Primer & Cement

CPVC piping and fittings are joined with CPVC cements. The solvent cement process can be a one- or a two-step process. The one-step cement does not require the use of a primer or a cleaner; the cement will be yellow in color. The two-step process does require the use of a primer or cleaner; the cement will be orange in color. Both types of cements are manufactured under the ASTM F493 for use with CPVC hot and cold water piping (1/2" to 2" sizes) that conform with ASTM D2846. The label on the can will indicate color and whether a primer is required.

If primer is required, apply it to the outer surface of the pipe end (photo D) and the inner surface of the fitting socket (photo E) using a dauber supplied in the can or a brush which is at least one half the size of the pipe (1/2" min.) but not larger than the size of the pipe.

Apply a light coat of CPVC cement to the socket contact surface (photo F) and a full layer to the pipe end contact surface (photo G). Immediately insert the pipe into the socket and bottom it with a 1/4 turn (photo H). Hold the pipe in the socket firmly for 10 to 15 seconds. When released, the pipe should not push out of the socket. If "push out" occurs, increase the "holding in" time. If the surface dries before the joint is put together, quickly apply another light coat of cement to the pipe end and then assemble.

Do not use excessive amounts of primers or cements or allow them to puddle in the socket.

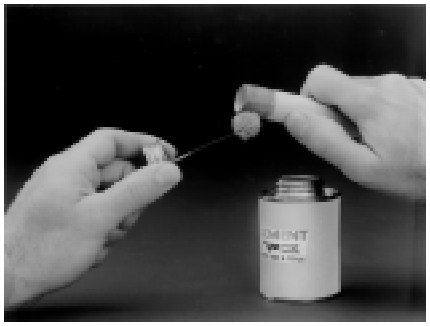
A good job of cementing is evidenced by an even bead or filet of cement all around the pipe at the socket interface. Wipe off any excess cement. At temperatures below 40º F, extended cure cycles may be required. Consult the solvent cement manufacturer's specifications for guidelines. In extremely hot temperatures, above 100º F, make sure both surfaces to be joined are still wet with cement when putting them together.

Solvent set and cure times are a function of pipe size, temperature, and relative humidity. Curing time is shorter for drier environments, smaller sizes, and higher temperatures. Follow the solvent cement manufacturer's recommended drying times. On smaller sizes and with short pieces of pipe, the joint has adequate handling strength almost immediately so that assembly can proceed without delay.

D

E

F



G

H

Safe Handling of Primer, Cleaner & Cement

Solvent cements, primers and cleaners must be handled properly. To do so, refer to ASTM F402, Standard Practice for Safe Handling of Solvent Cements, Primers and Cleaners, which contains the following directions:

"Avoid prolonged breathing of solvent vapors. When pipe and fittings are being joined in partially enclosed areas, use a ventilating device in such a manner as to maintain a safe level of vapor concentration with respect to toxicity and flammability in the breathing area. Select ventilating devices and locate them so as not to provide a source of ignition to flammable vapor mixtures."

"Keep cements, primers and cleaners away from all sources of ignition, heat, sparks and open flame."

"Keep containers of cements, primers and cleaners tightly closed except when the product is being used. The container type shall be in accordance with Parts 1 to 199, Title 49 — Transportation, Code of Federal Regulations. Container labeling shall conform with the requirements of the Federal Hazardous Substance Act and OSHA Hazard Communication Act."

"Dispose of all rags and other materials used for mopping up spills in an outdoor safety waste receptacle. Empty the receptacle daily with proper consideration for its flammable hazard."

"Most of the solvents used in pipe cements, primers and cleaners can be considered eye irritants and contact with the eye should be avoided as it may cause eye injury. Proper eye protection and the use of chemical goggles or face shields is advisable where the possibility of splashing exists in handling these products. In case of eye contact, flush with plenty of water for 15 minutes and call a physician immediately."

"Avoid contact with the skin. Wear proper gloves impervious to and unaffected by the solvents when contact with the skin is likely. Application of the primers, cleaners, or solvent cements with rags and bare hands is not recommended. Brushes, daubers, and other suitable applicators can be used effectively for applying these products, thus avoiding skin contact. Dispose of used applicators in the same manner as the rags. In the event of contact, remove contaminated clothing immediately and wash skin with soap and water. Wash contaminated clothing before wearing them again."

Expansion & Contraction

CPVC pipe, like all other piping, expands when heated and contracts when cooled. A 100 foot run of CPVC piping will expand about 4 inches with every 100°F temperature increase. Expansion does not vary with size. Measured expansions of piping in expansion joints are typically well below the theoretical values. Although some expansion joints are available, they are hardly ever used in water distribution systems. Thermal expansion in CPVC systems is usually accommodated at changes in direction or by offsets as shown below in the table. Full expansion loops are the least common of the three arrangements shown.

