



# Modern Plumbing

by E. Keith Blankenbaker, ©2010, 7th Edition

**Modern Plumbing** is designed to prepare students for today's sophisticated plumbing systems. The text provides basic information about safety, tools, materials, equipment, procedures, and career opportunities in the plumbing field. To enhance learning, the text is written in simple language and is heavily illustrated.

- Thorough coverage of piping materials and their installation.

- Expanded chapters on maintaining and repairing DWV and water supply systems.
- Full-color illustrations used throughout.
- Presentations for PowerPoint help you teach and visually reinforce the key concepts from each chapter.



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**Figure 19-29** Various types of solvent cement are available for making joints in plastic piping.

Next, apply a heavy coat of cement to the pipe end. See Figure 19-30. Immediately insert the pipe all the way into the fitting socket while giving it a quarter turn, Figure 19-31. This rotation ensures that the solvent cement is evenly distributed in the joint. A small bead of solvent cement should be visible completely around the fitting. This indicates that the proper amount of cement was applied. No bead or a partial bead may indicate incomplete bonding that could result in a leaking joint.

The solvent cement will set up in two to five minutes and can be handled with care at that time. Allow 24 hours setting time before testing the pipe.

**Supporting Pipe**

Horizontal runs of plastic pipe should be supported every 2'-4" with metal or plastic hangers that are 1/2" or more in width. Stacks should be set in concrete at their base and secured to the building frame in order to maintain alignment. (Additional information about

**Figure 19-30** Apply solvent cement to plastic pipe with brush or dabber.

**Figure 19-31** Turn the pipe as it is inserted and held in position until the cement has set.

pipe supports is provided toward the end of this chapter).

**Historical Note**

ABS pipe and fittings were developed in the early 1950s and originally used in oil fields and the chemical industry. John F. Long, an Arizona builder, is credited with the first use of ABS pipe and fittings in residential plumbing in 1959.

**Installing Copper Pipe and Fittings**

Copper DWV pipe measurements can often be taken shoulder-to-shoulder. However, face-to-face measurements are frequently more convenient. Appropriate allowances for fitting socket depth are shown in Figure 19-32. The laying lengths for common copper fittings are given in Figure 19-33.

**Cutting Copper Pipe and Tubing**

Copper pipe and tubing should be cut with a tubing cutter, Figure 19-34. Slowly rotate the tubing cutter around the pipe. Tighten the cutter one-fourth to one-half turn with each

**Figure 19-32** Make allowance for these socket depths when measuring copper piping.

Pipe size (in.)	Engagement (in.)
1/2	1/8
3/4	1/8
1	1/8
1 1/4	1/8
1 1/2	1/8
2	1/8
2 1/2	1/8
3	1/8
4	1/8
6	1/8
8	1/8

**Figure 19-33** The laying length of common copper DWV fittings is given in the table.

Fitting	Nominal size (in.)		Laying length (in.)	
	A	B	A	B
90° Elbow	1/2	1/2	2 1/2	2 1/2
	3/4	3/4	2 1/2	2 1/2
	1	1	2 1/2	2 1/2
	1 1/4	1 1/4	2 1/2	2 1/2
45° Elbow	1/2	1/2	2 1/2	2 1/2
	3/4	3/4	2 1/2	2 1/2
	1	1	2 1/2	2 1/2
	1 1/4	1 1/4	2 1/2	2 1/2
Tee	1/2	1/2	2 1/2	2 1/2
	3/4	3/4	2 1/2	2 1/2
	1	1	2 1/2	2 1/2
	1 1/4	1 1/4	2 1/2	2 1/2
Cross	1/2	1/2	2 1/2	2 1/2
	3/4	3/4	2 1/2	2 1/2
	1	1	2 1/2	2 1/2
	1 1/4	1 1/4	2 1/2	2 1/2

**Figure 19-34** Copper tubing is cut with light pressure on the rotating wheel.

**Joining Copper Pipe**

Copper DWV pipe and fittings are joined by soldering.

1. Clean both the end of the pipe and the inside of the fitting socket.
2. Once the parts are clean, apply flux to prevent the copper from oxidizing too quickly when it is heated, Figure 19-35.
3. Assemble the parts and heat them with a soldering torch until they are hot enough to melt the lead-free solder that is used to make the joint.

Excessive heating will burn away the flux and cause oxidation that will prevent the solder from bonding. Soldering is discussed in more detail in Chapter 6, **Soldering, Brazing, and Welding**. Care must be taken to avoid grinding the wood framing around solder joints. A strand made of fire-resistant material is very helpful. It is also a good practice to have a fire extinguisher nearby in case it is needed.

**G-W**  
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