



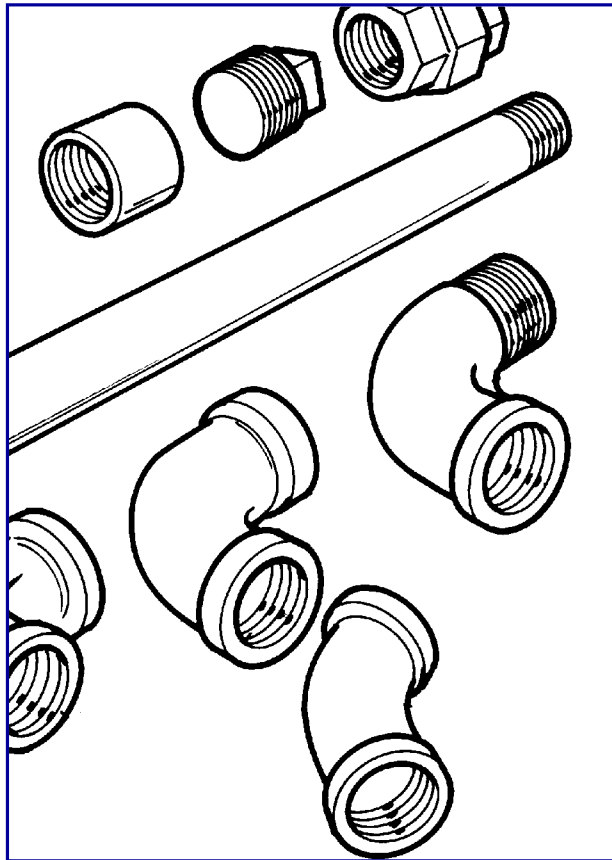
HOW-TO BOOKLET #3014 STEEL PIPE



TOOL & MATERIAL CHECKLIST

- Galvanized Steel Pipe and Fittings
- Two 12-inch Pipe Wrenches
- Pipe Union Fittings
- Pipe Joint Compound or Pipe Joint Tape
- Measuring Tape and Marking Pencils
- Pipe Vise or Mechanic's Vise
- Wiping Cloths

Read This Entire How-To Booklet for Specific Tools and Materials Not Listed in The basics Above.



Steel pipe has been used in more homes than any other kind of pipe, and unless your home is brand new it is very likely there will be threaded steel galvanized pipe somewhere in the water supply/drainage system.

Repairs to a steel pipe system—or adding onto the system with steel pipe—call for specific tools and somewhat more skill than working with either copper or plastic pipe. Yet steel pipe is within the skills of most do-it-yourselfers.

One of the big problems with steel pipe is a lack of flexibility in making up a system. Measurements must be extremely accurate. If the made-up length is too short, you must replace it with a longer one; if it is too long, the pipe may have to be recut and threaded. Another problem is the after many years steel pipe tends to become clogged with mineral deposits.

However, on the plus side, steel pipe has a life span of 25 years or more. Even after this period much of the pipe is still serviceable, although some of it may have to be replaced. Replacement is fairly easy since one part is—more-or-less—exchanged for another part; measurement is simplified.