Example: Pipe Size - $^{1}/_{2}$”
Length of Run - 60’
L = 38” (From Table)

		Length of Run in Feet				
		20	40	60	80	100
Nom.size	Avg. o.d.	Loop Length “L” in Inches				
½”	.625	22	31	38	44	50
¾”	.875	26	37	46	52	58
1”	1.125	30	42	52	60	67
1-¼”	1.375	33	47	57	66	74
1-½”	1.625	36	51	62	72	80
2”	2.125	41	58	71	82	91

Support Spacing

The following support spacing is recommended for the pipe sizes listed:

Nominal Size	Max. Spacing of Supports
$^{1}/_{2}$” & $^{3}/_{4}$”	36”
1”	40”
1-$^{1}/_{4}$”	46”
1-$^{1}/_{2}$”	52”
2”	58”

Although such small incremental variations are technically correct, the more practical provisions below are being submitted to the model code groups.

Nominal Size	Support Spacing
1” or smaller	3 ft.
1-1/4” or larger	4 ft.

Vertical piping should be supported at each floor level or as required by expansion/contraction design. Provide mid-story guides.

Point support must not be used for thermoplastic piping, and in general the wider the bearing surface of the support, the better. Supports should not be clamped in a way that restrains the axial movement of pipe that will normally occur due to thermal expansion and contraction. Concentrated loads, such as valves, must be separately supported.

Transition Fittings & Joints

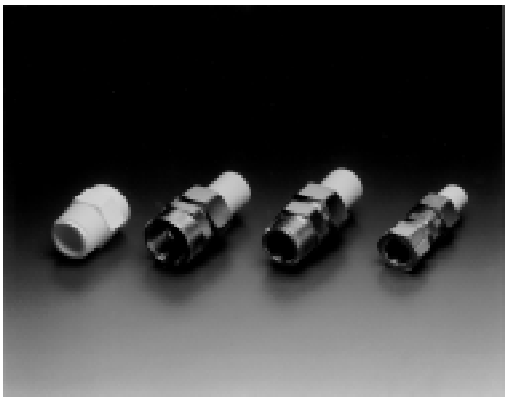
Special transition fittings or joints are used whenever CPVC piping is connected to a metal valve, fitting, or other appurtenance such as a filter, or to parts made of another plastic. These special transition fittings can have many forms (photo I). One common form is the true union with a metal end and a CPVC end held together with a plastic or metal gland nut and having an elastomeric seal between them. Other forms are the flanged joint, the grooved joint, insert molded metal in CPVC fittings, patented push-on type fittings, and finally the CPVC female threaded adapter with an elastomeric seal at the bottom of the thread. The latter fittings are designed so that they have no thread interference and rely entirely on the elastomeric seal for water tightness. They require only minimal torque to attain an adequate seal.

Standard compression fittings which utilize brass or plastic ferrules can be used to assemble CPVC (photo J). However, Teflon® tape should be applied over the brass ferrule to compensate for the dissimilar thermal expansion rates of the brass and CPVC that could possibly otherwise result in a leak. Care should be taken not to over-torque the compression connection.

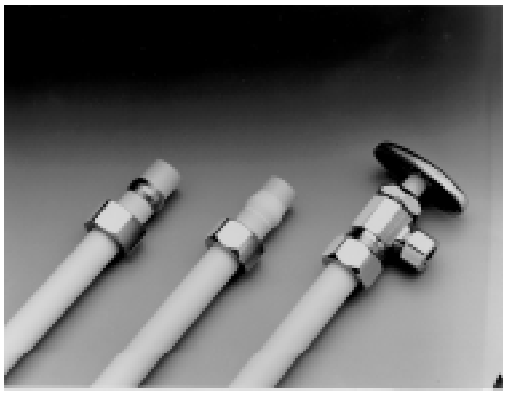
Metal fittings with CPVC socket inserts are also available. The tubing is cemented directly into the socket in the same way as an all-CPVC fitting.

The standard practice is to thread a male thread adapter into the female threaded part, such as a valve or stop, and then solvent cement to the CPVC pipe. However, when using the male thread adapter, there are two limitations that the installer must consider when deciding where and how to use it. First, the male thread adapter may develop a drip leak if the joint is subjected to too broad a temperature range. And second, some thread sealants intended to minimize leak problems may chemically attack the CPVC and cause stress cracking of the adapter (see Thread Sealants section). The preferred method of transitioning between metal and CPVC plumbing components is to use an insert molded metal-in-CPVC fitting or true union with a metal and a CPVC end.

Female threaded CPVC adapters without an elastomeric seal should never be used.



I



J