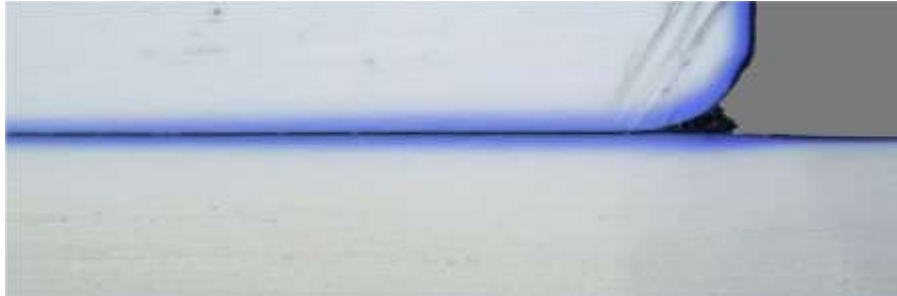


# The Art of Solvent Welding PVC Joints

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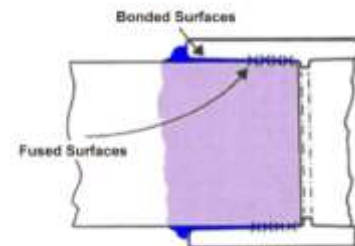
Years ago a newly emerging industry with its enthusiasm promoted the ease at which solvent-welded joints could be made. It is true that PVC turf and irrigation systems are easy to install. But larger sizes, those over 2-inch, need a much higher level of installation skill to create a secure leak-free assembly. Large diameter, 20 inches and more, piping have been successfully made using these recommendations.



Primer penetration within a properly solvent welded joint!

There are many types of solvent cement available from manufacturers. Many formulations available are designed for specific applications or materials. It is the installer's responsibility to use the proper cleaners, primers, and solvent cement formulation for the materials being connected. Check with the manufacturer's recommendations.

In swimming pool applications, it is not unusual to join ABS and PVC with solvent cement. The proper solvent cement for this process is different from that used when joining PVC to PVC or even PVC to CPVC. Each welded connection must use a product recommended by the solvent cement manufacturer for the materials involved.



Many people have been confused about the difference between cleaners and primers, and how each assist with the solvent welding procedure. Cleaners do not have the necessary solvents to prepare the material surface of both the pipe and fitting to ensure a proper fusion bond. Whereas primers soften the surfaces and facilitate a fusion bond between the components

Primers for PVC are available as clear, or more commonly Blue and Purple. A colored primer provides an indicator of use and the quality of coverage. A clear primer is more often than not used where visual aesthetics of the joint are at a premium. According to the American Society for Testing and Materials (ASTM), a primer must be identified by the designation "F-656" on its label. This avoids

confusion with plastic piping cleaner, which is meant only to clean the surface of the pipe.

The procedure and tools necessary for solvent welding PVC are generally the same as those used in solvent welding most other plastic materials. The process of cutting the pipe square, deburring, cleaning and priming of the pipe and fitting before applying the solvent cement is critical for trouble-free joints. Important aspects of proper solvent welding PVC pipe and fittings are:

1. Selecting the correct primers and solvent cement.
2. Choosing and using the correct sized applicator.
3. Using proper procedures for solvent welding PVC.

The label on the solvent container identifies the range of pipe sizes recommended by the manufacturer for each cement. Follow the solvent cement manufacturer's instructions closely; or, joint failure is likely.

Solvent cement designed for small-sized piping systems have a lower viscosity or a more "water-like" consistency. They do not have the higher viscosity (or thicker body) necessary to fill the normal gap or void that exists between larger-diameter fittings and pipe. In some bigger sizes (4-inch Schedule 40, for example), the industry-allowable tolerances for pipe and fittings can lead to a gap of close to 1/32 inch at the socket entrance. It is necessary for the solvent cement to fill this opening between the pipe and fitting and bond the two pieces.

When the applicator is too small to apply the cement quickly, the volatiles flash off, leaving an inadequate amount of solvent to create a fusion between the pipe and fitting. To prevent this, the applicator size needs to be one half of the pipe diameter. The applicators for both primer and cement must be  $\frac{1}{2}$  the diameter of the pipe to be assembled.

The correct sequence of putting on the primer and cement is important when you assemble larger sizes (above 3") and necessary when you use Schedule 80 fittings.

2. Apply primer to the fitting socket. Next, apply primer to the end of the pipe to a point  $\frac{1}{2}$ -1 inch beyond the depth of the fitting socket.
3. Apply a second coat of primer to the fitting socket. Do not allow puddles of primer nor let primer run down a pipe or fitting.

4. Using the proper size and type of applicator, and while the primed surfaces are still wet, aggressively apply a full, even layer of cement to the pipe-end, equal to the depth of the fitting socket. Do not brush it out to a thin layer, as this will dry too quickly.
5. Next, apply a medium layer of cement in the fitting socket.
6. Apply a second full layer of cement to the pipe and immediately push the parts together while rotating one-eighth to one-quarter turn. Do not continue to rotate after the pipe has reached the socket bottom.
7. Hold the joint together for 15 to 30 seconds. (In cold weather installations, increase the hold time to prevent push-off.)

Many joint failures can be attributed to the lack of a second coat of cement on the pipe. As you push the pipe into the fitting, any excess cement on the pipe will be extruded backward along the pipe, filling the tapered gap between the pipe and fitting in the socket opening. Any excess cement needs to be wiped off the exterior of the pipe at this point. Avoid puddles of primer or solvent cement inside the fitting.

Think back! Put cement on the pipe, then in the socket and a **second** coat on the pipe before assembling.

Many times field failures portrayed as defective parts have been found by laboratory analysis to be solvent weld failures. More often than not, improper solvent welding technique and assembly is the cause of the joint failure!