

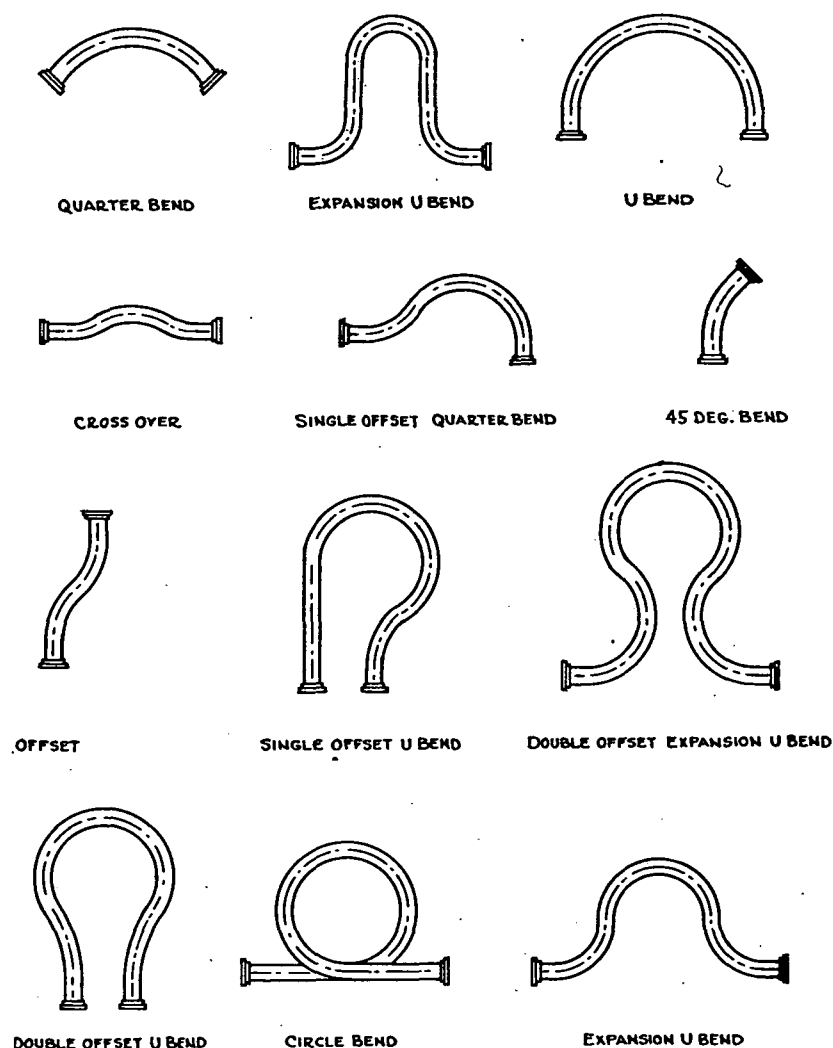


FIG. 1. COMMON TYPES OF PIPE BENDS

tions in weights are known as (1) low-pressure fittings for steam working pressures of 25 lb (cast-iron flanged only, sizes 4 in. and larger), (2) standard fittings for saturated steam working pressures of 125 lb, and (3) extra heavy fittings for saturated steam working pressures of 250 lb. These last fittings are suitable for cold water working pressures of 350 lb and are usually tested to twice the steam working pressure, or 500 lb cold hydrostatic.

