

TABLE 1. DIMENSIONS AND PROPERTIES OF STEEL PIPE

NOM- INAL SIZE	ASTM ¹ SCHED- ULE	DIAMETER		WALL THICK- NESS IN.	SURFACE AREA SQ FT/LIN FT		SECTION AREA Sq IN.		AREA OF METAL SQ IN	VOL- UME GAL/ LIN FT	WEIGHT ² (PLAIN END) LBS/LIN FT	WORKING PRESS- URE ⁴ PSIA
		O. D. IN.	I. D. IN.		O. D.	I. D.	O. D.	I. D.				
1/2	40 (s)	0.405	0.269	0.068	0.106	0.0704	0.129	0.0568	0.0720	0.00295	0.244	314 (a)
	80 (x)	0.405	0.215	0.095	0.106	0.0563	0.129	0.0363	0.0925	0.00189	0.314	1084 (a)
3/4	40 (s)	0.540	0.364	0.088	0.141	0.0953	0.229	0.104	0.125	0.00541	0.424	649 (a)
	80 (x)	0.540	0.302	0.119	0.141	0.0791	0.229	0.0716	0.157	0.00372	0.535	1353 (a)
1	40 (s)	0.675	0.493	0.091	0.177	0.129	0.358	0.191	0.167	0.00992	0.567	574 (a)
	80 (x)	0.675	0.423	0.126	0.177	0.111	0.358	0.140	0.217	0.00730	0.738	1191 (a)
1 1/2	40 (s)	0.840	0.622	0.109	0.220	0.163	0.554	0.304	0.250	0.0158	0.850	697 (a)
	80 (x)	0.840	0.546	0.147	0.220	0.143	0.554	0.234	0.320	0.0122	1.09	1265 (a)
2	XX	0.840	0.252	0.294	0.220	0.0660	0.554	0.0499	0.504	0.00259	1.71	3824 (a)
	40 (s)	1.050	0.824	0.113	0.275	0.216	0.866	0.533	0.333	0.0277	1.13	604 (a)
2 1/2	80 (x)	1.050	0.742	0.154	0.275	0.194	0.866	0.432	0.434	0.0225	1.47	1078 (a)
	XX	1.050	0.434	0.308	0.275	0.114	0.866	0.148	0.718	0.00768	2.44	3134 (a)
3	40 (s)	1.315	1.049	0.133	0.344	0.275	1.36	0.864	0.494	0.0449	1.68	651 (a)
	80 (x)	1.315	0.957	0.179	0.344	0.251	1.36	0.719	0.639	0.0374	2.17	1083 (a)
3 1/2	XX	1.315	0.599	0.358	0.344	0.157	1.36	0.282	1.08	0.0146	3.66	2963 (a)
	40 (s)	1.660	1.380	0.140	0.435	0.361	2.16	1.50	0.669	0.0777	2.27	440 (a)
4	80 (x)	1.660	1.278	0.191	0.435	0.335	2.16	1.28	0.881	0.0666	3.00	805 (a)
	XX	1.660	0.896	0.382	0.435	0.235	2.16	0.630	1.53	0.0328	5.21	2313 (a)
4 1/2	40 (s)	1.900	1.610	0.145	0.497	0.421	2.84	2.04	0.800	0.1058	2.72	417 (a)
	80 (x)	1.900	1.500	0.200	0.497	0.393	2.84	1.77	1.07	0.0918	3.65	756 (a)
5	XX	1.900	1.100	0.400	0.497	0.288	2.84	0.950	1.89	0.0494	6.41	2122 (a)
	40 (s)	2.375	2.067	0.154	0.622	0.541	4.43	3.36	1.07	0.174	3.65	376 (a)
5 1/2	80 (x)	2.375	1.939	0.218	0.622	0.508	4.43	2.95	1.48	0.153	5.02	690 (a)
	XX	2.375	1.503	0.436	0.622	0.393	4.43	1.77	2.66	0.0922	9.03	1861 (a)
6	40 (s)	2.875	2.469	0.203	0.753	0.646	6.49	4.79	1.70	0.249	5.79	505 (a)
	80 (x)	2.875	2.323	0.276	0.753	0.608	6.49	4.24	2.25	0.220	7.06	806 (a)
6 1/2	XX	2.875	1.771	0.552	0.753	0.394	6.49	2.46	4.03	0.128	13.7	2045 (a)
