TABLE 90.. GENUINE WROUGHT IRON PIPE—BLACK OR GALVANIZED—Continued

*All Weights and Dimensions are Nominal*

| | Size | Outside diam., in. | Inside diam., in. | Std. wt. plain ends, lbs. per ft. | Couplings: Outside diam., in. | Couplings: Length, in. | Couplings: Weight, lbs. |
|---|---|---|---|---|---|---|---|
| *Double Extra Heavy* | | | | | | | |
| Buttweld | ½ | 0.840 | 0.225 | 1.714 | Same as for Extra Heavy | | |
| | ¾ | 1.050 | 0.413 | 2.440 | | | |
| | 1 | 1.315 | 0.576 | 3.659 | | | |
| | 1¼ | 1.660 | 0.874 | 5.214 | | | |
| Buttweld and Lapweld | 1½ | 1.900 | 1.078 | 6.408 | Same as for Extra Heavy | | |
| Lapweld | 2 | 2.375 | 1.480 | 9.029 | Same as for Extra Heavy | | |
| | 2½ | 2.875 | 1.742 | 13.695 | | | |
| | 3 | 3.500 | 2.270 | 18.583 | | | |
| | 3½ | 4.000 | 2.697 | 22.850 | | | |
| | 4 | 4.500 | 3.119 | 27.541 | | | |
| | 4½ | 5.000 | 3.546 | 32.530 | | | |
| | 5 | 5.563 | 4.028 | 38.552 | | | |
| | 6 | 6.625 | 4.857 | 53.160 | | | |

Permissible variation in weight is 2½ per cent below and 5 per cent above.

Standard pipe furnished with threads and couplings and in random lengths; extra heavy and double extra heavy with plain ends, and in random lengths unless otherwise ordered. Extra heavy and double extra heavy pipe fitted with threads and couplings at an extra charge above regular.

*Expansion of Wrought Iron Pipe*

| INITIAL | INCREASE IN LENGTH PER 100 FT. WHEN HEATED TO | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Temperature | 160° | 180° | 200° | 212° | 228° | 240° | 250° | 259° | 267° | 274° |
| Zero, in. | 1.28 | 1.44 | 1.60 | 1.69 | 1.82 | 1.92 | 2.00 | 2.07 | 2.13 | 2.20 |
| 32° in. | 1.02 | 1.18 | 1.34 | 1.43 | 1.56 | 1.66 | 1.74 | 1.81 | 1.87 | 1.94 |
| 64° in. | 0.77 | 0.93 | 1.09 | 1.18 | 1.31 | 1.41 | 1.49 | 1.56 | 1.61 | 1.69 |
| | Hot Water | | | Water Boils | 5 lb. | 10 lb. | 15 lb. | 20 lb. | 25 lb. | 30 lb. |

Wrought iron pipe expands, in inches, per 100 ft., 4/5 of the increase in temperature of steam or water it is subjected to, over the temperature at the time of installation, divided by 100.

*Example.*—Temperature when installed, 32 deg., 10 lb. pressure=240 deg., difference 208 deg., 4/5 of which equals 1.66 in. expansion per 100 ft.

ing cost covering the items of fittings, valves, installation, shop costs, supervision and overhead.

When it is recalled that a pipe failure may cause the loss of the first investment and may also be accompanied by costly repair bills on interior walls, floors and decorations it is important to choose pipe which will give the maximum assurance of long life.

In ordering genuine wrought iron pipe a specification that is frequently used is as follows:

> Manufacturer's Name or "Brand;" or
> Genuine Wrought Iron Pipe.





> Finish: (Black or Galvanized)
> Weight: (Full Standard Weight, or Extra Heavy Weight)
> Nipples: Must be made up from genuine wrought iron specified for pipe, of the same quality, weight, and finish as for the latter.

In accordance with established practice of manufacturers of genuine wrought iron pipe it is sold with the guarantee somewhat as follows:

> (1) All pipe is guaranteed to be made of genuine wrought iron aggregated from a solidifying mass of pasty particles of highly refined metal which, without subsequent fusion, are incorporated with a minutely and uniformly distributed quality of silicate slag.

## COPPER AND BRASS PIPE

Copper and brass tubing are commonly stocked and supplied by manufacturers and distributors in sizes varying from ⅛ to 10 in. o. d. and in gages from 2 to 25 B & S and Stubbs.

Cooper and brass piping are stocked and supplied in regular and extra heavy iron pipe sizes. Both tubing and piping are usually stocked in 12 ft. lengths, and can be obtained in lengths from 2 to 20 ft. or more if required.

The use of brass piping for water supply service is widely increasing in the domestic, institutional and industrial fields, and the growing interest in its use and application is primarily due to the wider public knowledge of the economic and engineering advantages of brass in pipe, pipe-fittings, plumbing and heating installations. The serviceability and usefulness of brass piping is due principally to its inherent resistance to corrosion.

An outstanding example of its use and field is afforded by the general employment of brass piping and fittings in boiler feed lines throughout, from meter or hot-well to pump, to feed-water heater to boiler, as well as in circulating and drip systems.

Corrosion is caused by the chemical interaction between the oxygen of the atmosphere and the metallic surfaces. This type of corrosion or oxidation is universal and is the chief cause of the deterioration and decay of metals and alloys used in engineering. Other types of corrosion or chemical decomposition frequently occur and are very often due to the interaction of acids on the metals, the latter replacing the hydrogen constituent of the acid to form a metallic salt.

The chemical corrosion of metals is greatly accelerated by temperature, and the degree of activity depends on the nature of the metals themselves.

Brass, which is a mixture of copper and zinc, the copper greatly predominating, is incomparably less active from a chemical point of view than the irons and steels, and does not rust or oxidize at anything like the rapidity under ordinary exposure to the atmosphere.

In cities sulphur dioxide, hydrogen chloride, hydrogen sulphide and other ingredients which may be looked upon as accidental, also have a