

EQUIVALENTS & CONVERSION FACTORS

A MULTIPLY	B BY	C TO OBTAIN	A MULTIPLY	B BY	C TO OBTAIN
Atmospheres	14.697	Pounds per sq. in.	Inches of mercury	1.133	Feet of water
Atmospheres	1.033	Kilograms per sq. cm	Inches of mercury	0.4912	Pounds per sq. in.
Atmospheres	29.92	Inches of mercury	Inches of mercury	0.0345	Kilograms per sq. cm
Atmospheres	760	Millimeters of mercury	Inches of water	0.03613	Pounds per sq. in.
Atmospheres	407	Inches of water	Inches of water	0.07355	Inches of mercury
Atmospheres	33.90	Feet of water	Kilograms	2.205	Pounds
Barrels (petroleum)	42	Gallons	Kilograms	0.001102	Short tons (2000 lbs.)
Barrels per day	0.0292	Gallons per minute	Kilograms per minute	132.3	Pounds per hour
Bars-G	14.5	Pounds per sq. in.	Kilograms per sq. cm	14.22	Pounds per sq. in.
Centimeters	0.3937	Inches	Kilograms per sq. cm	0.9678	Atmospheres
Centimeters	0.03281	Feet	Kilograms per sq. cm	28.96	Inches of mercury
Centimeters	0.01	Meters	Kilopascals	0.145	Pounds per sq. in.
Centimeters	0.01094	Yards	Liters	1000	Cubic centimeters
Cubic centimeters	0.06102	Cubic inches	Liters	0.2642	Gallons
Cubic feet	7.48055	Gallons	Liters per hour	0.0044	Gallons per minute
Cubic feet	0.17812	Barrels	Meters	3.281	Feet
Cubic feet per second	448.833	Gallons per minute	Meters	1.0936	Yards
Cubic inches	16.39	Cubic centimeters	Meters	100	Centimeters
Cubic inches	0.004329	Gallons	Meters	39.37	Inches
Cubic meters	264.17	Gallons	Megapascals	145.0	Pounds per sq. in.
Cubic meters per hour	4.40	Gallons per minute	Pounds	0.0005	Short tons (2000 lbs.)
Feet	0.3048	Meters	Pounds	0.4536	Kilograms
Feet	0.3333	Yards	Pounds	0.000454	Metric Tons
Feet	30.48	Centimeters	Pounds	16	Ounces
Feet of water	0.882	Inches of mercury	Pounds per hour	6.32/M.W.	Cubic feet per minute
Feet of water	0.433	Pounds per sq. in.	Pounds per hour liquid	0.002/Sp. Gr.	Gallons per minute liquid (at 70°F)
Gallons (U.S.)	3785	Cubic centimeters	Pounds per sq. in.	27.684	Inches of water
Gallons (U.S.)	0.13368	Cubic feet	Pounds per sq. in.	2.307	Feet of water
Gallons (U.S.)	231	Cubic inches	Pounds per sq. in.	2.036	Inches of mercury
Gallons (Imperial)	277.4	Cubic inches	Pounds per sq. in.	0.0703	Kilograms per sq. cm
Gallons (U.S.)	0.833	Gallons (Imperial)	Pounds per sq. in.	51.71	Millimeters of mercury
Gallons (U.S.)	3.785	Liters	Pounds per sq. in.	0.7037	Meters of water
Gallons of water	8.328	Pounds (at 70°F)	Specific Gravity (of gas or vapors)	28.97	Molecular Wt. (of gas or vapors)
Gallons of liquid per minute	500 x Sp. Gr.	Pounds per hr liquid (at 70°F)	Square centimeters	0.1550	Square inches
Gallons per minute	0.002228	Cubic feet per second	Square inches	6.452	Square centimeters
Horsepower (boiler)	34.5	Pounds water per hr. evaporation	Tons (short ton 2000 lbs.)	907.2	Kilograms
Horsepower (boiler)	33479	Btu per hour	Tons (short ton 2000 lbs.)	0.9072	Metric Tons
Inches	2.54	Centimeters	Tons (metric) per day	91.8	Pounds per hour
Inches	0.0833	Feet	Water (cubic feet)	62.3	Pounds (at 70°F)
Inches	0.0254	Meters	Yards	0.9144	Meters
Inches	0.02778	Yards	Yards	91.44	Centimeters

This table may be used in two ways:

- (1) Multiply the unit under column A by the figure under column B; the result is the unit under column C.
- (2) Divide the unit under column C by the figure under column B; the result is the unit under column A.

