabrication begins, bring the adhesives into the condition of room temperature, by placing the adhesive upright at room temperature. On occasion, you might have experienced the condition that the adhesive was at room temperature, but the mold or part was stored outside at 20°F, and came into the factory and was glued together, and no reaction occurred. The adhesive will quickly reach the temperature of the part, and if it is 20°F, don't expect a reaction, or if so, one that will take much longer, and might not have the normal strength. Likewise, in hotter climates, if you are dispensing the adhesive outside, on a sunny day, on a dark, black, or grey gel coat, you might experience a much quicker than normal reaction time, as the substrate can be 150°F or more.

3 Balance the Pistons

Adhesives are produced so that a consistent reaction occurs. However, since there is a resin side (A-side, the bigger side) and an activator side (B-side, the smaller side), and these products are filled with different equipment, there's a good possibility that the A-side resin piston and the B-side activator piston are not exactly at the same level of filling. This chemistry is formulated so that the optimal reaction happens at room temperature, when the A-side resin and the B-side activator are dispensed simultaneously and consistently. The first task is to balance the pistons so that when the cartridge is dispensed, both the A-side resin and the B-side activator come out at the proper ratio of 10 to 1.

Procedure: Place the cartridge in a dispensing gun (whether it is a manual dispensing gun or a pneumatic, this procedure should be done at all times). Using the clear cam lock nut, turn the cam lock nut 1/4 turn to lift up the gray nose plug. Remove the nose plug from the cartridge and keep the cam lock nut, and the nose plug close by for use. You will need the clear cam lock nut to secure the dispensing mix tip in a bit. Dispense the adhesive in the manual gun into a cup/container by slowly squeezing the handle, until both the A-side resin and the B-side activator come out consistently. This should only take 1 to 3 squeezes on the dispensing gun. Wipe the excess adhesive and activator on the side the cup. You are now ready to attach the static mix tip now.

Align the static mix tip to the appropriate part of the cartridge. Be sure to align A-side resin to A-side resin, and B-side activator to B-side activator. **NOTE:** It seems obvious, but many times fabricators will now dispense the adhesive and the tip will pop off. You will probably do this the first time also. The reality is that you must lock the tip onto the cartridge by taking the clear cam lock retaining nut, and placing the nut over the tip, and turn the nut 1/4 clockwise to "lock" the tip onto the cartridge. You are now ready to dispense 6" to 12" onto a piece of cardboard or into a cup/container to ensure even flow of both adhesive and activator through the static mix tip.

4 Uniform Hardening of Adhesives is Dependent on Uniform Flow of Adhesives

The key to getting consistent, uniform hardening (reaction) is to make sure that the adhesive is dispensed in a uniform manner. The manual guns are designed for a pulsating movement, that is: squeeze and recover, squeeze and recover, squeeze and recover. This actually is not the best system for dispensing (pneumatic guns/battery guns actually work best for dispensing, in that when you pull the trigger, you get a uniform dispensing). So, if possible, and if you are doing a lot of adhesive dispensing, get with your supplier to see what it takes to get a pneumatic dispensing gun. You will not regret the purchase of a pneumatic dispensing gun; however, they are not inexpensive.

5 Dispense Two Small Beads instead of One Large Bead

Dispensing two small beads (and if possible, one over the second), allows for the fabricator to have a second shot of making sure that all of the product will react. There may be the time when there is an air bubble of notable size that may affect the uniform dispensing of the adhesive, particularly if that air bubble is in the activator side of the cartridge. Air bubbles particularly in the catalyst side can cause havoc in the uniform ejection of the activator, as when pressure is put on the pistons by squeezing the handle and depressing the pistons, the bubble collapses, just as a balloon collapses when you press on the side of a balloon. Then no activator will dispense for a bit from the cartridge into the static mix tip, and you have uncatalyzed or light catalyzed sections of the adhesive bead. After a short interval, after the balloon is collapsed, and becomes pressurized, and just like that, you will have a section of the bead that has too much activator, and will react faster than the sections of the bead next to it. When this happens, you have inconsistent cure, sparked primarily by the bubble. Dispensing two smaller beads, laying one bead over the other will eliminate or significantly reduce this inconsistent cure. So, how does the catalyst side get an air bubble in it. Generally, there are three ways. The first way is that the activator may not have been vacuumed to remove the air before filling the cartridges. The second way is that the activator could have been vacuumed, but an air bubble was trapped when filling in the cartridge chamber. The third way, and by far the most likely is that the cartridge was dropped, either in shipping or storage somehow, and the piston has been dislodged from its location, and air has found its way through the piston seals into the cartridge. Here's how to check for air: Press on the activator piston with your finger, and if it depresses any at all (spongy feeling) and pushes back at you, there's air in the activator. If you press on the activator piston, and it is immovable, you've eliminated air in the activator side as the culprit. If you press on the activator piston and it slides in a bit, and holds firm (not spongy), you've probably fixed some aspect of the piston being down. All cartridges/all manufactures have this risk, especially on the 10:1 formulations, meaning from time to time it rears its ugly head, but not to worry. Dispensing the adhesive more slowly, that is uniformly, or with a pneumatic gun, and dispensing two smaller beads instead of one almost always alleviates the problem.

