thinner wall and, in the small sizes, its freedom from the occasional tendency of welded pipe to split at the weld when bent.

Wrought-Iron Pipe. Wrought-iron pipe is claimed to be more corrosion-resisting than ordinary steel pipe and therefore its somewhat higher first cost is said to be justified on the basis of longer life expectancy. Wrought-iron pipe may be identified by the spiral line marked into each length, either knurled into the metal or painted on it in red or other bright color. Otherwise, there is little difference in the appearance of

TABLE 1. DIMENSIONS OF SCHEDULES 30 AND 40 AND STANDARD WEIGHT PIPE[a]

Size	Diameter In.		Thickness, In.	Weight per Ft, Lb		Threads per In.	Circumference, In.		Transverse Area, Sq In.			Length of Pipe, Ft per Sq Ft		Length of Pipe, Ft Containing 1 Cu Ft	Weight of Water, Lb per Ft
	External	Internal		Plain Ends	Threads and Couplings		External	Internal	External	Internal	Metal	External Surface	Internal Surface		
1/8	0.405	0.269	0.068	0.244	0.245	27	1.272	0.845	0.129	0.057	0.072	9.431	14.199	2533.775	0.025
1/4	0.540	0.364	0.088	0.424	0.425	18	1.696	1.144	0.229	0.104	0.125	7.073	10.493	1383.789	0.045
3/8	0.675	0.493	0.091	0.567	0.568	18	2.121	1.549	0.358	0.191	0.167	5.658	7.748	754.360	0.083
1/2	0.840	0.622	0.109	0.850	0.852	14	2.639	1.954	0.554	0.304	0.250	4.547	6.141	473.906	0.132
3/4	1.050	0.824	0.113	1.130	1.134	14	3.299	2.589	0.866	0.533	0.333	3.637	4.635	270.034	0.231
1	1.315	1.049	0.133	1.678	1.684	11½	4.131	3.296	1.358	0.864	0.494	2.904	3.641	166.618	0.375
1¼	1.660	1.380	0.140	2.272	2.281	11½	5.215	4.335	2.164	1.495	0.669	2.301	2.768	96.275	0.65
1½	1.900	1.610	0.145	2.717	2.731	11½	5.969	5.058	2.835	2.036	0.799	2.010	2.372	70.733	0.88
2	2.375	2.067	0.154	3.652	3.678	11½	7.461	6.494	4.430	3.355	1.075	1.608	1.847	42.913	1.45
2½	2.875	2.469	0.203	5.793	5.819	8	9.032	7.757	6.492	4.788	1.704	1.328	1.547	30.077	2.07
3	3.500	3.068	0.216	7.575	7.616	8	10.996	9.638	9.621	7.393	2.228	1.091	1.245	19.479	3.20
3½	4.000	3.548	0.226	9.109	9.202	8	12.566	11.146	12.566	9.886	2.680	0.954	1.076	14.565	4.29
4	4.500	4.026	0.237	10.790	10.889	8	14.137	12.648	15.904	12.730	3.174	0.848	0.948	11.312	5.50
5	5.563	5.047	0.258	14.617	14.810	8	17.477	15.856	24.306	20.006	4.300	0.686	0.756	7.198	8.67
6	6.625	6.065	0.280	18.974	19.185	8	20.813	19.054	34.472	28.891	5.581	0.576	0.629	4.984	12.51
8c	8.625	8.071	0.277	24.696	25.000	8	27.096	25.356	58.426	51.161	7.265	0.443	0.473	2.815	22.18
8	8.625	7.981	0.322	28.554	28.809	8	27.096	25.073	58.426	50.027	8.399	0.443	0.478	2.878	21.70
10c	10.750	10.136	0.307	34.240	35.000	8	33.772	31.843	90.763	80.691	10.072	0.355	0.376	1.785	34.95
10	10.750	10.020	0.365	40.483	41.132	8	33.772	31.479	90.763	78.855	11.908	0.355	0.381	1.826	34.20
12c	12.750	12.090	0.330	43.773	45.000	8	40.055	37.982	127.676	114.800	12.876	0.299	0.315	1.254	49.70
12	12.750	12.000	0.375	49.562	50.706	8	40.055	37.699	127.676	113.097	14.579	0.299	0.318	1.273	49.00

[a]Standard-weight wrought-iron pipe has approximately the same wall thicknesses and weights as contained herein for steel pipe. For exact dimensions, see *American Standard for Wrought-Iron and Wrought-Steel Pipe, A.S.A.* B36.10.

