TABLE 6. PIPE FITTINGS

ELBOWS			
90, 60, 45 & 22½° Standard	90 & 45° Street		90 & 45° Male union
90 & 45° Female union	90 & 45° Butt-welding		90 & 45° Socket-welding
90 & 45° Flanged	90° Side outlet		90° Rolling
90° side Outlet rolling	Base		Drop
TEES			
Standard	Service		Four-way
Flanged	Flanged side outlet		Male union
Female union	Female union outlet		Flanged reducing
Flanged base	Butt-welding		Socket-welding
Railing	Side outlet railing		Drop
COUPLINGS			
Wrought	Cast		Socket-welding
CROSSES			
Screwed	Flanged		Butt-welding
Y-BENDS			
45° Screwed	45° Flanged	45° Double screwed	True flanged
RETURN BENDS			
Butt-welding	Back outlet	Screwed	Union end
REDUCERS			
Standard	Eccentric	Flanged taper	Flanged eccentric
Butt-welding	Socket-welding	Eccentric butt-welding	
BUSHINGS			
Outside hexagon	Eccentric		Face
CAPS			
Standard	Socket-welding		Butt-welding
PLUGS			
Countersunk	Square head		Bar
NIPPLES			
Close	Long		Tank
UNIONS			
Female	Male & female	Flange	Tongue & groove flange
FLANGES			
Blind	Screwed		Welding neck
Floor	Slip-on		Reducing

PIPE FITTINGS

Pipe is joined by butt welding one length to another or by the use of fittings. Pipe fittings are made in a variety of forms (the common types are listed in Table 6), and are screwed, flanged or welded. The type of fitting to be used is determined by the pressure of the fluid being carried, or by the use of the pipe line. The materials generally used are steel, cast iron, malleable iron (heat treated cast iron), copper, brass, stainless steel, alloy steel, or bronze. The material used also depends upon the pressure or characteristics of the fluid.

Fittings are designated and sized in accordance with *American Standards Association* specifications and are identified by their nominal pipe sizes.

In the case of reducing tees, crosses, and Y-branches (laterals), the size of the largest run opening is given first, followed by the size of the opening at the opposite end of the run. Where the fitting is a tee or Y-branch

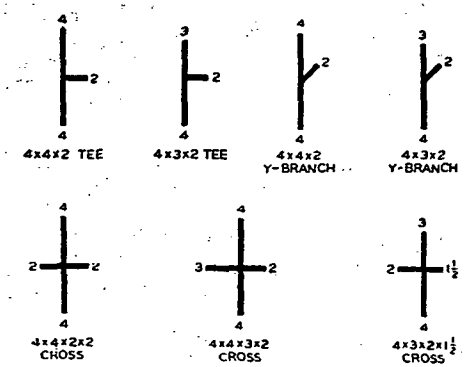

FIG. 1. DESCRIPTION OF TEES AND LATERALS (*ASA* B16.3—1951)

(lateral), the size of the outlet is given last. Where the fitting is a cross, the largest side-outlet opening is the third dimension given followed by the opening opposite. The straight line sketches, Fig. 1, illustrate how the reducing fittings are designated.

Where an external thread is wanted the word *male* follows the size of that opening.

Allowable pressures for solder type fittings are given in Table 7. Allowable pressures for ferrous screwed, flanged, and welding fittings are covered in the following *ASA* specifications:

TYPE OF FITTING	SPECIFICATION	SATURATED STEAM PRESSURE PSIG[a]
Cast Iron—Flanged	B16.1	125
Cast Iron—Flanged	B16b	250
Cast Iron—Flanged	B16b1	800
Cast Iron—Flanged (refrigeration)	B16.16	300
Cast Iron—Screwed	B16.4	125 and 150
Malleable Iron—Screwed	B16.3	150
Malleable Iron—Screwed	B16.19	300
Brass or Bronze—Screwed	B16.15	125
Brass or Bronze—Screwed	B16.17	250
Steel—Flanged	B16.5	2500

[a] Pressure may reduce with increasing sizes. This pressure is the maximum allowed in this specification for saturated steam. Higher pressures may be allowed with lower temperatures.

Steel welding (butt or socket type) fittings may be used for the same pressure as the pipe, providing wall thickness (or schedule number), and also the material, are the same as the pipe on which they are used.

Screwed fittings include: couplings, elbows (45° or 90°), return bends (close and open), tees, crosses, laterals (Y-branches), plugs, caps, lock nuts, flanges, bushings, and reducing fittings (elbows, tees and couplings). Reducing fittings and bushings may be eccentrically tapped to permit drainage of condensate.

Sometimes nipples are erroneously called fittings. Actually a nipple is a piece of pipe less than 12 in. long that has been threaded on both ends. Pipe 12 in. or longer is regarded as *cut pipe*. Nipples are classified as