Properties of Saturated Steam

Pressure	Temp. (°F)	Heat (BTU/lb)			Volume (ft ³ /lb)	
		Sensible	Latent	Total	Condensate	Steam
In Hg vac						
25	133	101	1018	1119	0.01626	143.3
20	161	129	1002	1131	0.01640	75.41
15	179	147	991	1138	0.01650	51.41
10	192	160	983	1143	0.01659	39.22
5	203	171	976	1147	0.01666	31.82
(PSIG)						
0	212	180	970	1151	0.01672	26.80
1	215	184	968	1152	0.01674	25.21
2	219	187	966	1153	0.01676	23.79
3	222	190	964	1154	0.01679	22.53
4	224	193	962	1155	0.01681	21.40
5	227	195	961	1156	0.01683	20.38
6	230	198	959	1157	0.01685	19.46
7	232	201	957	1158	0.01687	18.62
8	235	203	956	1159	0.01689	17.85
9	237	206	954	1160	0.01690	17.14
10	239	208	953	1160	0.01692	16.49
12	244	212	950	1162	0.01696	15.33
14	248	216	947	1163	0.01699	14.33
16	252	220	944	1165	0.01702	13.45
18	255	224	942	1166	0.01705	12.68
20	259	228	940	1167	0.01708	11.99
22	262	231	937	1168	0.01711	11.38
24	265	234	935	1169	0.01713	10.83
25	267	236	934	1170	0.01715	10.57
26	268	237	933	1170	0.01716	10.33
28	271	240	931	1171	0.01719	9.874
30	274	243	929	1172	0.01721	9.459
32	277	246	927	1173	0.01723	9.078
34	279	249	925	1174	0.01726	8.728
35	281	250	924	1174	0.01727	8.563
36	282	251	923	1174	0.01728	8.404
38	284	254	922	1175	0.01730	8.104
40	287	256	920	1176	0.01733	7.826
42	289	258	918	1177	0.01735	7.566
44	291	261	916	1177	0.01737	7.323
45	292	262	916	1178	0.01738	7.208
46	294	263	915	1178	0.01739	7.096
48	296	265	913	1178	0.01741	6.883
50	298	267	912	1179	0.01743	6.683
55	303	272	908	1180	0.01748	6.230
60	307	277	905	1182	0.01753	5.837
65	312	282	901	1183	0.01757	5.491
70	316	286	898	1184	0.01761	5.184
75	320	291	895	1185	0.01766	4.911
80	324	295	892	1186	0.01770	4.665
85	328	298	889	1187	0.01774	4.444
90	331	302	886	1188	0.01778	4.242
95	335	306	883	1189	0.01782	4.059
100	338	309	881	1190	0.01785	3.891
105	341	312	878	1190	0.01789	3.736
110	344	316	876	1191	0.01792	3.594
115	347	319	873	1192	0.01796	3.462
120	350	322	871	1192	0.01799	3.340
125	353	325	868	1193	0.01803	3.226
130	356	328	866	1194	0.01806	3.119
135	358	331	864	1194	0.01809	3.020
140	361	333	861	1195	0.01812	2.927
145	363	336	859	1195	0.01815	2.839

(continued)

Pressure (PSIG)	Temp. (°F)	Heat (BTU/lb)			Volume (ft ³ /lb)	
		Sensible	Latent	Total	Condensate	Steam
150	366	339	857	1196	0.01818	2.756
155	368	341	855	1196	0.01821	2.678
160	371	344	853	1196	0.01824	2.605
165	373	346	851	1197	0.01827	2.535
170	375	349	849	1197	0.01830	2.469
175	377	351	847	1198	0.01833	2.407
180	380	353	845	1198	0.01835	2.347
185	382	355	843	1198	0.01839	2.291
190	384	358	841	1199	0.01841	2.237
195	386	360	839	1199	0.01844	2.185
200	388	362	837	1199	0.01847	2.136
205	390	364	836	1200	0.01850	2.089
210	392	366	834	1200	0.01852	2.044
215	394	368	832	1200	0.01855	2.001
220	395	370	830	1200	0.01857	1.960
225	397	372	829	1201	0.01860	1.920
230	399	374	827	1201	0.01863	1.882
235	401	376	825	1201	0.01865	1.845
240	403	378	823	1201	0.01868	1.810
245	404	380	822	1202	0.01870	1.776
250	406	382	820	1202	0.01873	1.744
255	408	384	818	1202	0.01875	1.712
260	409	385	817	1202	0.01878	1.682
265	411	387	815	1202	0.01880	1.652
270	413	389	814	1203	0.01882	1.624
275	414	391	812	1203	0.01885	1.596
280	416	392	811	1203	0.01887	1.570
285	417	394	809	1203	0.01889	1.544
290	419	396	808	1203	0.01891	1.520
295	420	397	806	1203	0.01894	1.497
300	422	399	805	1203	0.01896	1.473
310	425	402	802	1204	0.01901	1.428
320	428	405	799	1204	0.01906	1.386
330	430	408	796	1204	0.01910	1.346
340	433	411	793	1204	0.01915	1.309
350	436	414	790	1204	0.01919	1.273
360	438	417	787	1204	0.01923	1.240
370	441	420	785	1204	0.01927	1.207
380	443	423	782	1205	0.01932	1.177
390	446	426	779	1205	0.01936	1.148
400	448	428	777	1205	0.01940	1.120
450	460	441	764	1205	0.01961	0.9992
500	470	453	752	1205	0.01980	0.9010
550	480	464	740	1204	0.02000	0.8195
600	489	475	729	1203	0.02019	0.7509
650	497	485	718	1203	0.02038	0.6922
700	505	494	707	1202	0.02056	0.6415
750	513	504	697	1200	0.02074	0.5971
800	520	512	687	1199	0.02092	0.5580
900	534	529	667	1196	0.02128	0.4922
1000	546	545	648	1192	0.02164	0.4390
1250	574	581	601	1182	0.02256	0.3410
1500	598	614	556	1169	0.02352	0.2740
1750	618	644	510	1155	0.02456	0.2248
2000	637	674	463	1137	0.02572	0.1864
2250	654	703	413	1116	0.02707	0.1554
2500	669	734	358	1092	0.02871	0.1293
2750	683	766	295	1061	0.03097	0.1062
3000	696	805	211	1016	0.03465	0.0835

STEAM PROPERTIES & FLOW CHARACTERISTICS



STEAM CAPACITY TABLES

This chart provides a simple method for sizing steam pipes with velocities in the range of 7,000 to 10,000 ft/min.
 (Example: a 1" pipe with 100 PSIG steam pressure has a flow rate of 672 lbs/hr at a velocity of 7250 ft/min.)