6 Dispensing Adhesive Through a Used or Gelled Tip

This sounds like something that you would never do, but I'll bet you've done this!! BUSTED! Many fabricators are aware of the cost of the static mixer tips by their bosses, and some have found creative ways to endeavor to overcome the single use aspects of the single use static mixer tip, but I've never seen one actually overcome it. Compared to the adhesive in the cartridge, and your time, and the potential disastrous outcomes of plugged or partially plugged mixer tips, the static mixer tip is the least expensive cost item, so while there's no recommendation here to use tips willy-nilly, be prudent. Don't succumb to a used tip. Get a new tip and purge the material properly. The more common circumstance seen in plants is this situation. The adhesive has a 5 or 10 minute gel time (working time), and the dispensing gun with cartridge and static mix tip has been set off to the side to position/re-position or clamp substrates together, and the adhesive in the tip is gelled past the point where normal pressure on the dispensing gun will dispense the adhesive. The fabricator turns

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up the pressure on the pneumatic gun, or gets his cranking forearms ready for the task of squeezing hard enough to “pop” the curled adhesive out of the gelled static mixer tip! Success or failure, you risk reactive materials that have not been successfully removed from the tip, which interfere with the mixing of the adhesive. Or, more commonly, when you put that much pressure on the “system” something has got to give, and it can be a blowout of the adhesive past the piston (YUCK), or a crack in the cartridge. Most manual guns have a 28 to 1 mechanical advantage, so great forearm strength translates into blowouts or cracked tubes or worse, uncatalyzed materials in the seam.
GET A NEW STATIC MIXER TIP.

7 When Finished with Lamination, Remove Tip (while still liquid), and Reinsert Grey Nose Plug

The cartridges are designed to be a multiple use cartridge, which means that the cartridge can be used again over and over until the adhesive is completely consumed in the cartridge. These adhesives are impressive, so we want to use all of the adhesive we purchased efficiently, and the best way to do that is to, when done dispensing the adhesive, to remove the tip, wipe off any excess around the nose of the cartridge and re-install the nose plug. Be sure to find the clear plastic cam lock to hold the nose plug in, as you will need this clear plastic cam lock the next time you attach a static mixer tip. Frequently, it is seen in plants that the static mixer tip is left on the cartridge, and the nose plug is absent or tossed away. This is very typical in plants, as it is the quicker way, but what happens is that over time, the adhesive reacts in the nose of the cartridge, and quite often, the nose of the cartridge is plugged. At the very least, it will take some time to unplug the nose by picking the hardened adhesive out of either the A-side resin or B-side activator or both. Most issues are a result of fabricators re-using the cartridge without clearing the hardened adhesive from the nose, and attaching a new mixer to pre-hardened adhesive in the nose. If possible, get into the habit of re-inserting the nose plugs with the retaining clear cam lock.

8 Store Cartridges in an Upright Condition and at room or Normal Factory Temperature

Need we repeat anything here? See item 1 for a complete description.

Instructions: Have each operator read the above guidelines and then return the signed copy to their supervisor to certify that the training occurred and was understood. Once all operators have read and signed the training guidelines, make copies and post the first page in high-visibility public areas and in any work areas where adhesives are used as a reminder of these best practices. If you require any additional assistance related to adhesive selection, usage, troubleshooting, storage, dispensing and/or training, please contact our expert team of sales technicians @ 1-800-220-1966 or sales@chemical-concepts.com.

Signature here

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