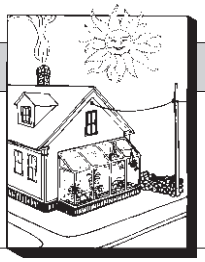


Making Mastic Stick

by Bruce Sullivan

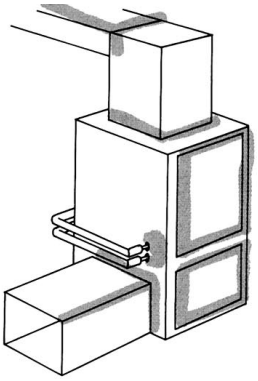
To many homeowners, central forced-air hvac systems spell the ultimate in comfort. However, buyers don't know, and contractors are just learning, that the comfort and efficiency of a central hvac system often come with an energy penalty. Recent research shows that ducts are responsible for 20% to 60% of the air leakage in houses.

Some contractors have used duct tape to seal ducts — seemingly a logical move — but duct tape becomes brittle and loses its adhesion within a couple of years. So more residential contractors are turning to the treatment used in many larger commercial buildings — duct mastic. Applied properly, it can all but eliminate air leakage from ducts.

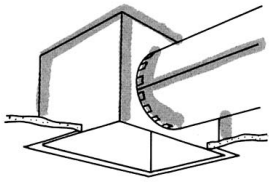
Duct mastic doesn't hold ducts or their seams together. That's a job for screws, rivets, and straps. Mastic does, however, serve as a high-quality flexible sealant. Because it never fully hardens, mastic stretches as the duct expands and contracts. It withstands wetness. Some mastics contain tiny strands of fiberglass to increase strength.

Mastic products vary in consistency from that of mashed potatoes to yogurt. It comes in cartridges (like caulk), tubs, and buckets. You can apply it with a caulk gun, brush, or trowel, or with your gloved hand. In the past, most mastics used a petroleum solvent base, but manufacturers now offer many water-based products. These are safer to handle and easier to clean up.

Where to Use Mastic

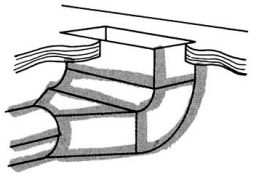


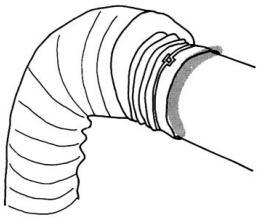
Air Handler: Fill all openings for wiring, plumbing, and refrigerant lines. Seal all seams in the air handler and plenums. Tape around access panels, so they can be opened for service.



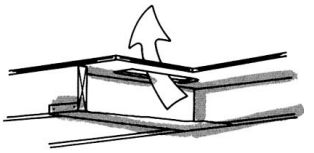
Transitions: Use mesh tape to strengthen the joint where ducts of different shapes meet. Seal all seams, even manufactured ones.

Register boot: Few manufactured seams leak, but for insurance it's worth hitting the ones you can easily. The transition between the duct and boot may require mesh tape. Folded corners don't need sealant.





Flex duct connections: Plastic strap holds the inner liner firmly to the duct or fitting. Mastic should cover the end of the liner. Then tape the outer liner to the metal fitting.



Building cavities: Seal all joints and openings in cavities used for air movement. Seal sheet metal to framing.

Finding the Good Stuff

The lack of uniform standards makes it hard to judge the sealing qualities of a mastic without trying it. You'll have to try several and choose one that works best for you. A few are listed at the end of the article. A good duct mastic has these characteristics:

High solids content. Solids content (usually listed on the product literature) should be at least 50%. Some have as much as 70%. As with paint, higher solids means less shrinkage as the material cures.

Excellent adhesion. Duct mastic is used mainly for metal ductwork, but since you'll probably occasionally seal plenums, you'll want a product that sticks well to wood, drywall, plastic, concrete, and just about any other material you might find in a house. Since these surfaces are seldom clean, a mastic should adhere well to dirty or oily surfaces.

Water-resistance. Condensation may collect on ducts during cooling, so the mastic must hold even when exposed to water.

Low toxicity. Check the product's Material Safety Data Sheet for warnings. If you like to spread the material with your hands, wear gloves. Water-based mastics are generally less irritating than petroleum-based ones.

Surface burning characteristics. Duct mastics should meet standards for flame spread and smoke development (ASTM E-84 and UL 723). The National Fire Protection Association Standard 90A requires mastics to have a flame-spread rating no higher than 25 and a maximum "smoke developed" rating of 50.

Viscosity. Some installers like thicker mastic that they can apply with a trowel or gloved hand; this lets you reach and feel places that are hard to reach or see. Others like it thinner so they can brush it on.

Viscosity is measured in units called centipois (cps) — the higher the number, the thicker the mastic. For mastic, the mashed-potato-like high end is around 100,000 cps; the 60,000 to 70,000-cps range will be more like yogurt, requiring a brush.

Storage. Mastics have a shelf life of a year or less, so don't overbuy. Mastic should not be allowed to freeze, so store it in a conditioned space, and don't leave it in your truck on freezing days.

Color. If the ducts will be visible, you may want to select a pleasing color.

Not all these characteristics will necessarily be published by the manufacturer. Until some type of industry standard is established, you'll just have to try different products.

Application

In most situations, it's easier and more effective to seal ducts with mastic than with tape. Even so, to make mastic work, you must install it properly.

Clean the surface. Wipe off loose dirt and oil with a dry rag. You want the mastic to stick to the duct, not the dirt.

Secure the joint. Mastic will stand normal duct expansion and shrinkage, but not movement of unsecured joints. Secure connections and plenums with screws, rivets, or other mechanical fasteners. For flex duct, use plastic straps and tightening tools to secure the ducts to metal collars before sealing.

Gaps between 1/4 inch and 1/2 inch wide need reinforcement; use fiberglass mesh tape. Buy the special mesh tape for ducts, for it differs in two crucial ways from the drywall product: It is treated to reduce smoke development and it is generally 3 to 4 inches wide. You can usually buy it wherever you buy the mastic itself. You may need to repair holes larger than 1/2 inch with a rigid material, such as metal.

Apply the mastic. Gaps and openings up to 1/4 inch wide can be sealed with mastic alone. Spread the material at least one inch beyond the opening or on either side of the seam. Apply a thick coat, filling all crevices.

If you want to get really serious about duct sealing, you can take the Florida Solar Energy Center's one-week "Duct School." For information, call 407/783-0300. ■

Bruce Sullivan, a writer and editor specializing in energy topics for builders, is the principal of Iris Communications.

Sources of Supply

Here are a few of the mastics used by the duct gurus:

Glenkote Sea-Flex (King Adhesive Corp., 5031 Northrup Ave., St. Louis, MO 63110; 800/233-8171)

RCD #6 (RCD Corp., 2310 Coolidge Ave., Orlando, FL 32804; 407/422-0089)

30-90 (Foster Products Corp., 3210 LaBore Rd., Vadnais Heights, MN 55110; 612/481-9559)