STEAM CAPACITY – Flow in lbs/hr																		
Pressure (PSIG)	Temp. (°F) (sat.)	FULL-PORT VALVE or PIPE SIZE																
		1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
		VELOCITY (FPM)																
		7062	7094	7125	7187	7250	7312	7375	7500	7625	7750	7875	8000	8250	8500	9000	9500	10000
250	406	176	324	518	916	1498	2615	3591	6018	8731	13700	18620	24360	39470	58730	107700	179200	267700
200	388	143	264	423	748	1223	2135	2932	4913	7128	11190	15200	19880	32230	47950	87910	146300	218500
175	378	127	235	375	664	1086	1895	2603	4361	6328	9931	13490	17650	28610	42560	78040	129800	194000
150	366	111	205	328	580	948	1655	2273	3810	5528	8675	11790	15420	24990	37180	68170	113400	169500
125	353	95	175	280	496	811	1415	1943	3256	4724	7414	10070	13180	21360	31780	58260	96940	144800
100	338	79	145	232	411	672	1173	1612	2701	3919	6150	8356	10930	17720	26360	48330	80410	120100
90	331	72	133	213	377	617	1076	1478	2477	3594	5641	7665	10030	16250	24180	44330	73760	110200
80	324	66	121	194	343	561	979	1345	2254	3270	5132	6973	9122	14780	22000	40330	67100	100300
70	316	59	109	175	309	505	881	1211	2029	2943	4619	6277	8211	13310	19800	36300	60400	90240
60	308	53	97	155	274	449	783	1076	1803	2616	4105	5577	7296	11820	17590	32260	53670	80190
50	298	46	85	136	240	392	684	940	1575	2286	3587	4874	6376	10330	15380	28190	46900	70080
40	287	39	72	116	205	335	585	803	1346	1953	3066	4166	5449	8831	13140	24090	40080	59890
30	274	33	60	96	170	278	485	666	1115	1618	2539	3451	4514	7315	10880	19960	33200	49610
25	267	29	54	86	152	249	434	596	999	1449	2274	3090	4042	6551	9747	17870	29730	44430
20	259	26	47	76	134	219	383	526	881	1279	2006	2726	3566	5780	8600	15770	26230	39200
15	250	22	41	66	116	190	331	455	763	1107	1737	2360	3087	5003	7444	13650	22710	33930
10	240	19	35	55	98	160	279	384	643	933	1464	1990	2603	4218	6276	11510	19150	28610
5	228	15	28	45	79	130	227	311	522	757	1188	1615	2112	3423	5093	9339	15540	23220
0	212	11	21	34	60	97	170	233	391	568	891	1210	1583	2566	3818	7000	11650	17400

This table represents steam loss thru an orifice on a failed open steam trap, assuming that 25% of the flow consists of condensate.

STEAM FLOW – thru various orifice diameters discharging to atmosphere (0 PSIG) in lbs/hr													
Orifice Diameter (Inches)	Inlet Pressure (PSIG)												
	2	5	10	15	25	50	75	100	125	150	200	250	300
1/32	0.31	0.47	0.58	0.70	0.94	1.53	2.12	2.70	3.30	3.90	5.10	6.30	7.40
1/16	1.25	1.86	2.30	2.80	3.80	6.10	8.50	10.80	13.20	15.60	20.30	25.10	29.80
3/32	2.81	4.20	5.30	6.30	8.45	13.80	19.10	24.40	29.70	35.10	45.70	56.40	67.00
1/8	4.50	7.50	7.40	11.20	15.00	24.50	34.00	43.40	52.90	62.40	81.30	100.00	119.00
5/32	7.80	11.70	14.60	17.60	23.50	38.30	53.10	67.90	82.70	97.40	127.00	156.00	186.00
3/16	11.20	16.70	21.00	25.30	33.80	55.10	76.40	97.70	119.00	140.00	183.00	226.00	268.00
7/32	15.30	22.90	28.70	34.40	46.00	75.00	104.00	133.00	162.00	191.00	249.00	307.00	365.00
1/4	20.00	29.80	37.40	45.00	60.10	98.00	136.00	173.00	212.00	250.00	325.00	401.00	477.00
9/32	25.20	37.80	47.40	56.90	76.10	124.00	172.00	220.00	268.00	316.00	412.00	507.00	603.00
5/16	31.20	46.60	58.50	70.30	94.00	153.00	212.00	272.00	331.00	390.00	508.00	627.00	745.00
11/32	37.70	56.40	70.70	85.10	114.00	185.00	257.00	329.00	400.00	472.00	615.00	758.00	901.00
3/8	44.90	67.10	84.20	101.00	135.00	221.00	306.00	391.00	478.00	561.00	732.00	902.00	1073.00
13/32	52.70	78.80	98.80	119.00	159.00	259.00	359.00	459.00	559.00	659.00	859.00	1059.00	1259.00
7/16	61.10	91.40	115.00	138.00	184.00	300.00	416.00	532.00	648.00	764.00	996.00	1228.00	1460.00
15/32	70.20	105.00	131.00	158.00	211.00	344.00	478.00	611.00	744.00	877.00	1144.00	1410.00	1676.00
1/2	79.80	119.00	150.00	180.00	241.00	392.00	544.00	695.00	847.00	998.00	1301.00	1604.00	1907.00

