fact in practical pipe experience is that hot-water-heating systems invariably showed no corrosion to speak of after 35 or 40 years' use; whereas, frequently, hot-water-supply systems operating at the same average temperature with the same water lasted less than half this time. That this was independent of whether the material was iron or steel was fully demonstrated by many service tests which were conducted for a period of more than ten years, in which representative pipes of each class were installed alternately in hot-water lines.

TABLE 58. STANDARD PIPE—BLACK AND GALVANIZED*

All Weights and Dimensions are Nominal

Size	Diameters		Thickness	Weight per Foot		Threads per inch	Couplings			Test Pressure in Pounds	
	External	Internal		Plain ends	Threads and couplings		Diameter	Length	Weight	Butt	Lap
⅛	.405	.269	.068	.244	.245	27	.562	⅜	.029	700	.....
¼	.540	.364	.088	.424	.425	18	.685	1	.043	700	.....
⅜	.675	.493	.091	.567	.568	18	.848	1⅛	.070	700	.....
½	.840	.622	.109	.850	.852	14	1.024	1⅜	.116	700	.....
¾	1.050	.824	.113	1.130	1.134	14	1.281	1⅝	.209	700	.....
1	1.315	1.049	.133	1.678	1.684	11½	1.576	1⅞	.343	700	.....
1¼	1.660	1.380	.140	2.272	2.281	11½	1.950	2⅛	.535	700	1000
1½	1.900	1.610	.145	2.717	2.731	11½	2.218	2⅜	.743	700	1000
2	2.375	2.067	.154	3.652	3.678	11½	2.760	2⅝	1.208	700	1000
2½	2.875	2.469	.203	5.793	5.819	8	3.276	2⅞	1.720	800	1000
3	3.500	3.068	.216	7.575	7.616	8	3.948	3⅛	2.498	800	1000
3½	4.000	3.548	.226	9.109	9.202	8	4.591	3⅜	4.241	.....	1000
4	4.500	4.026	.237	10.790	10.889	8	5.091	3⅝	4.741	.....	1000
4½	5.000	4.506	.247	12.538	12.642	8	5.591	3⅝	5.241	.....	1000
5	5.563	5.047	.258	14.617	14.810	8	6.296	4⅛	8.091	.....	1000
6	6.625	6.065	.280	18.974	19.185	8	7.358	4⅛	9.554	.....	1000
7	7.625	7.023	.301	23.544	23.769	8	8.358	4⅛	10.932	.....	1000
8	8.625	8.071	.277	24.696	25.000	8	9.358	4⅛	13.905	.....	800
8	8.625	7.981	.322	28.554	28.809	8	9.358	4⅛	13.905	.....	1000
9	9.625	8.941	.342	33.907	34.188	8	10.358	5⅛	17.236	.....	900
10	10.750	10.192	.279	31.201	32.000	8	11.721	6⅛	29.877	.....	600
10	10.750	10.136	.307	34.240	35.000	8	11.721	6⅛	29.877	.....	800
10	10.750	10.020	.365	40.483	41.132	8	11.721	6⅛	29.877	.....	900
11	11.750	11.000	.375	45.557	46.247	8	12.721	6⅛	32.550	.....	800
12	12.750	12.090	.330	43.773	45.000	8	13.958	6⅛	43.098	.....	600
12	12.750	12.000	.375	49.562	50.706	8	13.958	6⅛	43.098	.....	800
14 O. D.	14.000	13.250	.375	54.568	55.824	8	15.208	6⅛	47.152	.....	700
15 O. D.	15.000	14.250	.375	58.573	60.375	8	16.446	6⅛	59.493	.....	700
16 O. D.	16.000	15.250	.375	62.579	64.500	8	17.446	6⅛	63.294	.....	600
17 O. D.	17.000	16.214	.393	69.704	72.602	8	18.683	7⅛	90.941	.....	600
18 O. D.	18.000	17.182	.409	76.840	80.482	8	19.921	7⅛	108.672	.....	600
20 O. D.	20.000	19.182	.409	85.577	89.617	8	21.921	7⅛	120.187	.....	500

The permissible variation in weight is 5 per cent above and 5 per cent below.
Furnished with threads and couplings and in random lengths unless otherwise ordered.
Taper of threads is ¾-in. diameter per foot length for all sizes.
The weight per foot of pipe with threads and couplings is based on a length of 20 ft., including the coupling, but shipping lengths of small sizes will usually average less than 20 ft.
All weights given in pounds. All dimensions given in inches.
On sizes made in more than one weight, weight desired must be specified.

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

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 corrsion *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 59. 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
⅛	.405	.215	.095	.314	700	.....
¼	.540	.302	.119	.535	700	.....
⅜	.675	.423	.126	.738	700	.....
½	.840	.546	.147	1.087	700	.....
¾	1.050	.742	.154	1.473	700	.....
1	1.315	.957	.179	2.171	700	.....
1¼	1.660	1.278	.191	2.996	1500	2500
1½	1.900	1.500	.200	3.631	1500	2500
2	2.375	1.939	.218	5.022	1500	2500
2½	2.875	2.323	.276	7.661	1500	2000
3	3.500	2.900	.300	10.252	1500	2000
3½	4.000	3.364	.318	12.505	.....	2000
4	4.500	3.826	.337	14.983	.....	2000
4½	5.000	4.290	.355	17.611	.....	1800
5	5.563	4.813	.375	20.778	.....	1800
6	6.625	5.761	.432	28.573	.....	1800
7	7.625	6.625	.500	38.048	.....	1500
8	8.625	7.625	.500	43.388	.....	1500
9	9.625	8.625	.500	48.728	.....	1500
10	10.750	9.750	.500	54.735	.....	1200
11	11.750	10.750	.500	60.075	.....	1100
12	12.750	11.750	.500	65.415	.....	1100
14 O. D.	14.000	13.000	.500	72.091	.....	1000
15 O. D.	15.000	14.000	.500	77.431	.....	1000
16 O. D.	16.000	15.000	.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 ⅛-in. to 1-in. inclusive, the pipe is jarred with a hammer while under pressure.

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