

All reliable data on this subject indicate that the composition of the iron—i.e., the varying amount of carbon, phosphorous, manganese, sulphur, silicon, oxides, slag and copper usually found in wrought iron and soft steel—makes very little difference in the amount or character of corrosion under water, although under atmospheric exposure the influence of composition is sometimes quite marked.

In practice, oxygen removal has been accomplished in two ways, namely; by de-aerating the water mechanically; and by fixing the free oxygen by chemical combination. Suitable apparatus is now being manufactured for this purpose.

TABLE 89. EXTRA STRONG PIPE—BLACK AND GALVANIZED\*

All Weights and Dimensions are Nominal

| SIZE           | DIAMETERS |          | THICKNESS | WEIGHT PER FOOT PLAIN ENDS | TEST PRESSURE IN POUNDS |       |
|----------------|-----------|----------|-----------|----------------------------|-------------------------|-------|
|                | External  | Internal |           |                            | Butt                    | Lap   |
| $\frac{1}{8}$  | 0.405     | 0.215    | 0.095     | 0.314                      | 700                     | ----- |
| $\frac{1}{4}$  | 0.540     | 0.302    | 0.119     | 0.535                      | 700                     | ----- |
| $\frac{3}{8}$  | 0.675     | 0.423    | 0.126     | 0.738                      | 700                     | ----- |
| $\frac{1}{2}$  | 0.840     | 0.546    | 0.147     | 1.087                      | 700                     | ----- |
| $\frac{3}{4}$  | 1.050     | 0.742    | 0.154     | 1.473                      | 700                     | ----- |
| 1              | 1.315     | 0.957    | 0.179     | 2.171                      | 700                     | ----- |
| $1\frac{1}{4}$ | 1.660     | 1.278    | 0.191     | 2.996                      | 1500                    | 2500  |
| $1\frac{1}{2}$ | 1.900     | 1.500    | 0.200     | 3.631                      | 1500                    | 2500  |
| 2              | 2.375     | 1.939    | 0.218     | 5.022                      | 1500                    | 2500  |
| $2\frac{1}{2}$ | 2.875     | 2.323    | 0.276     | 7.661                      | 1500                    | 2000  |
| 3              | 3.500     | 2.900    | 0.300     | 10.252                     | 1500                    | 2000  |
| $3\frac{1}{2}$ | 4.000     | 3.364    | 0.318     | 12.505                     | -----                   | 2000  |
| 4              | 4.500     | 3.826    | 0.337     | 14.983                     | -----                   | 2000  |
| $4\frac{1}{2}$ | 5.000     | 4.290    | 0.355     | 17.611                     | -----                   | 1800  |
| 5              | 5.563     | 4.813    | 0.375     | 20.778                     | -----                   | 1800  |
| 6              | 6.625     | 5.761    | 0.432     | 28.573                     | -----                   | 1800  |
| 7              | 7.625     | 6.625    | 0.500     | 38.048                     | -----                   | 1500  |
| 8              | 8.625     | 7.625    | 0.500     | 43.388                     | -----                   | 1500  |
| 9              | 9.625     | 8.625    | 0.500     | 48.728                     | -----                   | 1500  |
| 10             | 10.750    | 9.750    | 0.500     | 54.735                     | -----                   | 1200  |
| 11             | 11.750    | 10.750   | 0.500     | 60.075                     | -----                   | 1100  |
| 12             | 12.750    | 11.750   | 0.500     | 65.415                     | -----                   | 1100  |
| 14 O. D.       | 14.000    | 13.000   | 0.500     | 72.091                     | -----                   | 1000  |
| 15 O. D.       | 15.000    | 14.000   | 0.500     | 77.431                     | -----                   | 1000  |
| 16 O. D.       | 16.000    | 15.000   | 0.500     | 82.771                     | -----                   | 1000  |

The permissible variation in weights is 5 per cent above and 5 per cent below. Furnished with plain ends and in random lengths unless otherwise ordered. All weights given in pounds. All dimensions given in inches. In addition to the above test, on sizes  $\frac{1}{8}$ -in to 1-in. inclusive, the pipe is jarred with a hammer while under pressure.

\*From National Tube Co.'s "Book of Standards."

## WROUGHT IRON PIPE

Wrought iron pipe is generally designated by the word *genuine* when the product referred to is that produced by the puddling process and its cost is from 30 to 60 per cent higher than steel pipe, depending upon its size. In the average heating, plumbing or power piping system the cost of pipe is about 10 to 20 per cent of the installation cost, with the remain-