FLUID FLOW IN PIPING

Flow of Water thru Schedule 40 Steel Pipe

Pressure Drop per 1,000 Feet of Schedule 40 Steel Pipe

Flow Rate (GPM)	Velocity (ft/s)	Pressure Drop (PSI)	Velocity (ft/s)	Pressure Drop (PSI)	Velocity (ft/s)	Pressure Drop (PSI)	Velocity (ft/s)	Pressure Drop (PSI)	Velocity (ft/s)	Pressure Drop (PSI)	Velocity (ft/s)	Pressure Drop (PSI)	Velocity (ft/s)	Pressure Drop (PSI)	Velocity (ft/s)	Pressure Drop (PSI)	Velocity (ft/s)	Pressure Drop (PSI)
1"																		
1	0.37	0.49	1 1/4"															
2	0.74	1.70	0.43	0.45	1 1/2"													
3	1.12	3.53	0.64	0.94	0.47	0.44												
4	1.49	5.94	0.86	1.55	0.63	0.74												
5	1.86	9.02	1.07	2.36	0.79	1.12	2"											
6	2.24	12.25	1.28	3.30	0.95	1.53	0.57	0.46										
8	2.98	21.1	1.72	5.52	1.26	2.63	0.76	0.75	2 1/2"									
10	3.72	30.8	2.14	8.34	1.57	3.86	0.96	1.14	0.67	0.48								
15	5.60	64.6	3.21	17.6	2.36	8.13	1.43	2.33	1.00	0.99	3"							
20	7.44	110.5	4.29	29.1	3.15	13.5	1.91	3.86	1.34	1.64	0.87	0.59	3 1/2"					
25			5.36	43.7	3.94	20.2	2.39	5.81	1.68	2.48	1.08	0.67	0.81	0.42				
30			6.43	62.9	4.72	29.1	2.87	8.04	2.01	3.43	1.30	1.21	0.97	0.60	4"			
35			7.51	82.5	5.51	38.2	3.35	10.95	2.35	4.49	1.52	1.58	1.14	0.79	0.88	0.42		
40					6.30	47.8	3.82	13.7	2.68	5.88	1.74	2.06	1.30	1.00	1.01	0.53		
45					7.08	60.6	4.30	17.4	3.00	7.14	1.95	2.51	1.46	1.21	1.13	0.67		
50					7.87	74.7	4.78	20.6	3.35	8.82	2.17	3.10	1.62	1.44	1.26	0.80		
60							5.74	29.6	4.02	12.2	2.60	4.29	1.95	2.07	1.51	1.10	5"	
70							6.69	38.6	4.69	15.3	3.04	5.84	2.27	2.71	1.76	1.50	1.12	0.48
80							7.65	50.3	5.37	21.7	3.48	7.62	2.59	3.53	2.01	1.87	1.28	0.63
90	6"						8.60	63.6	6.04	26.1	3.91	9.22	2.92	4.46	2.26	2.37	1.44	0.80
100	1.11	0.39					9.56	75.1	6.71	32.3	4.34	11.4	3.24	5.27	2.52	2.81	1.60	0.95
125	1.39	0.56							8.38	48.2	5.42	17.1	4.05	7.86	3.15	4.38	2.00	1.48
150	1.67	0.78							10.06	60.4	6.51	23.5	4.86	11.3	3.78	6.02	2.41	2.04
175	1.94	1.06							11.73	90.0	7.59	32.0	5.67	14.7	4.41	8.20	2.81	2.78
200	2.22	1.32	8"								8.68	39.7	6.48	19.2	5.04	10.2	3.21	3.46
225	2.50	1.66	1.44	0.44							9.77	50.2	7.29	23.1	5.67	12.9	3.61	4.37
250	2.78	2.05	1.60	0.55							10.85	61.9	8.10	28.5	6.30	15.9	4.01	5.14
275	3.06	2.36	1.76	0.63							11.94	75.0	8.91	34.4	6.93	18.3	4.41	6.22
300	3.33	2.80	1.92	0.75							13.02	84.7	9.72	40.9	7.56	21.8	4.81	7.41
325	3.61	3.29	2.08	0.88									10.53	45.5	8.18	25.5	5.21	8.25
350	3.89	3.62	2.24	0.97									11.35	52.7	8.82	29.7	5.61	9.57
375	4.16	4.16	2.40	1.11									12.17	60.7	9.45	32.3	6.01	11.0
400	4.44	4.72	2.56	1.27									12.97	68.9	10.08	36.7	6.41	12.5
425	4.72	5.34	2.72	1.43									13.78	77.8	10.70	41.5	6.82	14.1
450	5.00	5.96	2.88	1.60	10"								14.59	87.3	11.33	46.5	7.22	15.0
475	5.27	6.66	3.04	1.69	1.93	0.30									11.96	51.7	7.62	16.7
500	5.55	7.39	3.20	1.87	2.04	0.63									12.59	57.3	8.02	18.5
550	6.11	8.94	3.53	2.26	2.24	0.70									13.84	69.3	8.82	22.4
600	6.66	10.6	3.85	2.70	2.44	0.86									15.10	82.5	9.62	26.7
650	7.21	11.8	4.17	3.16	2.65	1.01	12"										10.42	31.3
700	7.77	13.7	4.49	3.69	2.85	1.18	2.01	0.48									11.22	36.3
750	8.32	15.7	4.81	4.21	3.05	1.35	2.15	0.55									12.02	41.6
800	8.88	17.8	5.13	4.79	3.26	1.54	2.29	0.62	14"								12.82	44.7
850	9.44	20.2	5.45	5.11	3.46	1.74	2.44	0.70	2.02	0.43							13.62	50.5
900	10.00	22.6	5.77	5.73	3.66	1.94	2.58	0.79	2.14	0.48							14.42	56.6
950	10.55	23.7	6.09	6.38	3.87	2.23	2.72	0.88	2.25	0.53							15.22	63.1
1,000	11.10	26.3	6.41	7.08	4.07	2.40	2.87	0.98	2.38	0.59							16.02	70.0
1,100	12.22	31.8	7.05	8.56	4.48	2.74	3.16	1.18	2.61	0.68	16"						17.63	84.6
1,200	13.32	37.8	7.69	10.2	4.88	3.27	3.45	1.40	2.85	0.81	2.18	0.40						
1,300	14.43	44.4	8.33	11.3	5.29	3.86	3.73	1.56	3.09	0.95	2.36	0.47						
1,400	15.54	51.5	8.97	13.0	5.70	4.44	4.02	1.80	3.32	1.10	2.54	0.54						
1,500	16.65	55.5	9.62	15.0	6.10	5.11	4.30	2.07	3.55	1.19	2.73	0.62						
1,600	17.76	63.1	10.26	17.0	6.51	5.46	4.59	2.36	3.80	1.35	2.91	0.71	18"					
1,800	19.98	79.8	11.54	21.6	7.32	6.91	5.16	2.98	4.27	1.71	3.27	0.85	2.58	0.48				
2,000	22.20	98.5	12.83	25.0	8.13	8.54	5.73	3.47	4.74	2.11	3.63	1.05	2.88	0.56				
2,500			16.03	39.0	10.18	12.5	7.17	5.41	5.92	3.09	4.54	1.63	3.59	0.88	20"			
3,000			19.24	52.4	12.21	18.0	8.60	7.31	7.12	4.45	5.45	2.21	4.31	1.27	3.45	0.73		
3,500			22.43	71.4	14.25	22.9	10.03	9.95	8.32	6.18	6.35	3.00	5.03	1.52	4.03	0.94	24"	
4,000			25.65	93.3	16.28	29.9	11.48	13.0	9.49	7.92	7.25	3.92	5.74	2.12	4.61	1.22	3.19	0.51
4,500					18.31	37.8	12.90	15.4	10.67	9.36	8.17	4.97	6.47	2.50	5.19	1.55	3.59	0.60
5,000					20.35	46.7	14.34	18.9	11.84	11.6	9.08	5.72	7.17	3.08	5.76	1.78	3.99	0.74
6,000					24.42	67.2	17.21	27.3	14.32	15.4	10.88	8.24	8.62	4.45	6.92	2.57	4.80	1.00
7,000					28.50	85.1	20.08	37.2	16.60	21.0	12.69	12.2	10.04	6.06	8.06	3.50	5.68	1.36
8,000							22.95	45.1	18.98	27.4	14.52	13.6	11.48	7.34	9.23	4.57	6.38	1.78
9,000							25.80	57.0	21.35	34.7	16.32	17.2	12.92	9.20	10.37	5.36	7.19	2.25
10,000							28.63	70.4	23.75	42.9	18.16	21.2	14.37	11.5	11.53	6.63	7.96	2.78
12,000							34.38	93.6	28.50	61.8	21.80	30.9	17.23	16.5	13.83	9.54	9.57	3.71
14,000									33.20	84.0	25.42	41.6	20.10	20.7	16.14	12.0	11.18	5.05
16,000											29.05	54.4	22.96	27.1	18.43	15.7	12.77	6.60

