FREQUENTLY ASKED QUESTIONS

Where can I use CPVC?

Copper tube size (CTS) CPVC is designed for use in hot-and-cold-water distribution systems. CPVC systems are ideal for all potable water piping requirements in typical residential (single and multi-family), motel/hotel, mobile home, manufactured housing, light commercial, and institutional structures.

CPVC systems conforming to ASTM D2846 are rated for continuous service at 100 psi and 180 degrees F and are marked accordingly. The model codes recognize CPVC's capability to handle short-term pressure/temperature excursions beyond these levels. Therefore, CPVC is well suited for usage as T/P relief valve discharge lines, evidenced by its faultless service history over the past two decades in this application.

What is the thermal expansion rate for CPVC, and how can I best allow for expansion and contraction when installing?

CPVC piping will expand about 4 inches per 100 feet with a 100 degree F temperature change. The fact that CPVC has higher thermal expansion than metals has led to some concern. However, laboratory testing and installation experience have demonstrated that the problems are much smaller than the coefficient of thermal expansion would suggest. The stresses developed in CPVC pipe are generally much smaller than those developed in metal pipe for equal temperature changes because of the difference in elastic modulus.

Should special considerations be taken to connect CPVC to a hot water heater?

In some instances, yes. However, these considerations are based on concerns regarding external sources of heat. The hot water from the heater will not affect the CPVC.

When connecting to a gas water hear, CPVC should not be located within 6" of the heater's flue, if the flue has no insulation. A metal nipple or flexible appliance connector should be used. This measure eliminates the potential for damage to plastic piping that might result from excessive radiant heat from the flue. If the flue is insulated, the instructions of the flue manufacturer should be followed.

How can I use CPVC if I run under slab?

When using CPVC with joints under slab, YOU MUST PRESSURE TEST THE SYSTEM BEFORE POURING THE SLAB. Also, it is wise to use 1" foam insulation pipe sleeve at changes in direction, where the pipe comes out of the slab, and at construction joints. The pipe should be evenly supported in smooth bottom trenches. The backfill should be free of rocks and debris.

The purpose of the foam insulation is to:

- Provide for a degree of movement at changes in direction due to thermal expansion.
- Protect the tubing from shear forces due to minor shifts in the slab at construction joints.
- Provide some protection from abuse during the construction phase for the pipe where it emerges from the slab. Longer lengths of pipe (rolled pipe) is also available for under slab installation.

Should I use metal nipples on a CPVC system when I come through the sheetrock?

In areas where there is a likelihood that stresses or impact abuse will occur, a metal nipple is recommended. Such applications as tub fillers, showerheads, and outside sillcocks are examples. However, CPVC stub-outs for closets, lavatories, and sinks are appropriate.

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 expansion of installed piping is 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 in the example and Table 1. Full expansion loops are the least common of the three arrangements shown.

Supports

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. Where pipes go through wood studs, provide oversize holes to allow pipe to move. When installed through metal studs, provide grommets or some form of insulation to protect the pipe from abrasion and to prevent noise.

For horizontal spacing, Table 2 shows the maximum spacing of supports based on hot water applications.

Example: Pipe Size -½" Length of run -60 ft L = 38" from Table 1

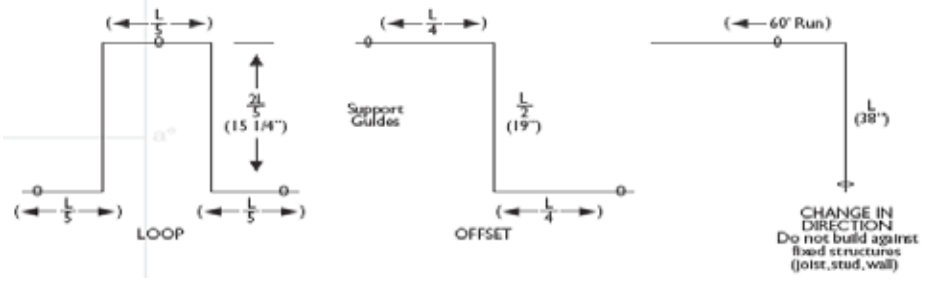

Table 1: Loop Length (inches)

Run length (ft)		20	40	60	80	100
Nom.Size	Avg.OD	Loop length "L" in inches				
1/2"	0.625	22	31	38	44	50
3/4"	0.875	26	37	46	52	58
1"	1.125	30	42	52	60	67

Table 2: Maximum Support Spacing

Nom.Size	Support of spacing
1/2", 3/4"	36"
1"	40"

CUTTING & CHAMFERING CPVC pipe is easy to cut with a tubing cutter (photo A), a power saw, handsaw, or a ratchet cutter. When using a ratchet cutter, blades should be sharpened regularly. The tubing cutter should be equipped with a blade made especially for cutting plastic. A roller-type tubing cutter with a cutting blade designed for metal is not satisfactory, even if the blade is new. All cuts should be made so they are square to the tubing.

Chamfer the end of the pipe (photo B) and remove any burrs. Although this can be done with a knife or file, a chamfering tool that produces a 10° to 15° chamfer is ideal. **Use a clean, dry rag;** wipe dirt and moisture from the fitting sockets and tubing ends.

CHECK DRY FIT This is done just before a joint is solvent cemented, and it verifies the pipe OD and the fitting socket tolerances (photo C). The pipe should go into the socket 1/3 to 2/3 of the socket depth before it makes contact with the socket wall. This interference is necessary and provides a joint that will quickly attain the desired handling strength and give good, long-term service.

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; the cement will be yellow in color. The two-step process does require the use of a primer; the cement will be orange in color. Both types of cements are manufactured under ASTM F 493 for use with CPVC hot and cold water piping (1/2-inch to 2- inch sizes) that conform with ASTM D 2846. The label on the can will indicate the cement color and whether a primer is required. Before using one-step cement, check to determine if the local code permits its use or if two-step cement with 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- inch 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 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 40° F, extended cure cycles may be required. Consult the solvent cement manufacturer’s specifications for guidelines. In extremely hot temperatures, above 100° 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.

Check dry fit Photos A-B-C

Primer & Cement Photos D-E-F-G-H