TABLE 90. GENUINE WROUGHT IRON PIPE—BLACK OR GALVANIZED

All Weights and Dimensions are Nominal

|                      | Size           | Outside diam., in. | Inside diam., in. | Std. wt. plain ends, lbs. per ft. | Couplings          |             |              |
|----------------------|----------------|--------------------|-------------------|-----------------------------------|--------------------|-------------|--------------|
|                      |                |                    |                   |                                   | Outside diam., in. | Length, in. | Weight, lbs. |
| Standard             |                |                    |                   |                                   |                    |             |              |
| Buttweld             | $\frac{1}{4}$  | 0.540              | 0.367             | 0.424                             | 0.750              | 1.000       | 0.059        |
|                      | $\frac{3}{8}$  | 0.675              | 0.489             | 0.567                             | 0.968              | 1.343       | 0.156        |
|                      | $\frac{1}{2}$  | 0.840              | 0.617             | 0.850                             | 1.078              | 1.343       | 0.168        |
|                      | $\frac{3}{4}$  | 1.050              | 0.819             | 1.130                             | 1.312              | 1.531       | 0.243        |
| Buttweld and Lapweld | $1\frac{1}{4}$ | 1.660              | 1.369             | 2.272                             | 1.984              | 2.062       | 0.631        |
|                      | $1\frac{1}{2}$ | 1.900              | 1.604             | 2.717                             | 2.281              | 2.312       | 0.884        |
| Lapweld              | 2              | 2.375              | 2.060             | 3.652                             | 2.750              | 2.500       | 1.100        |
|                      | $2\frac{1}{2}$ | 2.875              | 2.460             | 5.793                             | 3.312              | 3.125       | 2.100        |
|                      | 3              | 3.500              | 3.059             | 7.575                             | 4.031              | 3.125       | 3.025        |
|                      | $3\frac{1}{2}$ | 4.000              | 3.538             | 9.109                             | 4.500              | 3.687       | 3.900        |
|                      | 4              | 4.500              | 4.016             | 10.790                            | 4.968              | 3.687       | 4.200        |
|                      | $4\frac{1}{2}$ | 5.000              | 4.496             | 12.538                            | 5.531              | 4.218       | 6.200        |
|                      | 5              | 5.563              | 5.036             | 14.617                            | 6.281              | 4.125       | 8.250        |
|                      | 6              | 6.625              | 6.053             | 18.974                            | 7.375              | 4.156       | 10.800       |
|                      | 7              | 7.625              | 7.010             | 23.544                            | 8.375              | 5.000       | 14.650       |
|                      | 8              | 8.625              | 8.059             | 24.696                            | 9.406              | 5.000       | 16.250       |
|                      | 9              | 9.625              | 8.927             | 33.907                            | 10.687             | 6.375       | 33.700       |
|                      | 10             | 10.750             | 10.181            | 31.201                            | 11.937             | 6.750       | 42.900       |
|                      | 11             | 10.750             | 10.124            | 34.240                            | 11.937             | 6.750       | 42.900       |
|                      | 12             | 10.750             | 10.065            | 40.483                            | 11.937             | 6.750       | 42.900       |
|                      | 12             | 11.750             | 10.985            | 45.567                            | 12.937             | 6.750       | 45.900       |
|                      | 12             | 12.750             | 12.077            | 43.773                            | 13.875             | 6.750       | 49.100       |
| 12                   | 12.750         | 11.985             | 49.562            | 13.875                            | 6.937              | 49.100      |              |
| Extra Heavy          |                |                    |                   |                                   |                    |             |              |
| Buttweld             | $\frac{1}{4}$  | 0.540              | 0.295             | 0.535                             | 0.843              | 1.250       | 0.125        |
|                      | $\frac{3}{8}$  | 0.675              | 0.417             | 0.738                             | 0.968              | 1.343       | 0.156        |
|                      | $\frac{1}{2}$  | 0.840              | 0.539             | 1.087                             | 1.109              | 1.500       | 0.200        |
|                      | $\frac{3}{4}$  | 1.050              | 0.735             | 1.473                             | 1.406              | 2.125       | 0.460        |
| Buttweld and Lapweld | $1\frac{1}{4}$ | 1.660              | 1.269             | 2.996                             | 2.094              | 2.750       | 1.150        |
|                      | $1\frac{1}{2}$ | 1.900              | 1.491             | 3.631                             | 2.375              | 2.750       | 1.300        |
| Lapweld              | 2              | 2.375              | 1.929             | 5.022                             | 2.937              | 3.625       | 2.400        |
|                      | $2\frac{1}{2}$ | 2.875              | 2.311             | 7.661                             | 3.531              | 4.125       | 4.250        |
|                      | 3              | 3.500              | 2.887             | 10.252                            | 4.187              | 4.250       | 5.200        |
|                      | $3\frac{1}{2}$ | 4.000              | 3.350             | 12.505                            | 4.750              | 4.437       | 6.900        |
|                      | 4              | 4.500              | 3.811             | 14.983                            | 5.250              | 4.437       | 7.500        |
|                      | $4\frac{1}{2}$ | 5.000              | 4.275             | 17.611                            | 5.671              | 4.375       | 7.700        |
|                      | 5              | 5.563              | 4.797             | 20.778                            | 6.375              | 5.000       | 10.850       |
|                      | 6              | 6.625              | 5.743             | 28.573                            | 7.500              | 5.437       | 15.500       |
|                      | 7              | 7.625              | 6.603             | 38.048                            | 8.625              | 6.250       | 24.300       |
|                      | 8              | 8.625              | 7.604             | 43.388                            | 9.500              | 6.250       | 24.000       |
|                      | 9              | 9.625              | 8.604             | 48.728                            | 10.687             | 6.375       | 33.700       |
|                      | 10             | 10.750             | 9.729             | 54.735                            | 11.937             | 6.750       | 42.200       |
|                      | 11             | 11.750             | 10.729            | 60.075                            |                    |             |              |
|                      | 12             | 12.750             | 11.729            | 65.415                            | 13.875             | 6.937       | 49.100       |