FLANGE STANDARDS – Dimensional Data in inches

125 lb. CAST IRON		ANSI STANDARD B16.1													
PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	–	–	4 1/4	4 5/8	5	6	7	7 1/2	8 1/2	9	10	11	13 1/2	16	19
Thickness of Flange (min) ^a	–	–	7/16	1/2	9/16	5/8	11/16	3/4	13/16	15/16	15/16	1	1 1/8	1 3/16	1 1/4
Diameter of Bolt Circle	–	–	3 1/8	3 1/2	3 7/8	4 3/4	5 1/2	6	7	7 1/2	8 1/2	9 1/2	11 3/4	14 1/4	17
Number of Bolts	–	–	4	4	4	4	4	4	8	8	8	8	8	12	12
Diameter of Bolts	–	–	1/2	1/2	1/2	5/8	5/8	5/8	5/8	5/8	3/4	3/4	3/4	7/8	7/8

^a 125 lb. Cast Iron Flanges have plain faces (i.e. not raised faces).

250 lb. CAST IRON		ANSI STANDARD B16.1													
PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	–	–	4 7/8	5 1/4	6 1/8	6 1/2	7 1/2	8 1/4	9	10	11	12 1/2	15	17 1/2	20 1/2
Thickness of Flange (min) ^b	–	–	11/16	3/4	13/16	7/8	1	1 1/8	1 3/16	1 1/4	1 3/8	1 7/16	1 5/8	1 7/8	2
Diameter of Raised Face	–	–	2 11/16	3 1/16	3 9/16	4 3/16	4 15/16	5 1/16	6 5/16	6 15/16	8 5/16	9 11/16	11 15/16	14 1/16	16 7/16
Diameter of Bolt Circle	–	–	3 1/2	3 7/8	4 1/2	5	5 7/8	6 5/8	7 1/4	7 7/8	9 1/4	10 5/8	13	15 1/4	17 3/4
Number of Bolts	–	–	4	4	4	8	8	8	8	8	8	12	12	16	16
Diameter of Bolts	–	–	5/8	5/8	3/4	5/8	3/4	3/4	3/4	3/4	3/4	3/4	7/8	1	1 1/8

^b 250 lb. Cast Iron Flanges have a 1/16" raised face which is included in the flange thickness dimensions.