Screwed fittings include: nipples or short pieces of pipe of varying

TABLE 3. THERMAL EXPANSION OF PIPE IN INCHES PER 100 FT³
(For superheated steam and other fluids refer to temperature column)

SATURATED STEAM			ELONGATION IN INCHES PER 100 FT FROM -20 F UP				SATURATED STEAM		ELONGATION IN INCHES PER 100 FT FROM -20 F UP			
Vacuum Inches of Hg.	Pressure Pounds per Square Inch Gage	Temperature Degrees Fahrenheit	Cast-Iron Pipe	Steel Pipe	Wrought Iron Pipe	Copper Pipe	Pressure Pounds per Square Inch Gage	Temperature Degrees Fahrenheit	Cast-Iron Pipe	Steel Pipe	Wrought Iron Pipe	Copper Pipe
		-20	0	0	0	0	664.3	500	3.847	4.296	4.477	6.110
		0	0.127	0.145	0.152	0.204	795.3	520	4.020	4.487	4.677	6.352
		20	0.255	0.293	0.306	0.442	945.3	540	4.190	4.670	4.866	6.614
		40	0.390	0.430	0.465	0.655	1115.3	560	4.365	4.860	5.057	6.850
		60	0.518	0.593	0.620	0.888	1308.3	580	4.541	5.051	5.268	7.123
29.39		80	0.649	0.725	0.780	1.100	1525.3	600	4.725	5.247	5.455	7.388
28.89		100	0.787	0.898	0.939	1.338	1768.3	620	4.896	5.437	5.660	7.636
27.99		120	0.926	1.055	1.110	1.570	2041.3	640	5.082	5.627	5.850	7.893
26.48		140	1.051	1.209	1.265	1.794	2346.3	660	5.260	5.831	6.067	8.153
24.04		160	1.200	1.368	1.427	2.008	2705	680	5.442	6.020	6.260	8.400
20.27		180	1.345	1.528	1.597	2.255	3080	700	5.629	6.229	6.481	8.676
14.63		200	1.495	1.691	1.778	2.500		720	5.808	6.425	6.673	8.912
6.45		220	1.634	1.852	1.936	2.720		740	6.006	6.635	6.899	9.203
	2.5	240	1.780	2.020	2.110	2.960		760	6.200	6.833	7.100	9.460
	10.3	260	1.931	2.183	2.279	3.189		780	6.389	7.046	7.314	9.736
	20.7	280	2.085	2.350	2.465	3.422		800	6.587	7.250	7.508	9.992
	34.5	300	2.233	2.519	2.630	3.665		820	6.779	7.464	7.757	10.272
	52.3	320	2.395	2.690	2.800	3.900		840	6.970	7.662	7.952	10.512
	74.9	340	2.543	2.862	2.988	4.145		860	7.176	7.888	8.195	10.814
	103.3	360	2.700	3.029	3.175	4.380		880	7.375	8.098	8.400	11.175
	138.3	380	2.859	3.211	3.350	4.628		900	7.579	8.313	8.639	11.360
	180.9	400	3.008	3.375	3.521	4.870		920	7.795	8.545	8.867	11.625
	232.4	420	3.182	3.566	3.720	5.118		940	7.989	8.755	9.089	11.911
	293.7	440	3.345	3.740	3.900	5.358		960	8.200	8.975	9.300	12.180
	366.1	460	3.511	3.929	4.096	5.612		980	8.406	9.196	9.547	12.473
	451.3	480	3.683	4.100	4.280	5.855		1000	8.617	9.421	9.776	12.747

*From Piping Handbook, by Walker and Crocker. This table gives the expansion from -20 F to the temperature in question. To obtain the amount of expansion between any two temperatures take the difference between the figures in the table for those temperatures. For example, if a steel pipe is installed at a temperature of 60 F and is to operate at 300 F, the expansion would be 2.519 - 0.593 = 1.926 in.

lengths; couplings, usually of wrought iron only; elbows for turning angles of either 45 deg or 90 deg; return bends, which may be of either the close or open pattern, and may be cast with either a back or side outlet; tees; crosses; laterals or Y branches; and a variety of plugs, bushings, caps, lock-nuts, flanges and reducing fittings. Reducing fittings as well as bushings, both of which are used in changing from one pipe size to another, may have the smaller connection tapped eccentrically to permit free drainage of the water of condensation in steam lines or free escape of air in water lines.