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 amount 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.

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

| Size | Diameter, In. | | Thickness[b], 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 | | |
| ⅛ | 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 |
| ¼ | 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 |
| ⅜ | 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 |
| ½ | 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 |
| ¾ | 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 | 0.688 | 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, ASA* B36.10.

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

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

*Copper Pipe and Fittings.* Owing to 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 would be 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, ASA* 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.

TABLE 2. STANDARD WEIGHTS AND DIMENSIONS OF WELDED AND SEAMLESS STEEL PIPE[a]

| Size | Outside Diameter, In. | No. of Threads per In. | Standard-Weight Pipe | | | | Extra-Strong Pipe | | | | Double Extra-Strong Pipe[b] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Schedule 30 | | Schedule 40 | | Schedule 60 | | Schedule 80 | | | |
| | | | Wall Thickness, In. | Weight per Ft, Lb T & C | Wall Thickness, In. | Weight per Ft, Lb T & C | Wall Thickness, In. | Weight per Ft, Lb Plain Ends | Wall Thickness, In. | Weight per Ft, Lb Plain Ends | Wall Thickness In. | Weight per Ft, Lb Plain Ends |
| ⅛ | 0.405 | 27 | ..... | ..... | 0.068 | 0.25 | ..... | ..... | 0.095 | 0.31 | ..... | ..... |
| ¼ | 0.540 | 18 | ..... | ..... | 0.088 | 0.43 | ..... | ..... | 0.119 | 0.54 | ..... | ..... |
| ⅜ | 0.675 | 18 | ..... | ..... | 0.091 | 0.57 | ..... | ..... | 0.126 | 0.74 | ..... | ..... |
| ½ | 0.840 | 14 | ..... | ..... | 0.109 | 0.85 | ..... | ..... | 0.147 | 1.09 | 0.294 | 1.71 |
| ¾ | 1.050 | 14 | ..... | ..... | 0.113 | 1.13 | ..... | ..... | 0.154 | 1.47 | 0.308 | 2.44 |
| 1 | 1.315 | 11½ | ..... | ..... | 0.133 | 1.68 | ..... | ..... | 0.179 | 2.17 | 0.358 | 3.66 |
| 1¼ | 1.660 | 11½ | ..... | ..... | 0.140 | 2.28 | ..... | ..... | 0.191 | 3.00 | 0.382 | 5.21 |
| 1½ | 1.900 | 11½ | ..... | ..... | 0.145 | 2.73 | ..... | ..... | 0.200 | 3.63 | 0.400 | 6.41 |
| 2 | 2.375 | 11½ | ..... | ..... | 0.154 | 3.68 | ..... | ..... | 0.218 | 5.02 | 0.436 | 9.03 |
| 2½ | 2.875 | 8 | ..... | ..... | 0.203 | 5.82 | ..... | ..... | 0.276 | 7.66 | 0.552 | 13.70 |
| 3 | 3.500 | 8 | ..... | ..... | 0.216 | 7.62 | ..... | ..... | 0.300 | 10.25 | 0.600 | 18.58 |
| 3½ | 4.000 | 8 | ..... | ..... | 0.226 | 9.20 | ..... | ..... | 0.318 | 12.51 | 0.636 | 22.85 |
| 4 | 4.500 | 8 | ..... | ..... | 0.237 | 10.89 | ..... | ..... | 0.337 | 14.98 | 0.674 | 27.54 |
| 5 | 5.563 | 8 | ..... | ..... | 0.258 | 14.81 | ..... | ..... | 0.375 | 20.78 | 0.750 | 38.55 |
| 6 | 6.625 | 8 | ..... | ..... | 0.280 | 19.19 | ..... | ..... | 0.432 | 28.57 | 0.864 | 53.16 |
| 8 | 8.625 | 8 | 0.277 | 25.00 | 0.322 | 28.81 | ..... | ..... | 0.500 | 43.39 | 0.875 | 72.42 |
| 10[c] | 10.750 | 8 | 0.307 | 35.00 | 0.365 | 41.13 | 0.500 | 54.74 | ..... | ..... | ..... | ..... |
| 12[d] | 12.750 | 8 | 0.330 | 45.00 | 0.375 | 50.71 | 0.500[d] | 65.41 | ..... | ..... | ..... | ..... |

From Standard Specifications for Welded and Seamless Steel Pipe of the *American Society for Testing Materials, A.S.T.M.*, Designation A120.

[a] Sizes larger than those shown in the table are measured by their outside diameter, such as 14 in. outside diameter, etc. These larger sizes will be furnished with plain ends, unless otherwise specified. The weights will correspond to the manufacturers' published standards although it is possible to calculate the theoretical weights for any given size and wall thickness on the basis of 1 cu in. of steel weighing 0.2833 lb.

[b] The American Standard for Wrought-Iron and Wrought-Steel Pipe *ASA* B36.10-1939 has assigned no schedule number to *Double Extra-Strong* pipe.

[c] A 10 in. Standard Weight pipe is also available with 0.279 in. wall thickness, but this wall is not covered by a Schedule Number.

[d] Owing to a departure from the *Standard-Weight* and *Extra-Strong* wall thicknesses for the 12 in. nominal size, Schedules 40 and 60, Table 2 of the *ASA* B36.10-1939, Standard for Wrought-Iron and Wrought-Steel Pipe, the regular *Standard* and *Extra-Strong* wall thicknesses (0.375 in. and 0.500 in.) have been substituted.

While the demands for pipe for the heating and ventilating industry are reasonably well served by Schedule 40 (standard weight) pipe, the erection