150 lb. BRONZE		ANSI STANDARD B16.24													
PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	3 1/2	3 7/8	4 1/4	4 5/8	5	6	7	7 1/2	8 1/2	9	10	11	13 1/2	16	19
Thickness of Flange (min) ^c	5/16	11/32	3/8	13/32	7/16	1/2	9/16	5/8	11/16	11/16	3/4	13/16	15/16	1	1 1/16
Diameter of Bolt Circle	2 3/8	2 3/4	3 1/8	3 1/2	3 7/8	4 3/4	5 1/2	6	7	7 1/2	8 1/2	9 1/2	11 3/4	14 1/4	17
Number of Bolts	4	4	4	4	4	4	4	4	8	8	8	8	8	12	12
Diameter of Bolts	1/2	1/2	1/2	1/2	1/2	5/8	5/8	5/8	5/8	5/8	3/4	3/4	3/4	7/8	7/8

^c 150 lb. Bronze Flanges have plain faces (i.e. not raised faces) with two concentric gasket-retaining grooves between the port and the bolt holes.

300 lb. BRONZE		ANSI STANDARD B16.24													
PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	3 3/4	4 5/8	4 7/8	5 1/4	6 1/2	6 1/2	7 1/2	8 1/4	9	10	11	12 1/2	15	–	–
Thickness of Flange (min) ^d	1/2	17/32	19/32	5/8	11/16	3/4	13/16	29/32	31/32	11/16	1 1/8	1 3/16	1 3/8	–	–
Diameter of Bolt Circle	2 5/8	3 1/4	3 1/2	3 7/8	4 1/2	5	5 7/8	6 5/8	7 1/4	7 7/8	9 1/4	10 5/8	13	–	–
Number of Bolts	4	4	4	4	4	8	8	8	8	8	8	12	12	–	–
Diameter of Bolts	1/2	5/8	5/8	5/8	3/4	5/8	3/4	3/4	3/4	3/4	3/4	3/4	7/8	–	–

^d 300 lb. Bronze Flanges have plain faces (i.e. not raised faces) with two concentric gasket-retaining grooves between the port and the bolt holes.

PIPE, FITTING & FLANGE SPECIFICATIONS

FLANGE STANDARDS – Dimensional Data in inches (continued)

150 lb. STEEL	ANSI STANDARD B16.5														
PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	–	–	4	4 ⁵ / ₈	5	6	7	7 ¹ / ₂	8 ¹ / ₂	9	10	11	13 ¹ / ₂	16	19
Thickness of Flange (min) ^e	–	–	7 ¹ / ₁₆	1 ¹ / ₂	9 ¹ / ₁₆	5 ⁵ / ₈	11 ¹ / ₁₆	3 ³ / ₄	13 ³ / ₁₆	15 ¹ / ₁₆	15 ¹ / ₁₆	1	1 ¹ / ₈	1 ³ / ₁₆	1 ¹ / ₄
Diameter of Raised Face	–	–	2	2 ¹ / ₂	2 ⁷ / ₈	3 ⁵ / ₈	4 ¹ / ₈	5	5 ¹ / ₂	6 ³ / ₁₆	7 ⁵ / ₁₆	8 ¹ / ₂	10 ⁵ / ₈	12 ³ / ₄	15
Diameter of Bolt Circle	–	–	3 ¹ / ₈	3 ¹ / ₂	3 ⁷ / ₈	4 ³ / ₄	5 ¹ / ₂	6	7	7 ¹ / ₂	8 ¹ / ₂	9 ¹ / ₂	11 ³ / ₄	14 ¹ / ₄	17
Number of Bolts	–	–	4	4	4	4	4	4	8	8	8	8	8	12	12
Diameter of Bolts	–	–	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₂	5 ⁵ / ₈	5 ⁵ / ₈	5 ⁵ / ₈	5 ⁵ / ₈	5 ⁵ / ₈	3 ³ / ₄	3 ³ / ₄	3 ³ / ₄	7 ⁷ / ₈	7 ⁷ / ₈

^e 150 lb. Steel Flanges have a 1/16" raised face which is included in the flange thickness dimensions.

300 lb. STEEL	ANSI STANDARD B16.5														
PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	–	–	4 ⁷ / ₈	5 ¹ / ₄	6 ¹ / ₈	6 ¹ / ₂	7 ¹ / ₂	8 ¹ / ₄	9	10	11	12 ¹ / ₂	15	17 ¹ / ₂	20 ¹ / ₂
Thickness of Flange (min) ^f	–	–	1 ¹ / ₁₆	3 ³ / ₄	13 ¹ / ₁₆	7 ⁷ / ₈	1	1 ¹ / ₈	13 ¹ / ₁₆	1 ¹ / ₄	13 ³ / ₈	17 ¹ / ₁₆	15 ⁵ / ₈	17 ⁷ / ₈	2
Diameter of Raised Face	–	–	2	2 ¹ / ₂	2 ⁷ / ₈	3 ⁵ / ₈	4 ¹ / ₈	5	5 ¹ / ₂	6 ³ / ₁₆	7 ⁵ / ₁₆	8 ¹ / ₂	10 ⁵ / ₈	12 ³ / ₄	15
Diameter of Bolt Circle	–	–	3 ¹ / ₂	3 ⁷ / ₈	4 ¹ / ₂	5	5 ⁷ / ₈	6 ⁵ / ₈	7 ¹ / ₄	7 ⁷ / ₈	9 ¹ / ₄	10 ⁵ / ₈	13	15 ¹ / ₄	17 ³ / ₄
Number of Bolts	–	–	4	4	4	8	8	8	8	8	8	12	12	16	16
Diameter of Bolts	–	–	5 ⁵ / ₈	3 ³ / ₄	5 ⁵ / ₈	3 ³ / ₄	3 ³ / ₄	3 ³ / ₄	3 ³ / ₄	3 ³ / ₄	3 ³ / ₄	3 ³ / ₄	7 ⁷ / ₈	1	1 ¹ / ₈

^f 300 lb. Steel Flanges have a 1/16" raised face which is included in the flange thickness dimensions.

