

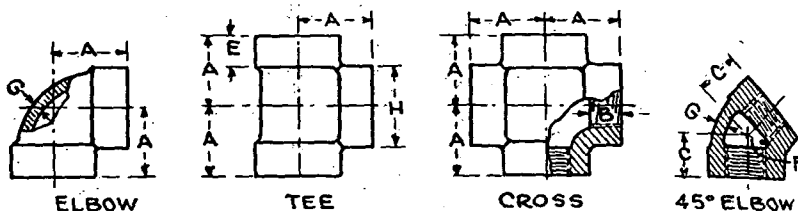
bend composed of several of the smaller curved pieces illustrated in Fig. 1.
(3) a combination of straight pieces with such curved pieces or cast ells.
(4) a so-called *square* bend made up entirely of straight pieces, cast ells, etc.

In designing any system of steam or hot water piping the expansion for each straight run should be calculated and allowed for.

All risers must be anchored and safeguarded so that the difference in length when hot from the length when cold shall not disarrange the normal and orderly provisions for drainage of the branches.

It is especially necessary with light-weight radiators so to anchor and so to give freedom for expansion of the piping that no strain therefrom shall be allowed to distort the radiators. When expansion strains from the pipes are permitted to reach these light metal heaters they usually emit sounds of distress which are exceedingly troublesome.

TABLE 3. DIMENSIONS OF ELBOWS, 45 DEG. ELBOWS, TEES, AND CROSSES (STRAIGHT SIZES) FOR 125 LB. CAST IRON SCREWED FITTINGS



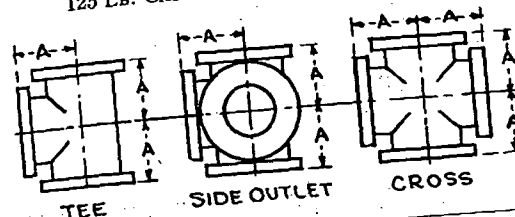
NOMINAL PIPE SIZE	A CENTER TO END, ELBOWS, TEES AND CROSSES	C CENTER TO END, 45 DEG. ELBOWS	B LENGTH OF THREAD MIN.	E WIDTH OF BAND, MIN.	F INSIDE DIAMETER OF FITTING		G METAL THICKNESS, MIN.	H OUTSIDE DIAMETER OF BAND, MIN.
					Min.	Max.		
1/4	0.81	0.73	0.32	0.38	0.540	0.584	0.110	0.93
3/8	0.95	0.80	0.36	0.44	0.675	0.719	0.120	1.12
1/2	1.12	0.88	0.43	0.50	0.840	0.897	0.130	1.34
3/4	1.31	0.98	0.50	0.56	1.050	1.107	0.155	1.63
1	1.50	1.12	0.58	0.62	1.315	1.385	0.170	1.95
1 1/4	1.75	1.29	0.67	0.69	1.660	1.730	0.185	2.39
1 1/2	1.94	1.43	0.70	0.75	1.900	1.970	0.200	2.68
2	2.25	1.68	0.75	0.84	2.375	2.445	0.220	3.28
2 1/2	2.70	1.95	0.92	0.94	2.875	2.975	0.240	3.86
3	3.08	2.17	0.98	1.00	3.500	3.600	0.260	4.62
3 1/2	3.42	2.39	1.03	1.06	4.000	4.100	0.280	5.20
4	3.79	2.61	1.08	1.12	4.500	4.600	0.310	5.79
5	4.50	3.05	1.18	1.18	5.563	5.663	0.380	7.05
6	5.13	3.46	1.28	1.28	6.625	6.725	0.430	8.28
8	6.56	4.28	1.47	1.47	8.625	8.725	0.550	10.63
10	8.08	5.16	1.68	1.68	10.750	10.850	0.690	13.12
12	9.50	5.97	1.88	1.88	12.750	12.850	0.800	15.47
14 O.D.	10.40		2.00	2.00	14.000	14.100	0.880	16.94
16 O.D.	11.82		2.20	2.20	16.000	16.100	1.000	19.30

All dimensions given in inches.

FITTINGS

Fittings for joining the separate lengths of pipe together are made in a variety of forms, and are either screwed or flanged; the former being generally used for the smaller sizes of pipe up to and including 3 1/2 in., and the latter for the larger sizes, 4 in. and above. Screwed fittings of large size as well as flanged fittings of small size are also made and are used for certain classes of work at the proper pressure.
The material used for fittings is generally cast iron, but in addition to this malleable iron, steel and steel alloys are also used, as well as various

TABLE 4. DIMENSIONS OF TEES AND CROSSES (STRAIGHT SIZES) FOR 125 LB. CAST IRON FLANGED FITTINGS



TEE			SIDE OFFSET		
NOMINAL PIPE SIZE a-b	A	AA	DIAMETER OF FLANGE	THICKNESS OF FLANGE, MIN.	METAL THICKNESS OF BODY, MIN.
	CENTER TO FACE TEES AND CROSSES b-c	FACE TO FACE TEES AND CROSSES b-c			
1	3½	7	4¼	7/16	7/16
1¼	3¾	7½	4⅝	1/2	7/16
1½	4	8	5	9/16	7/16
2	4½	9	6	5/8	7/16
2½	5	10	7	11/16	7/16
3	5½	11	7½	¾	7/16
3½	6	12	8½	13/16	7/16
4	6½	13	9	15/16	1/2
5	7½	15	10	1	1/2
6	8	16	11	1 1/8	9/16
8	9	18	13½	1 1/8	5/8
10	11	22	16	1 3/8	3/4
12	12	24	19	1 ¼	13/16
14 O.D.	14	28	21	1 5/8	7/8
16 O.D.	15	30	23½	1 7/8	1
18 O.D.	16½	33	25	1 7/8	1 1/8
20 O.D.	18	36	27½	2 1/8	1 1/4
24 O.D.	22	44	32	2 3/8	1 1/2
30 O.D.	25	50	38¾	2 ¾	1 5/8
36 O.D.	28	56	46	2 7/8	1 ¾
42 O.D.	31	62	53	2 7/8	1 ¾
48 O.D.	34	68	59½	2 ¾	2

All dimensions given in inches.

aSize of all fittings listed indicates nominal inside diameter of port.
bTees, side outlet tees, and crosses, 16 in. and smaller, reducing on the outlet, have the same dimensions center to face, and face to face as straight size fittings, corresponding to the size of the larger opening. Sizes 18 in. and larger, reducing on the outlet, are made in two lengths, depending on the size of the outlet.
cTees and crosses, reducing on run only, carry same dimensions center to face and face to face as a straight size fitting of the larger opening.