	40 (s)	3.500	3.068	0.216	0.916	0.803	9.62	7.39	2.23	0.384	7.57	454 (a)
7	80 (x)	3.500	2.900	0.300	0.916	0.759	9.62	6.61	3.02	0.343	10.3	734 (a)
	XX	3.500	2.300	0.600	0.916	0.602	9.62	4.15	5.47	0.216	18.5	1829 (a)
7 1/2	40 (s)	4.000	3.548	0.226	1.05	0.929	12.6	9.89	2.68	0.514	9.11	425 (a)
	80 (x)	4.000	3.364	0.318	1.05	0.881	12.6	8.89	3.68	0.462	12.5	692 (a)
8	XX	4.000	2.728	0.636	1.05	0.714	12.6	5.85	6.72	0.304	22.9	1699 (a)
	40 (s)	4.500	4.026	0.237	1.18	1.05	15.9	12.7	3.17	0.661	10.8	403 (a)
8 1/2	80 (x)	4.500	3.828	0.337	1.18	1.00	15.9	11.5	4.41	0.597	14.9	663 (a)
	XX	4.500	3.152	0.674	1.18	0.825	15.9	7.80	8.10	0.405	27.5	1602 (a)
9	40 (s)	5.563	5.047	0.258	1.46	1.32	24.3	20.0	4.30	1.04	14.6	498 (b)
	80 (x)	5.563	4.813	0.375	1.46	1.26	24.3	18.2	6.11	0.945	20.8	825 (b)
9 1/2	XX	5.563	4.063	0.750	1.46	1.06	24.3	13.0	11.3	0.673	38.6	1951 (b)
	40 (s)	6.625	6.065	0.280	1.73	1.59	34.5	28.9	5.68	1.50	18.0	467 (b)
10	80 (x)	6.625	5.761	0.432	1.73	1.51	34.5	26.1	8.40	1.35	28.6	825 (b)
	XX	6.625	4.897	0.864	1.73	1.28	34.5	18.8	15.6	0.978	53.1	1912 (b)
11	40 (s)	8.625	8.071	0.277	2.26	2.11	58.4	51.2	7.26	2.66	24.7	351 (b)
	80 (x)	8.625	7.981	0.352	2.26	2.09	58.4	50.0	8.40	2.60	28.6	431 (b)
11 1/2	XX	8.625	7.625	0.500	2.26	2.00	58.4	45.7	12.8	2.37	43.4	753 (b)
	40 (s)	10.750	10.020	0.365	2.81	2.62	90.8	78.9	11.9	4.10	40.5	460 (b)
12	80 (x)	10.750	9.750	0.500	2.81	2.55	90.8	74.7	16.1	3.88	54.7	600 (b)
	XX	10.750	10.192	0.279	2.81	2.67	90.8	81.6	9.18	4.24	31.2	285 (b)
12 1/2	40 (s)	10.750	10.136	0.307	2.81	2.65	90.8	80.7	10.1	4.19	34.2	324 (b)
	80 (x)	10.750	10.020	0.365	2.81	2.62	90.8	78.9	11.9	4.10	40.5	460 (b)
13	XX	10.750	9.750	0.500	2.81	2.55	90.8	74.7	16.1	3.88	54.7	600 (b)
	40 (s)	12.750	12.090	0.330	3.34	3.17	128	115	12.9	5.96	43.8	299 (b)
14	80 (x)	12.750	12.000	0.375	3.34	3.14	128	113	14.6	5.88	49.6	352 (b)
	XX	12.750	11.750	0.500	3.34	3.08	128	108	19.2	5.63	65.4	503 (b)
15	40 (s)	14.000	13.250	0.375	3.67	3.46	154	138	16.0	7.17	54.6	458 (c)
	80 (x)	14.000	13.000	0.500	3.67	3.15	154	133	21.2	6.70	72.1	653 (c)
16	40 (s)	16.000	15.250	0.375	4.18	3.99	201	183	18.4	9.48	62.4	400 (c)
	80 (x)	16.000	15.000	0.500	4.18	3.93	201	177	24.3	9.18	82.8	570 (c)
18	(s)	18.000	17.250	0.375	4.71	4.52	254	234	20.7	12.1	70.6	355 (c)
	(x)	18.000	17.000	0.500	4.71	4.45	254	227	27.4	11.8	93.5	506 (c)

