

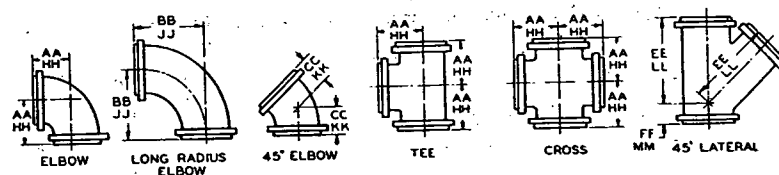
cludes butt-welding or socket-welding. See Tables 10 and 13 for size of fittings available in each class. The valves are made in the same size range.

3. **Brazing Ends:** These ends are available on brass valves. The ends have a special shape to facilitate use of brazing alloys. These valves are used for higher temperatures than solder end valves.

4. **Solder Ends:** For use with copper tubing in plumbing, heating and air conditioning. Should not be used at high temperatures.

5. **Flared Ends:** For use with light wall tubing—either metal or plastic—and for

TABLE 11. DIMENSIONS OF STEEL FLANGED FITTINGS FOR PRIMARY SERVICE PRESSURE RATING OF 150 PSI (GAGE)



1	2	3	4	5	6	7	8	9	10	11
NOM- INAL PIPE SIZE	OUTSIDE DIAM- ETER OF FLANGE	THICK- NESS OF FLANGE, MIN	1/2 IN. RAISED FACE (FLANGE EDGE)						RING JOINT	
			Center to Contact Surface of Raised Face, Elbow, Tee, Cross, and True Y	Center to Contact Surface of Raised Face, Long Radius Ell	Center to Contact Surface of Raised Face, 45° Ell	Long Center to Contact Surface of Raised Face, Lateral	Short Center to Contact Surface of Raised Face, Lateral, and True Y	Contact Surface to Contact Surface of Raised Face, Red- ucer	Center to End, Elbow, Tee, Cross, and True Y	Center to End, Long Radius Ell
			AA	BB	CC	EE	FF	GG	HH	JJ
1	4 1/4	7/16	3 1/4	5	1 3/4	5 3/4	1 3/4	4 1/4	3 3/4	5 1/4
1 1/4	4 5/8	1/2	3 3/4	5 1/2	2	6 1/4	1 3/4	4 1/2	4	5 3/4
1 1/2	5	9/16	4	6	2 1/4	7	2	4 3/4	4 1/4	6 1/4
2	6	5/8	4 1/4	6 1/2	2 3/4	8	2 1/2	5	4 3/4	6 3/4
2 1/4	7	1 1/8	5	7	3	9 1/4	2 3/2	5 1/2	5 1/4	7 1/4
3	7 1/4	3/4	5 1/4	7 3/4	3	10 3/4	3	6	5 3/4	8
3 1/2	8 1/4	1 1/4	6	8 1/4	3 1/4	11 1/4	3	6 1/2	6 1/4	8 3/4
4	9	1 1/2	6 1/2	9	4	12	3	7	6 3/4	9 1/4
5	10	1 5/8	7 1/4	10 1/4	4 1/4	13 1/4	3 1/2	8	7 3/4	10 1/4
6	11	1 7/8	8	11 1/2	5	14 1/4	3 3/2	9	8 3/4	11 3/4
8	13 1/4	1 3/4	9	14	5 1/4	17 1/4	4 1/4	11	9 1/4	14 1/4
10	16	1 3/4	11	16 1/4	6 1/4	20 1/4	5	12	11 1/4	16 3/4
12	19	1 3/4	12	19	7 1/4	24 1/4	5 1/4	14	12 3/4	19 1/4
14	21	1 3/4	14	21 1/4	7 3/4	27	6	16	14 1/4	21 3/4
16	23 1/4	1 3/4	15	24	8	30	6 1/2	18	16 1/4	24 1/4
18	25	1 3/4	16 1/4	26 1/4	8 1/4	32	7	19	16 3/4	26 1/4
20	27 1/4	1 3/4	18	29	9 1/4	35	8	20	18 1/4	29 1/4
24	32	1 3/4	22	34	11	40 1/4	9	24	22 1/4	34 1/4

From American Standard for Steel Pipe Flanges and Flanged Fittings, 150, 300, 400, 600, 900, 1500 and 2500 Lb. ASA B16.5-1953.

All dimensions given in inches.

* Actual diameter is same for sizes 1 to 12 in. and is 3/4 in. less than nominal for sizes 14 to 24 in.