[b]Thicknesses shown in bold face type are identical with thicknesses for Schedule 40 pipe of *A.S.A.* B36.10.

[c]Same as Schedule 30, *A.S.A.* B36.10.

wrought iron and steel pipe, although microscopic examination of polished and etched specimens will readily disclose the difference.

Cast-Ferrous Pipe. There are now available several types of cast-ferrous metal pipe made of a good grade of cast-iron with or without additions of nickel, chromium, or other alloy. This pipe is available in sizes from 1½ in. to 6 in., and in standard lengths of 5 or 6 ft with external and internal diameters closely approximating those of extra strong wrought pipe. Cast-ferrous pipe may be obtained coupled, beveled for welding, or with ends plain or grooved for the several types of couplings. It is easily cut and threaded as well as welded. The fact that it is readily

welded enables the manufacturers to supply the pipe in any lengths practicable for handling.

Alloy Metal Pipe. Steel pipe bearing a small alloy of copper or other alloying element and iron pipe bearing a small alloy of copper and molybdenum have been claimed to possess more resistance to corrosion than plain steel pipe and they are advertised and sold under various trade names.

Copper Pipe and Fittings. Owing to its inherent resistance to corrosion, copper and brass pipe have always been used in heating, ventilating, and water supply installations, but the cost with standard dimensions for threaded connections has been high. The recent introduction of fittings which permit erection by soldering or sweating allows the use of pipe with thinner walls than are possible with threaded connections, thereby reducing the cost of installations.

The initial cost of brass and copper pipe installations generally runs higher than the corresponding job with steel pipe and screwed connections in spite of the use of thin wall pipe, but the corrosive nature of the fluid conveyed or the inaccessibility of some of the piping may warrant use of a more expensive material than plain steel. The advantages of corrosion-resisting pipe and fittings should be weighed against the correspondingly higher initial cost.

COMMERCIAL PIPE DIMENSIONS

The two weights of steel and wrought-iron pipe commonly used are known as *standard weight* and *extra strong*, which correspond to Schedules 40 and 80 respectively of the *American Standard for Wrought-Iron and Wrought-Steel Pipe, A.S.A.* B36.10. The same external diameter is used for both weights of each nominal size for manufacturing reasons as well as to afford interchangeability in threading, and other elements associated with fabrication and erection. Hence the difference in wall thickness is accompanied by a corresponding change in inside diameter. In sizes up to 14 in., pipe is designated by its nominal size which corresponds roughly to the inside diameter of Schedule 40 pipe. In sizes 14 in. and upward, pipe is designated by its outside diameter (O. D.), and the wall thickness is specified.

While the demands for pipe for the heating and ventilating industry are reasonably well served by Schedule 40 (standard weight) pipe, the erection of pipe by welding sometimes warrants using lighter wall thicknesses. The considerations governing pipe wall thickness and its relation to joint design are covered in the *American Standard Code for Pressure Piping, A.S.A.* B31.1-1942, see Section 122. Standard schedules of pipe thicknesses are contained in the *American Standard for Wrought-Iron and Wrought-Steel Pipe, A.S.A.* B36.10, which includes standard-weight and extra-strong thicknesses in Schedules 40 and 80, respectively, and eight other schedules of varying wall thickness to provide for different service conditions. Dimensions and other useful data for Schedules 30 and 40 pipe are given in Table 1. Table 2 from *A.S.T.M.* Specifications A53 and A120 combines the schedule thicknesses of *A.S.A.* B36.10 and the old series designations.

Standard-weight pipe is generally furnished with threaded ends in random lengths of 16 to 22 ft, although when ordered with plain ends,