

# TechTips

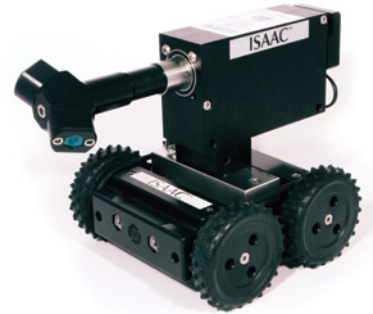
VOLUME 8

## Application Methods of Liquid Sealants

### From a hand to a robot!



First, we need to define the scope we are working within. This Tech Tip will focus on the Carlisle HVAC/Hardcast offering of sealants. Liquid duct sealants come in either a water-based or solvent-based form. This is an important distinction, as it plays a key role in the application methods the installer can use.



The packaging size also plays a key role in the application method chosen. Carlisle HVAC/Hardcast offers a plethora of package sizes to fit any job, from an 11-ounce cartridge to a 50-gallon drum, including:

- 11-ounce cartridge
- 1-gallon pail
- 2-gallon pail
- 5-gallon pail
- 50-gallon drum



Let's start out with the simplest and easiest method, the hand. The Carlisle HVAC/Hardcast bucket and brush products are thick enough to allow an installer to utilize their gloved hands to apply the product. This method comes in particularly handy (see what I did there?) in cases where minimal access is available on one or more sides of the duct. For example, ductwork that is too close to either the ceiling, roof, or another structural member that will not allow easy access with a chip brush (*right*).



The second application option is using a chip brush. This is not your typical paint brush. A chip brush uses natural bristles which are typically made of animal hair (mostly hog's hair or oxen hair). A standard paint brush usually uses synthetic bristles made from nylon, polyester, or a nylon/polyester blend. A chip brush will withstand epoxies, paint removers, stains, etc., whereas the synthetic bristles in a standard paint brush can be damaged.



Applying the sealant products via brush is a fairly simple and straightforward process. Load up your brush and begin brushing the sealant onto the ductwork. Care must be taken to fully cover the longitudinal seams, transverse joints, and any duct wall penetrations. The installer will use a pattern that will help force the sealant into any gaps and crevices, followed by another pass over the joint to keep the sealant looking good.



With liquid sealants available in cartridges, a caulking gun can be used to apply and then tool the sealant. Caulking guns come in a variety of sizes and application methods. The simplest is the hand-held manual caulking gun that requires the user to continually work the trigger to move the plunger and push the product from the cartridge. Other versions are available which use electricity, batteries, or compressed air to handle the manual trigger. Most caulking guns come with a device installed to break the seal within the tip of the cartridge.



The unit we offer is a manual gun that comes with plastic caps and a tooling device. The plastic caps allow you to cap the cartridge to save any remaining product. The tooling device gives the user the option to tool the bead for a more pleasing look. The additional feature is the tooling device simply clips on to the frame of the caulking gun to keep it handy.

Another option is using a trowel, putty knife, or similar hand-held tool, all of which allow the user to grab as much or as little product as they need from the pail. Using the tool, work the sealant into the gaps and crevices, making sure to fill in completely. It is important to note that trowels, putty knives, and similar tools do not have the forgiveness of a hand or brush when going over radii or other inconsistent surfaces.



**The above processes are suitable for both water-based and solvent-based products. Because these are manual application methods, the quality of the sealing job will rely heavily on the user. There are other methods that take out some of the user reliance.**



## Spraying duct sealant

When spraying duct sealant, you will always use a water-based sealant. The solvent-based products are too thick and cure too quickly to allow spray application. There are a couple of options on the equipment side. You can use either a modified airless paint sprayer or a priming piston pump. The equipment market has many options, including engineered systems (Hardcast MSDS), full spray cart systems (Graco, Titan, Wagner, and others), table-top, electric, compressed air- and battery-powered devices, as well as pogo pumps.



The airless paint sprayer is typically an electric-powered piston pump that will pull the product from the pail and pump it through the fluid handling hose, gun, and spray tip. The stroke action of the piston keeps a steady flow of high-pressure product delivered to the spray tip. The airless paint sprayer pump models work beautifully for on-site sealing, and their minimal motor amp draws allow users to simply plug into a 15 amp 120 volt outlet.