PIPE LENGTHS AND THREADS

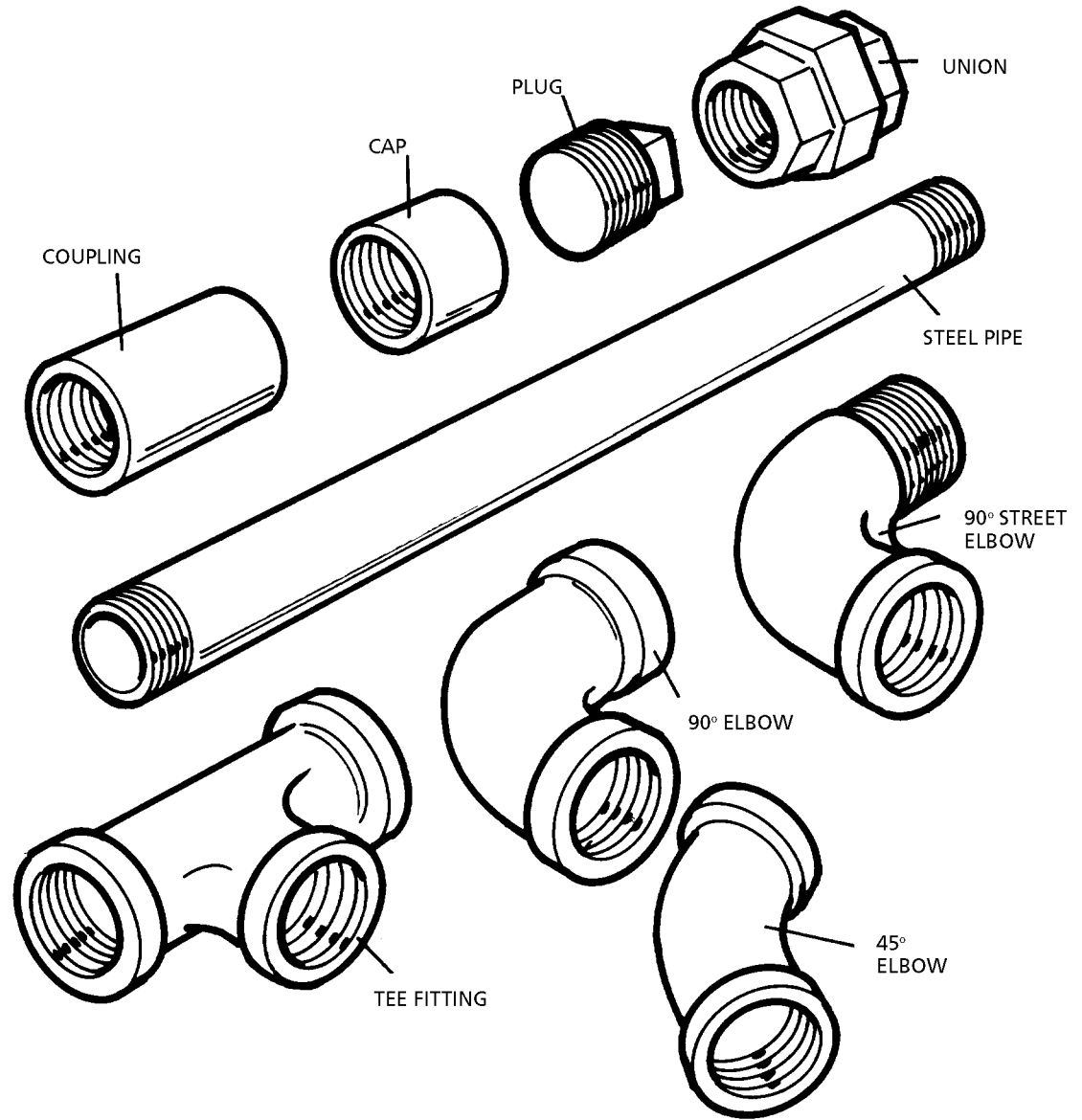
At many home center and building material stores, galvanized steel pipe is limited to lengths of 4-, 6-, and 8-foot. Some stores stock 10-footers. One reason for this (as opposed to 10- and 20-foot. lengths for copper and plastic) is weight; steel pipe is heavy. It is easier to assemble a long run from short pieces of pipe for many do-it-yourselfer. Another reason is that a majority of steel pipe sales are for maintenance and repair purposes rather than for new steel pipe runs within a house, so long lengths are not needed by the do-it-yourselfer.

Usually, you will find a full complement of galvanized steel pipe fittings in these stores. If special fittings and long sections of pipe are required, a plumbing specialty outlet may have the merchandise. If you are adding to a system, it is recommended that you buy unthreaded pipe and thread it yourself. Standard pipe dies are not inexpensive, but they are not prohibitive if a large project is underway.

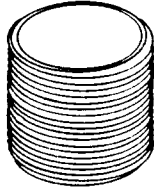
The basic threading tool is a round or square block of steel in which there is an opening with hardened teeth that cut threads into the relatively soft steel of the pipe. Most dies come in sets with pipe sizes of 3/8-, 1/2-, 3/4-, and 1 inch. The 1 inch size generally is the largest size that will be used in the water supply lines of a house. Larger pipes, of course, would be used in commercial and industrial applications, but the homeowner seldom has need for tools to thread larger sizes of pipe: 1 1/4 to 3 inches. Steel pipe in sizes of 1 1/4 and 1 1/2 inches are used for drain lines from sinks and some vents. You can buy these sizes.

