

solvent cement welding of pvc-u

Making a solvent welded joint - joint preparation

- ① Bring the pipes, fittings and solvent cements to the same temperature condition. Ensure that the items to be joined are clean and dry prior to use. Inspect the components for any signs of damage or irregularities. Do not use items that appear not to be correct.
- ② Cut the pipe ends squarely using tool suitable for plastic pipe. A wheel-type cutter is ideal. If a saw is used, a mitre box is recommended to ensure a square cut. Power saws may be used with care.
- ③ Using a chamfering tool cut a 10° to 15° chamfer on the outside of the pipe. This will help ease the pipe into the fitting and minimise the risk of cement being wiped from the fitting during assembly.
- ④ Remove the internal burr from the pipe, and clean up any cutting debris or swarf.
- ⑤ Check the dry fit by entering the pipe into the fitting. The pipe should enter the socket of the fitting to between $\frac{1}{3}$ to $\frac{3}{4}$ of its depth. This is regarded as a good "interference fit". If the pipe bottoms in the fitting with little interference, extra solvent cement should be used during assembly.
- ⑥ Measure the insertion depth of the socket and mark it on the pipe end. This makes it possible to verify later that the pipe has completely "bottomed out" in the fitting.
- ⑦ Open cans of cleaner, primer and cement ready for use and loosely replace lids to minimise the evaporation of the solvents. Check that the products are in good condition and not "gelled". Cements that are gelled must not be used. Never thin cements.
- ⑧ If needed, remove dirt with C-65 cleaner applied using a clean, lint-free cloth or paper towel.
- ⑨ Using a natural bristle brush or an applicator, apply P70 primer to the inside of the fitting socket then to the outside of the pipe, then apply a further coat to the fitting socket. The primer should be worked into the surfaces of the material. Avoid 'puddling' the primer in the fitting socket. Do not apply with a rag.
- ⑩ **While the primer is still wet**, apply the solvent cement using a natural bristle brush of the correct diameter, or a correctly sized applicator. The solvent cement coating on the pipe end should be liberally yet evenly applied to a distance equal to the depth of the fitting socket. A medium even coat should be made on the fitting socket surface. For diameters 4" (100mm) and above, or if the fit was loose, a second coat should be applied to the pipe.
- ⑪ **While both surfaces are still wet**, insert the pipe into the fitting until the pipe bottoms out fully in the socket. Check that alignment is correct. Hold the joint to prevent pull out for around 20 to 30 seconds (larger sizes may require more time). A bead of solvent cement should be evident around the pipe and fitting juncture. If the bead is not continuous it may indicate that insufficient solvent cement was applied. If this is the case the joint must be cut out, discarded and begun again with new product. Excess solvent cement should be removed from the mouth of the socket using a clean, dry cloth. Replace lids on cleaner, primer and cement cans to prevent the solvent from evaporating.
- ⑫ Handle the newly assembled joint with care until the initial set time has elapsed (see set and cure times table). Following the initial set period the assembly can be handled carefully, avoiding stresses on the joint. **All solvent cemented joints must be allowed to cure fully prior to pressure testing.**



Chamfering the pipe



Measuring the insertion depth



Marking the pipe end



Applying the primer to the pipe



Brush applying cement to the fitting



Brush applying cement to the pipe



Assembly



Wiping away excess cement

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Set and cure times

The initial set between the pipe and the fitting takes place in a matter of minutes, and joints can therefore safely be handled in a very short time. However, the joint needs to cure before it can be used as part of a pressurised assembly. The time taken to achieve this can depend upon a number of factors, including the tightness of fit as well as the ambient temperature and humidity. In general terms, joints will cure faster on tighter fitting assemblies in warmer, drier conditions, whereas looser fit joints made in cooler and/or humid conditions will cure slower.

As a general guide it is recommended that (wherever possible) joints be left for 24 hours to cure before pressure is applied. However, where this is not possible, consideration may be given to the above factors before determining when joints are put into service. Given average conditions and a working temperature not exceeding 20°C, a safe guide is to allow a cure time of not less than 1 hour for each bar of working pressure for pipe sizes up to 4" (100mm), and 1½ hours for each bar of working pressure for larger sizes.

Large diameter jointing

Solvent cement jointing on pipe sizes 6" (DN 150mm) and larger is a two-person operation. To ensure that primers and solvent cements are applied at the correct speed they should be simultaneously applied to both pipe and fitting. Applying a thorough coating of cement is critical at these sizes both to ensure a good weld and to ease the pipe into the fitting.

For sizes 10" and larger it is recommended to use a ratchet driven pipe puller to ensure that the pipe fully penetrates the fitting. These tools may be hired if required.

One-step cements

Specially formulated PVC-U solvent cements are available to provide solutions to specific applications or to solve installation difficulties. Examples include transition cements to make joints between flexible and rigid PVC, and Wet 'R Dry, a product designed to make solvent welded joints in wet conditions and/or where quick pressurisation of the system is required.

One-step cements do not require the use of a primer in the welding process and generally work best on pipe sizes up to 3" (DN 65). In all cases, strictly follow the instructions supplied with the product.

Chemical resistance of solvent welded joints - Important Note

A well-made solvent cement welded joint will provide excellent chemical resistance characteristics, in the same way as that of the parent piping material. However solvent welded joints in systems handling the following chemicals can be degraded and require the use of Weld-On 724 solvent cement to ensure chemical compatibility:-

- Hydrochloric Acid 25%+ concentration
- Nitric Acid 20%+ concentration
- Sulphuric Acid 70%+ concentration
- Hydrofluoric Acid all concentrations

Solvent welding of dissimilar materials

As a general guide, solvent welded joints between dissimilar materials are not recommended. Where possible, a mechanical transition joint should be used, such as a union, flange or threaded connection.

If a solvent welded joint is unavoidable, it may (depending upon the conditions) be possible to make a reliable joint provided that a suitable solvent cement is used:

Materials To Be Joined	Recommended Solvent Cement
PVC-U to PVC-C	Weld-On 724
PVC-U to ABS	Weld-On 719



Please note that in all cases we recommend contact with our technical department who will be able to provide assistance with specific applications and on recommended jointing methods.