The user must decide how much product they want to apply and how wide of an area they want to cover, then choose the appropriate spray tip size. The spray tips are designated by a three-digit number; for example, 111. The first number multiplied by two is the spray pattern width in inches when spraying from 12" off of the surface. The second and third number combined give you the orifice size in thousandths of an inch. In the example above, the 111 spray tip will give the user a 2"-wide spray pattern and will put down approximately 0.12 gallons per minute (GPM). Refer to Carlisle HVAC's [Tech Tips Newsletter Volume #2](#) for a detailed explanation of tip sizes.

The priming piston pump style of sprayer is a unit that uses a follower plate to force the product through the pump and is typically used with metal pails, as plastic pails will not hold the higher pressures the priming piston pump has. The priming piston pump typically uses compressed air to actuate the pump. Therefore, it is usually used within the fabrication shop, where larger amounts of sealant allow for extended periods of sealing with minimal downtime and compressed air is on hand. The follower plate can be a bellows style or similar method that seals to the inner surface of the pail or drum.

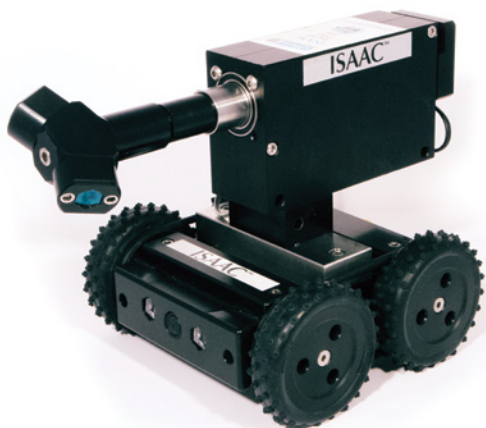


It is also possible to mix application methods, like when using the Cartridge Killer. The Cartridge Killer combines the ease of a caulking gun with the speed and pressure of a spray machine and provides you with a quick, simple way to apply a fine bead of Spray-Seal™ Duct Sealant to boots, wyes, and other fittings. Cartridge Killer helps you save time and money on labor and materials and provides superior aesthetics.

The Cartridge Killer kit comes with three different-sized tips so you can achieve the ideal bead size for any project and features a stainless steel mesh filter between the gun and the tip to minimize clogging and keep work on schedule. The 5-gallon "caulking tube" allows for less changeover time and minimal waste. The Cartridge Killer offers users excellent control over their sealant application and results in improved aesthetics, minimal product storage, and lower labor and material costs.



And finally, you can even use a robot to spray duct sealants inside a duct system. The robot is combined in tandem with an airless spray pump and utilizes two spray tips on a rotating spray head to seal joints and seams from the inside!



The key to spraying water-based duct sealants, whatever system you purchase, is to maintain the equipment. If one person owns the maintenance, you should get extended service from the equipment, as well as clean and continuous spraying. Carlisle HVAC offers a [cleaning video](#) to take you through the maintenance step-by-step.

When spraying duct sealant, you will see marked gains in speed and a drop in [product usage](#). As the machine is doing the labor of pumping the product, the user simply pulls the trigger and directs the sealant to the joints, seams, and duct wall penetrations. The pumps will supply the duct sealant at your designated pressure for as long as you pull the trigger. Typically for spraying, the outlet pressure will be in the range of 1,500 to 1,800 PSI. This guarantees that the sealant you are applying is forced at high pressure into the joints, seams, and duct wall penetrations.

The additional benefit of applying duct sealants using an airless sprayer is the ability to easily pass the required duct leakage test the first time. No re-work is required.

Using an airless sprayer does take a minimal amount of practice for the user to get comfortable and consistent. Once this learning time has passed, their speed will dramatically increase.

**To summarize, you will know which application method makes the most sense for each and every job. So, no matter the project, anywhere from hand application to robotically applied, you will be prepared to handle it! Happy sealing!**