

close or full thread, *shoulder*, *short*, and *long*. A close nipple is about twice the length of the pipe thread since the threads actually meet. A shoulder nipple has a shoulder between the threads and is further classified as *short* or *long*. All shoulder nipples are cut to specific lengths and sold in that manner.

As a general rule, flanged joints are used when it is expected that the line will be disassembled quite often. There are three ways to attach the flange to the pipe; screwed, welded or lapped. Types of contact surface will be discussed.

Tables 8 to 14 give data on various types of ferrous fittings.

Fittings for copper tubing are available in soldered, flared, or compression types (see Figure 2). Fittings for copper pipe of IPS dimensions are

TABLE 7. SERVICE PRESSURE RATINGS FOR WROUGHT COPPER OR BRONZE SOLDER JOINT FITTINGS*

TYPE OF SOLDER	SERVICE TEMP., F	MAXIMUM SERVICE PRESSURE, PSIG			
		Water			Steam All
		1/4 to 1 in. ^b	1 1/4 to 2 in. ^b	2 1/4 to 4 in. ^b	
50-50 Tin-lead (ASTM B32 Alloy Grade 50A)	100	200	175 ^c	150 ^d	—
	150	150	125 ^c	100 ^d	—
	200	100	90 ^c	75 ^d	—
	250	85	75 ^c	50 ^d	15 ^e
95-5 Tin-antimony or 95-5 Lead-tin (ASTM B32 Alloy Grade 5A)	100	500	400	300	—
	150	400	350	275	—
	200	300	250	200	—
	250	200	175	150	15
Solders with melting point 1100 F or above	350	270	190	155	120

Note: Ratings other than specified here may be used upon the recommendation of the manufacturer as to the proper solders that should be used.

^a Extracted from American Standard for Wrought Copper and Bronze Solder Joint Fittings, B16.22-1951

^b Standard water tube sizes except 1.8 in., which is 1/4 in. OD seamless copper tubing for refrigerator service, etc. (ASTM B68).

^c These pressures may be used for cast-brass fittings (ASA B16.18-1950) for sizes 2 in. and smaller.

^d These pressures may be used for cast-brass fittings (ASA B16.18-1950) for sizes 2 1/4 in. and above.

^e Also allowable for cast-brass fittings (ASA B16.18-1950).

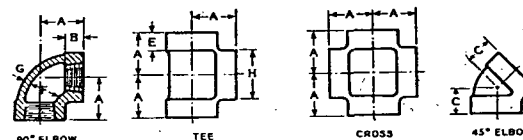
available in screwed or soldered types. Table 15 gives size data for screwed fittings and Tables 16 and 17 for solder-type fittings for copper tube and pipe.

The compression type fitting is generally limited to small sizes of tubing, while the flared and soldered types are used in both large and small sizes. An American Standard, ASA A 40.2 (1936), has been prepared to standardize dimensions of brass fittings for flared copper tubes. Flared tube fittings are widely used in refrigeration work where SAE dimensions and a 45 deg flare render most fittings interchangeable, although for refrigeration use, thread fits and tolerances on thread gages must be maintained within close limits. Brass fittings with SAE dimensions are not interchangeable with the American Standard fittings for water tubes.

FLANGE FACINGS AND GASKETS

There are many types of flange facings. The simplest, and the one most commonly used, is the plain face. This type of face is used with fittings shown in Table 9. Other facings, with varying complexity, are used for

TABLE 8. DIMENSIONS OF SCREWED CAST-IRON 90- AND 45-DEG ELBOWS, TEES, AND CROSSES (CLASS 125) (Straight Sizes)

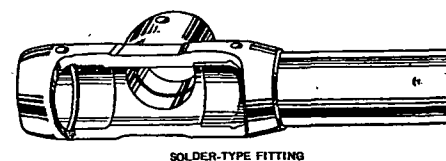


NOMINAL PIPE SIZE	CENTER TO END, ELBOWS, TEES, AND CROSSES	CENTER TO END, 45-DEG ELBOWS	LENGTH OF THREAD, MIN	WIDTH OF BAND, MIN	INSIDE DIAM- ETER OF FITTING		METAL THICKNESS	OUTSIDE DIAMETER OF BAND, MIN
					F			
					A	C	B	E
1/4	0.81	0.73	0.32	0.38	0.584	0.540	0.110	0.93
3/8	0.95	0.80	0.36	0.44	0.719	0.675	0.120	1.12
1/2	1.12	0.88	0.43	0.50	0.897	0.840	0.130	1.34
3/4	1.31	0.98	0.50	0.56	1.107	1.050	0.155	1.63
1	1.50	1.12	0.58	0.62	1.385	1.315	0.170	1.95
1 1/4	1.75	1.29	0.67	0.69	1.730	1.660	0.185	2.39
1 1/2	1.94	1.43	0.70	0.75	1.970	1.900	0.200	2.68
2	2.25	1.68	0.75	0.84	2.445	2.375	0.220	3.28
2 1/4	2.70	1.95	0.92	0.94	2.975	2.875	0.240	3.88
3	3.08	2.17	0.98	1.00	3.600	3.500	0.260	4.62
3 1/2	3.42	2.39	1.03	1.06	4.100	4.000	0.280	5.20
4	3.79	2.61	1.08	1.12	4.600	4.500	0.310	5.79
5	4.50	3.05	1.18	1.18	5.663	5.563	0.380	7.05
6	5.13	3.46	1.28	1.28	6.725	6.625	0.430	8.28
8	6.56	4.28	1.47	1.47	8.725	8.625	0.550	10.63
10	8.06*	5.16	1.68	1.68	10.850	10.750	0.690	13.12
12	9.50*	5.97	1.88	1.88	12.850	12.750	0.800	15.47

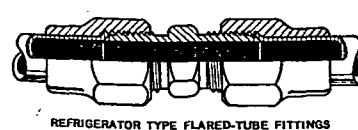
From American Standard Dimensions of Cast-Iron Screwed Fittings, Class 125. ASA B16.4-1949.

All dimensions given in inches.

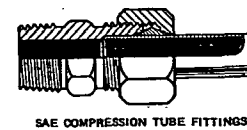
* This applies to elbows and tees only.



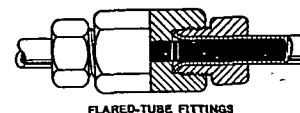
SOLDER-TYPE FITTING



REFRIGERATOR TYPE FLARED-TUBE FITTINGS



SAE COMPRESSION TUBE FITTINGS



FLARED-TUBE FITTINGS

FIG. 2. COPPER OR BRASS TUBE FITTINGS