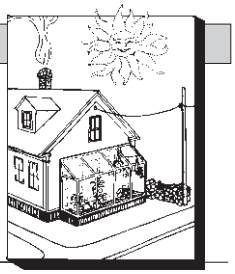
Caulking, Professional Style



by Alex Wilson

A whole column on caulking techniques? You've got to be kidding. What is there to say? Don't you just cut off the tip of the caulk tube, stick the nozzle in the crack, and squeeze the trigger?

Actually, there's quite a bit more to caulking. In the commercial building realm, caulking has become a science. Tolerances between building elements, joint design, joint preparation, priming, use of backer rod and bond breaker materials, and application techniques are being precisely specified by more and more architects. Since 1976, there has even existed an association which deals specifically with caulking practices: the Sealant and Waterproofers Institute (3130 Broadway, Suite 300, Kansas City, MO 64111; 816/561-8230). The Institute publishes training literature, conducts application workshops and helps to maintain quality control in this very specialized field.

All this is a far cry from where we are with houses. Most builders keep a few tubes of caulk in their tool boxes to fill up the obvious cracks and gaps, and some extremely diligent types caulk everything in sight. Few, however, do the prep work needed to make that caulking effective.

We can learn a great deal from the sealant professionals who work with commercial buildings. I predict, in fact, that within a few years we will begin seeing the same sort of detailed specifications we now see in commercial buildings in high-end custom and pre-fab houses. Here are a few of those practices:

1. Design intentional joints. Leave a 3/8-inch gap between building elements that are to be caulked (window frames, brick-to-siding joints, drywall edges at floor, etc.). This may be difficult to adjust to if you're used to tight tolerances, but once you're able to accept the idea of leaving gaps, it may speed up your work. A 3/8-inch joint width is ideal, according to Mason Crawford (Crawford Caulking Co., Southampton, Pa.) because it allows room for enough caulk to take any movement that might occur. Joints should be no less than ¼-inch and no more than ½-inch wide.

2. Carefully prepare joints before caulking. First make sure joints are large enough. In commercial buildings, masonry joints are often ground out to the proper width with specialized grinders, removing bits of mortar that have filled the joint and other material that can affect the caulk. You will probably not want to go to that length, but you should at least clean the joint with compressed air and/or solvents to remove dust, dirt, grease, moisture, and other substances.

3. Make sure joints are dry. Most caulks will not adhere well to damp surfaces. If you cannot get a totally dry joint, use a caulk that will bond to damp surfaces.

4. Tape along joists, if necessary, to prevent staining finish materials. While this is a good idea for inexperienced caulk applicators, it is usually unnecessary once you have had practice. Masking tape must be removed right after tooling the caulk, before it has set up.

5. Prime joints if necessary. For proper adhesion to some materials, certain caulks require priming of the joint. Review the manufacturer's literature carefully.

6. Use backer rod for deep joints. Backer rod is flexible foam or foam rubber which is pushed into a joint before caulking. It controls how deep the caulk will penetrate, it prevents "three-sided adhesion" (more about that later), and it provides a backing to tool against. Professionals use a special roller which pushes the backer rod in to just the proper depth. A piece of tongue-and-groove wood with the tongue planed down to the proper depth (1/4 to 3/8 inch) should do the trick. Backer rod is available in different diameters to meet most needs.

7. Use bond-breaker tape for joints too shallow for backer rod. Bond-breaker tape prevents three-sided adhesion of caulk. Three-sided adhesion occurs when the caulk sticks to both the sides and bottom of a joint, and it can cause seal failure. Also use bond breaker tape for joints that have already been partly filled with a material that the caulk will stick to, such as foam sealant or old hardened caulk.

8. Prepare caulk and caulk gun. Cut off the tip of the caulk tube nozzle at about a 45-degree angle. The tip of the nozzle should be slightly wider than the width of the joint. Most people leave the opening too small, thinking that the tip should fit into the joint. The tip of the nozzle should rest on top of, not in, the joint as you are caulking. You will need to puncture the skin of the caulk (or sometimes a metal seal) with a nail or other pointed object to allow the caulk to flow. Insert the tube in a caulk gun and tighten the plunger against the base of the tube (with Sikaflex caulk, you need to first punch out a metal seal on the bottom of the tube with a hammer). Now you're all set.

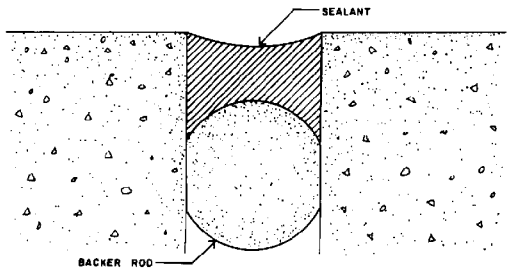
9. Apply caulk at a temperature of about 50° if possible. By doing so, the caulk will hold well, both when the joint shrinks in cooler temperatures and when it expands in warmer temperatures. Warmer temperatures may make it easier to apply caulk, but when the temperatures drop very low, the caulk will be stretched very thin and may rupture (cohesion failure). In colder temperatures, application will be more difficult and some caulks will not adhere well. If you have a choice, apply caulk when the house is at an intermediate level of dryness (that is, not during the very dry winter, or when the humidity is very high).

10. Pull caulk gun along joint. Angle the caulk gun at about a 45 degree angle and pull it along the joint as you apply gentle pressure with the trigger. If you are applying it at the proper rate, some caulk should run ahead of the nozzle in the joint, and it should not build up too heavily behind the nozzle. Keep your eye on the caulk ahead of the nozzle. It will take practice applying just the right amount of caulk, neither underfilling nor overfilling. If you overfill, you may need to tape the sides of the joint (if you have not already done so) and scrape off excess caulk with a putty knife or smoothing tool. If you do not apply enough caulk, go back and apply more.

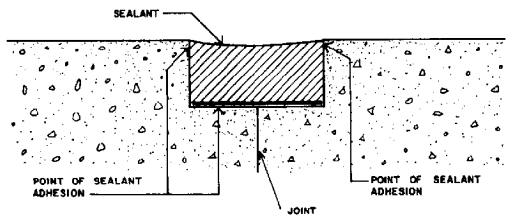
11. Finish the joint with a smoothing tool as necessary. Once the caulk has been applied in the joint, but before it has begun to set up, you can smooth or tool it. This helps seal the joint by pressing the caulk against the sides of the joint and getting rid of voids or bubbles. It will also provide a neater appearance which may be important for joints that are visible. Although some manufacturers recommend wetting the smoothing tool, the Sealant and Waterproofers Institute generally recommends a dry tool so as not to affect the setting of the caulk. The smoothing tool should leave a slightly concave depression in the finished joint.

Next month, I will review the different caulking materials available to builders and provide sources for hard-to-find backer rod and bond breaker tape. ■

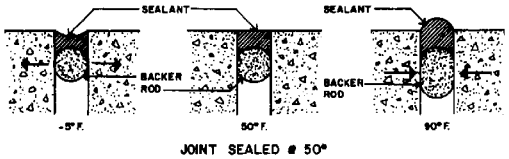
Alex Wilson is a technical writer based in Brattleboro, Vermont who specializes in energy and building issues.



Backer rod is very important for controlling caulk depth and providing a base to tool against.



Bond breaker tape prevents caulk adhesion to the bottom of the joint.



For optimum performance, apply caulk at an intermediate temperature. Then as temperatures rise and fall, the caulk will be squeezed and stretched respectively, but it should have enough give.

Credit: Sealant & Waterproofers Institute Applicator Training Manual. "Applying Sealants," ©1986.