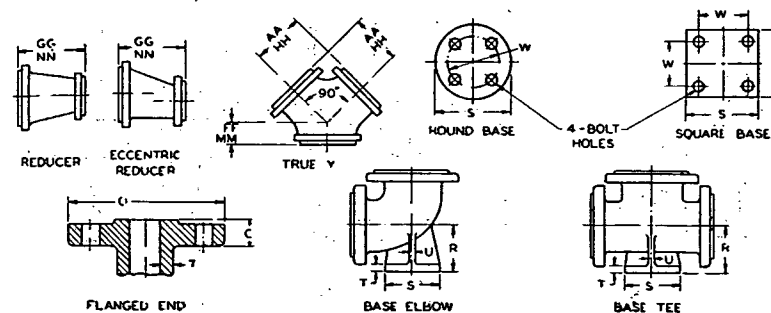
sizes 2 in. and below. A flaring tool flares the tube end, and a ring nut pulls the flared tubing up against a seat on the valve. This makes a lap joint.

6. **Hub Ends:** Generally used for water supply and sewage piping. This type joint is used with cast iron pipe. The joint is a socket type made by inserting the pipe in the hub, then caulking with oakum. After caulking, the joint is sealed with molten lead.

Valves are made of brass, iron, steel, and to some extent malleable iron.

Brass should not be used for work requiring temperatures above 550 F. The brass used in valves is similar to that used in brass pipe and contains some tin and lead as well as copper and zinc.

TABLE 11. DIMENSIONS OF STEEL FLANGED FITTINGS FOR PRIMARY SERVICE PRESSURE RATING OF 150 PSI (GAGE) (Concluded)



1	12	13	14	15	16	17	18	19	20
NOMINAL PIPE SIZE	RING JOINT			CENTER TO BASE	DIAM. OF ROUND BASE OR WIDTH OF SQUARE BASE	THICK- NESS OF BASE	THICK- NESS OF RIBS	BASE DRILLING	
	Center to End, 45-Deg Elbow	Long Center to End, Lateral	Short Center to End, Lateral, and True Y					Bolt Circle or Bolt Spacing	Diam. of Drilled Holes
	KK	LL	MM	R	S	T	U	W	
1	2	6	2						
1 1/4	2 1/4	6 1/4	2						
1 1/2	2 1/2	7 1/4	2 1/4						
2	2 3/4	8 1/4	2 3/4	4 1/4	4 5/8	1/2	1/2	3 1/2	5/8
2 1/4	3 1/4	9 3/4	2 3/4	4 1/4	4 5/8	1/2	1/2	3 1/2	5/8
3	3 3/4	10 1/4	3 1/4	4 3/4	5	5/8	1/2	3 3/4	5/8
3 1/2	3 3/4	11 1/4	3 1/4	5 1/4	5	5/8	1/2	3 3/4	5/8
4	4 1/4	12 1/4	3 1/4	5 1/2	6	5/8	1/2	4 1/4	5/8
5	4 3/4	13 3/4	3 3/4	6 1/4	7	1 1/8	5/8	5 1/4	3/4
6	5 1/4	14 3/4	3 3/4	7	7	1 1/8	5/8	5 1/4	3/4
8	6 3/4	17 3/4	4 3/4	8 3/4	9	1 1/8	5/8	7 1/4	3/4
10	6 3/4	20 3/4	5 1/4	9 1/4	9	1 1/8	5/8	7 1/4	3/4
12	7 3/4	24 3/4	5 3/4	11 1/4	11	1	1	9 1/2	3/4
14	7 3/4	27 3/4	6 1/4	12 1/4	11	1	1	9 1/2	3/4
16	8 1/4	30 1/4	6 3/4	13 3/4	11	1	1	9 1/2	3/4
18	8 3/4	32 3/4	7 1/4	15	13 1/2	1 1/4	1 1/4	11 3/4	3/4
20	9 3/4	35 3/4	8 1/4	16	13 1/2	1 1/4	1 1/4	11 3/4	3/4
24	11 3/4	40 3/4	9 3/4	18 1/4	13 3/4	1 1/4	1 1/4	11 3/4	3/4

Cast iron is generally provided in some alloying state, especially in the larger sizes. Cast iron is not suitable for service (above 450 F).

Malleable iron, which is a cast iron heat treated to provide some ductility, is used to some extent, primarily in place of cast iron.

Steel is used either in the cast or forged state. For corrosive service, alloy and stainless steel are used. Steel is used for high temperature—high