TABLE 1. DIMENSIONS AND PROPERTIES OF STEEL PIPE (Concluded)

NOM- INAL SIZE	ASTM ¹ SCHED- ULE	DIAMETER		WALL THICK- NESS IN.	SURFACE AREA SQ FT/LIN FT		SECTION AREA Sq IN.		AREA OF METAL Sq In	VOL- UME GAL/ LIN FT	WEIGHT ² (PLAIN END) LBS/LIN FT	WORKING PRESS- URE ⁴ PSIA
		O. D. IN.	I. D. IN.		O. D.	I. D.	O. D.	I. D.				
20	20 (s)	20.000	19.250	0.375	5.23	4.51	314	291	23.2	15.2	78.6	319 (c)
	30 (s)	20.000	19.000	0.500	5.23	4.97	314	284	30.6	14.7	104.2	454 (c)
24	20 (s)	24.000	23.250	0.375	6.29	5.08	452	426	26.8	22.1	94.6	265 (c)
	(s)	24.000	23.000	0.500	6.29	6.03	452	415	36.9	21.5	125.5	378 (c)

* 3/4 Double extra strong is no longer considered in ASTM specification but some pipe of this size is still manufactured.

¹ The sizes for wrought iron are approximately the same except wall thickness is slightly heavier. See ASTM A-72.

² American Society for Testing Materials Schedule. The numbers 30, 40, etc., refer to the ASTM Schedule; the letter (s) refers to the former designation *Standard Weight*; the letter (x) refers to the former designation *Extra Strong*; the letters XX refer to the former designation *Double Extra Strong*.

³ Weight per foot is based on plain end pipe. Threaded and coupled (T and C) pipe is slightly heavier.

⁴ Working pressure for welded joints—see formula in Table 3.

(a) Working pressure based on an allowable fiber stress of 6225 psi (for 250 F).

(b) Working pressure based on an allowable fiber stress of 8400 psi (for 250 F).

(c) Working pressure based on an allowable fiber stress of 12000 psi (for 250 F).

Note: Standard-weight pipe is generally furnished with threaded ends in random lengths of 16 to 22 ft., although when ordered with plain ends, 5 percent may be in lengths of 12 to 16 ft. Five percent of the total number of lengths ordered may be jointers which are two pieces coupled together. Extra-strong pipe is generally furnished with plain ends in random lengths of 12 to 22 ft., although 5 percent may be in lengths of 6 to 12 ft.

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. Both iron and steel pipe are available in the alloy class. In the case of iron pipe when copper and molybdenum are added, the material is known as alloy wrought-iron.

By common custom steel is considered to be an alloy when the maximum range of alloying elements exceed certain limits such as 1.65 percent manganese, 0.60 silicon, or 0.60 copper. Also, a steel is an alloy if any of the following elements are specified in minimal quantities or within limits: Al, B, Cr (up to 3.99), Co, Cb, Mo, Ni, Ti, W, V, Zr, or any other element added to obtain a certain alloying effect. Small quantities of certain elements are present in alloy steels and are considered as incidental and may be present to the following maximum amounts: copper—0.35 percent, nickel—0.25 percent, chromium—0.20 percent, and molybdenum—0.06 percent.

Commercially, steel is considered stainless when chromium exceeds 3.99 percent regardless of the inclusion of other alloying elements. With *tubing*, however, an alloy becomes stainless when it contains a minimum of 10.5 percent chromium.

The alloy and stainless steels are used for high temperature piping and for highly corrosive fluids and gases.

Copper Pipe and Fittings. Owing to inherent resistance to corrosion,