The “secret” to fitting steel pipe are “nipples.” Nipples are short lengths of pipe threaded at both ends and are ready for use. They are the little “gap-fillers”—the putty and caulking compound of steel pipe. Nipples vary in length from 1 1/2 inches (called a close coupling) to 6 inches. The lengths are in 1/2-inch increments. Although the 6-inch is “standard” some stores sell longer sizes: 8, 10, and 12 inches.

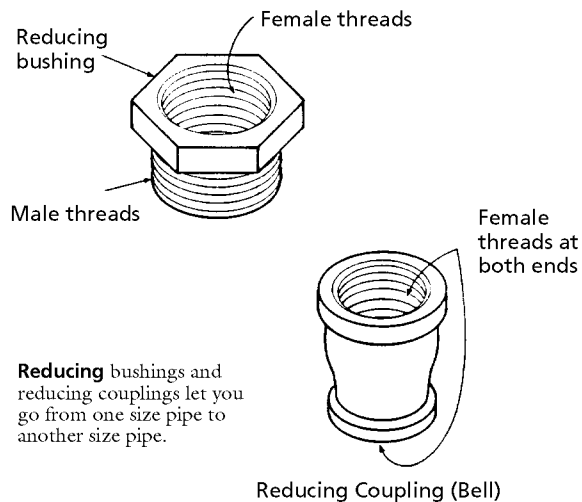
STANDARD STEEL PIPE AND FITTINGS



Once pipe has been threaded, oil must be applied to the die to lubricate the cutters. Quite a bit of metal is removed by cutters. After making one turn with the die, the cutter has to be backed about a half turn to clear out the metal shavings. This is repeated until the thread is completely cut. In most cases a full length of thread is completed when the pipe starts to project from the edge of the die. Be careful when handling steel pipe that has just been threaded. The threads will not only be razor sharp, but there may be some small shavings still in the threads that can cut your hands. Gloves are recommended when handling pipe. You get safety as well as a better grip.



Close nipple is threaded from end-to-end and is used to join two fittings that have female threads when space is at a minimum. A close nipple adds only 1/2" or even less to the length of pipe run and fittings when the nipple is in position.



Reducing bushings and reducing couplings let you go from one size pipe to another size pipe.

Fittings include tees, elbows, couplings, and unions. The fittings come in one size, as well as in a reducing size. That is, while the fitting will have one size to accommodate the pipe you are using, there will be one or more connections that are smaller. An example would be a 1/2-inch tee fitting that has a "straight through" size of 3/4-inch, while the connection at right angles would be 1/2- or 3/8-inch for the connection that supplies water to a sink or basin.

Another way to reduce pipe size is with reducing bushings and reducing couplings (sometimes called reducing bells). The bushings have male threads that twist into female threads with a smaller opening that has female threads into which a smaller pipe is turned. The term "male" means the threads are on the outside of the pipe or fitting. Female threads are inside the pipe or fitting.

One fitting that has both male and female threads is a street elbow, commonly called a street ell. All elbows, whether 90- or 45-degree or street (both 90 and 45) are commonly called ells. Fittings in steel pipe provide right-angle or 45-degree changes of direction, but you can create a swing joint by using two street ells. These fittings come in either 90- or 45-degree angles.

They can be angled in a combination of two (or more), sometimes along with standard 90- or 45-degree elbows which have female threads in both ends rather than the combination of male and female of a street elbow.



Threads on galvanized steel pipe (often called "iron" pipe) are slightly tapered. Therefore, when the pipe is assembled with fittings, the threads form a wedging action to prevent leaking. However, male pipe threads should be coated with joint compound or wrapped with joint tape to form a good seal.

As you can see by pipe and fitting descriptions, it is extremely important to draw a plan of any plumbing run or improvement, noting connections and turns of the run. This plan, used as a shopping list at the store, can save you lots of time and trouble.