400 lb. STEEL	ANSI STANDARD B16.5														
PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	3 ³ / ₄	4 ⁵ / ₈	4 ⁷ / ₈	5 ¹ / ₄	6 ¹ / ₈	6 ¹ / ₂	7 ¹ / ₂	8 ¹ / ₄	9	10	11	12 ¹ / ₂	15	17 ¹ / ₂	20 ¹ / ₂
Thickness of Flange (min) ^g	9 ⁹ / ₁₆	5 ⁵ / ₈	1 ¹ / ₁₆	13 ¹ / ₁₆	7 ⁷ / ₈	1	1 ¹ / ₈	1 ¹ / ₄	13 ³ / ₈	13 ³ / ₈	11 ¹ / ₂	15 ⁵ / ₈	17 ⁷ / ₈	2 ¹ / ₈	2 ¹ / ₄
Diameter of Raised Face	13 ³ / ₈	11 ¹ / ₁₆	2	2 ¹ / ₂	2 ⁷ / ₈	3 ⁵ / ₈	4 ¹ / ₈	5	5 ¹ / ₂	6 ³ / ₁₆	7 ⁵ / ₁₆	8 ¹ / ₂	10 ⁵ / ₈	12 ³ / ₄	15
Diameter of Bolt Circle	2 ⁵ / ₈	3 ¹ / ₄	3 ¹ / ₂	3 ⁷ / ₈	4 ¹ / ₂	5	5 ⁷ / ₈	6 ⁵ / ₈	7 ¹ / ₄	7 ⁷ / ₈	9 ¹ / ₄	10 ⁵ / ₈	13	15 ¹ / ₄	17 ³ / ₄
Number of Bolts	4	4	4	4	4	8	8	8	8	8	8	12	12	16	16
Diameter of Bolts	1 ¹ / ₂	5 ⁵ / ₈	5 ⁵ / ₈	5 ⁵ / ₈	3 ³ / ₄	5 ⁵ / ₈	3 ³ / ₄	3 ³ / ₄	7 ⁷ / ₈	7 ⁷ / ₈	7 ⁷ / ₈	7 ⁷ / ₈	1	1 ¹ / ₈	1 ¹ / ₄

^g 400 lb. Steel Flanges have a 1/4" raised face which is included in the flange thickness dimensions.

600 lb. STEEL	ANSI STANDARD B16.5														
PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	3 ³ / ₄	4 ⁵ / ₈	4 ⁷ / ₈	5 ¹ / ₄	6 ¹ / ₈	6 ¹ / ₂	7 ¹ / ₂	8 ¹ / ₄	9	10 ³ / ₄	13	14	16 ¹ / ₂	20	22
Thickness of Flange (min) ^h	9 ⁹ / ₁₆	5 ⁵ / ₈	1 ¹ / ₁₆	13 ¹ / ₁₆	7 ⁷ / ₈	1	1 ¹ / ₈	1 ¹ / ₄	13 ³ / ₈	1 ¹ / ₂	13 ³ / ₄	17 ⁷ / ₈	2 ³ / ₁₆	2 ¹ / ₂	2 ⁵ / ₈
Diameter of Raised Face	13 ³ / ₈	11 ¹ / ₁₆	2	2 ¹ / ₂	2 ⁷ / ₈	3 ⁵ / ₈	4 ¹ / ₈	5	5 ¹ / ₂	6 ³ / ₁₆	7 ⁵ / ₁₆	8 ¹ / ₂	10 ⁵ / ₈	12 ³ / ₄	15
Diameter of Bolt Circle	2 ⁵ / ₈	3 ¹ / ₄	3 ¹ / ₂	3 ⁷ / ₈	4 ¹ / ₂	5	5 ⁷ / ₈	6 ⁵ / ₈	7 ¹ / ₄	8 ¹ / ₂	10 ¹ / ₂	11 ¹ / ₂	13 ³ / ₄	17	19 ¹ / ₄
Number of Bolts	4	4	4	4	4	8	8	8	8	8	8	12	12	16	20
Diameter of Bolts	1 ¹ / ₂	5 ⁵ / ₈	5 ⁵ / ₈	5 ⁵ / ₈	3 ³ / ₄	5 ⁵ / ₈	3 ³ / ₄	3 ³ / ₄	7 ⁷ / ₈	7 ⁷ / ₈	1	1	1 ¹ / ₈	1 ¹ / ₄	1 ¹ / ₄

^h 600 lb. Steel Flanges have a 1/4" raised face which is included in the flange thickness dimensions.