STEEL PIPE TOOLS

Working with steel pipe requires threading dies—if you will thread the pipe—and a pipe vise which has jaws with teeth that grip the pipe firmly.

You also can use a machinist vise with pipe jaw inserts, although the pipe vise is best if you are assembling lots of galvanized steel pipe.

For maintenance and repair, you need only two pipe wrenches (we recommend the 12 in. size), pipe joint compound or tape, a tape measure, and a hacksaw with extra blades.

Pipe wrenches are used as a team. One pipe wrench goes on the fitting; the other pipe wrench goes on the pipe with the jaws opposed. That is, the jaws on the fitting face one way; the jaws on the pipe face the other way. This placement permits you to assemble/disassemble the pipe by working your hands back-and-forth parallel to each other. Pipe wrenches have lots of torque. In fact, they have so much torque that they can crack and break galvanized steel pipe like a fresh egg, if too much pressure is applied. Easy does it. A little pressure is plenty to properly seat the threads.

Pipe threads are tapered. The taper creates a wedging action that produces tremendous pressure as the threads are turned into a fitting. Before assembling pipe, use either pipe joint compound, a putty-like material, or joint tape, which looks like narrow typewriter ribbon that is white, on the MALE threads on the pipe. Do not put joint compound in the fitting (female threads). The compound, when the pipe is threaded into the fitting, will "bunch up" inside the pipe and clog it. If you use the tape, the tape goes around the male threads in the direction the threads turn into the pipe fitting.

Union fittings are an absolute **MUST** for assembling steel pipe. **DO NOT LEAVE THE STORE WITHOUT THEM.** Union fittings have three parts: there is a piece at each end that turns onto the pipe, and there is a large nut at the center that draws the two end pieces together. One end of the fitting turns one way; the opposite end of the fitting turns the other. Since pipe threads go one way, a union is essential to assemble pipe between regular fittings. **EXAMPLE:** A length of pipe is damaged between two elbows. The pipe must be replaced. You would hacksaw the pipe in half between the elbows, after turning off the water. With pipe wrenches—one on the elbow and one on the pipe—you would turn out half of the damaged pipe. Then you'd repeat the same procedure on the opposite fitting. To install the new pipe, one end goes into the fitting. However, the other end won't turn into the opposite fitting because the threads are in reverse. Therefore, you need a union fitting between the elbows so you can turn the pipe into the threads. Materials for this project would be two lengths of pipe and a union fitting to match the length of the replacement pipe run. Pipe threads turn into fittings about 1/2- to 5/8-inch. Be sure to figure this in your pipe measurements.

ELECTRICAL SAFETY

Look for an electrical ground connection on any steel pipe you work on. It will be on the cold water side. If you see such a ground wire, replace it immediately after making the pipe repair or connection.

If it is a heavy wire, it will be from the main electrical supply and is an absolutely necessary connection to assure safe and complete electrical service. This wire does not have electrical current running in it.

If the wire is a small one, it probably will be from a telephone, and it is likely that the phone will not work properly until the wire is reconnected.

The cold water supply line is used as a ground connection because it runs directly into the earth and provides a positive ground to earth. A hot water line should never be used because it is interrupted through a heating tank, and is possibly even an insulated dielectric fitting intended to prevent galvanic action. This fitting could also insulate the electric current from passing to the earth in the event of a fault in the electrical system. It will not work even if a ground fault interrupter (GFI) is included in the wiring system. The GFI still needs to direct current to ground, if only for a mere fraction of a second.

LEAKING STEEL PIPES

Any pipe that leaks must be replaced just as soon as possible. There are emergency repair kits for leaky pipes, however, but the emphasis is on emergency. Although the repair may seem to be sound, don't trust it. Patches have a way of peeling—and usually when you're on your 2-week vacation away from home.

Stop-leak pastes are available. You also can, in a real emergency, use a pipe sleeve device, which is lined with a rubber-like pad. The sleeve goes around the pipe at the leak point and is bolted together to form a clamp over the leak. Any repair kit usually requires that the water be turned off until the patch is made to the pipe. If the leak is at a fitting, try turning the pipe at the fitting a tad. Or, you can use a paste patch. However, replace the damaged pipe.