PIPE, FITTING & FLANGE SPECIFICATIONS

PIPE DATA TABLE														
Pipe Size (in.)	Outside Diameter (in.)	Weight Class	Carbon Steel Schedule	Stainless Steel Schedule	Wall Thickness (in.)	Inside Diameter (in.)	Circum. (Ext.) (in.)	Circum. (Int.) (in.)	Flow Area (sq. in.)	Weight of Pipe (lbs./Ft.)	Weight of Water (lbs./Ft.)	Gallons of Water per Ft.	Section Modulus	Pipe Size (in.)
1/8	0.405	-	-	10S	.049	.307	1.27	.96	.074	.19	.032	.004	.00437	1/8
		STD	40	40S	.068	.269		.85	.057	.24	.025	.003	.00523	
		XS	80	80S	.095	.215		.68	.036	.31	.016	.002	.00602	
1/4	0.540	-	-	10S	.065	.410	1.70	1.29	.132	.33	.057	.007	.01032	1/4
		STD	40	40S	.088	.364		1.14	.104	.42	.045	.005	.01227	
		XS	80	80S	.119	.302		.95	.072	.54	.031	.004	.01395	
3/8	0.675	-	-	10S	.065	.545	2.12	1.71	.233	.42	.101	.012	.01736	3/8
		STD	40	40S	.091	.493		1.55	.191	.57	.083	.010	.0216	
		XS	80	80S	.126	.423		1.33	.141	.74	.061	.007	.0255	
1/2	0.840	-	-	5S	.065	.710	2.64	2.23	.396	.54	.172	.021	.0285	1/2
		-	-	10S	.083	.674		2.12	.357	.67	.155	.019	.0341	
		STD	40	40S	.109	.622		1.95	.304	.85	.132	.016	.0407	
		XS	80	80S	.147	.546		1.72	.234	1.09	.102	.012	.0478	
		-	160	-	.187	.466		1.46	.171	1.31	.074	.009	.0527	
3/4	1.050	-	-	5S	.065	.920	3.30	2.89	.665	.69	.288	.035	.0467	3/4
		-	-	10S	.083	.884		2.78	.614	.86	.266	.032	.0566	
		STD	40	40S	.113	.824		2.59	.533	1.13	.231	.028	.0706	
		XS	80	80S	.154	.742		2.33	.433	1.47	.188	.022	.0853	
		-	160	-	.219	.612		1.92	.296	1.94	.128	.015	.1004	
1	1.315	-	-	5S	.065	1.185	4.13	3.72	1.103	.87	.478	.057	.0760	1
		-	-	10S	.109	1.097		3.45	.945	1.40	.409	.049	.1151	
		STD	40	40S	.133	1.049		3.30	.864	1.68	.375	.045	.1328	
		XS	80	80S	.179	.957		3.01	.719	2.17	.312	.037	.1606	
		-	160	-	.250	.815		2.56	.522	2.84	.230	.027	.1903	
1 1/4	1.660	-	-	5S	.065	1.530	5.22	4.81	1.839	1.11	.797	.096	.1250	1 1/4
		-	-	10S	.109	1.442		4.53	1.633	1.81	.708	.085	.1934	
		STD	40	40S	.140	1.380		4.34	1.495	2.27	.649	.078	.2346	
		XS	80	80S	.191	1.278		4.02	1.283	3.00	.555	.067	.2913	
		-	160	-	.250	1.160		3.64	1.057	3.76	.458	.055	.3421	
1 1/2	1.900	-	-	5S	.065	1.770	5.97	5.56	2.461	1.28	1.066	.128	.1662	1 1/2
		-	-	10S	.109	1.682		5.28	2.222	2.09	.963	.115	.2598	
		STD	40	40S	.145	1.610		5.06	2.036	2.72	.882	.106	.3262	
		XS	80	80S	.200	1.500		4.71	1.767	3.63	.765	.092	.4118	
		-	160	-	.281	1.338		4.20	1.406	4.86	.608	.073	.5078	
2	2.375	-	-	5S	.065	2.245	7.46	7.05	3.958	1.61	1.72	.206	.2652	2
		-	-	10S	.109	2.157		6.78	3.654	2.64	1.58	.190	.4204	
		STD	40	40S	.154	2.067		6.49	3.355	3.65	1.45	.174	.5606	
		XS	80	80S	.218	1.939		6.09	2.953	5.02	1.28	.153	.7309	
		-	160	-	.344	1.687		5.30	2.241	7.46	.97	.116	.9790	
2 1/2	2.875	-	-	5S	.083	2.709	9.03	8.51	5.764	2.48	2.50	.299	.4939	2 1/2
		-	-	10S	.120	2.635		8.28	5.453	3.53	2.36	.283	.6868	
		STD	40	40S	.203	2.469		7.76	4.788	5.79	2.07	.249	1.064	
		XS	80	80S	.276	2.323		7.30	4.238	7.66	1.87	.220	1.339	
		-	160	-	.375	2.125		6.68	3.546	10.01	1.54	.184	1.638	
3	3.500	-	-	5S	.083	3.334	11.00	10.47	8.730	3.03	3.78	.454	.744	3
		-	-	10S	.120	3.260		10.24	8.347	4.33	3.62	.434	1.041	
		STD	40	40S	.216	3.068		9.64	7.393	7.58	3.20	.384	1.724	
		XS	80	80S	.300	2.900		9.11	6.605	10.25	2.86	.343	2.225	
		-	160	-	.438	2.624		8.24	5.408	14.32	2.35	.281	2.876	
4	4.500	-	-	5S	.083	4.334	14.14	13.62	14.75	3.92	6.39	.766	1.249	4
		-	-	10S	.120	4.260		13.38	14.25	5.61	6.18	.740	1.761	
		STD	40	40S	.237	4.026		12.65	12.73	10.79	5.50	.661	3.214	
		XS	80	80S	.337	3.826		12.02	11.50	14.98	4.98	.597	4.271	
		-	120	-	.438	3.624		11.39	10.31	19.00	4.47	.536	5.178	
5	5.563	-	-	5S	.109	5.345	17.48	16.79	22.44	6.36	9.72	1.17	2.498	5
		-	-	10S	.134	5.295		16.63	22.02	7.77	9.54	1.14	3.029	
		STD	40	40S	.258	5.047		15.86	20.01	14.62	8.67	1.04	5.451	
		XS	80	80S	.375	4.813		15.12	18.19	20.78	7.88	.945	7.431	
		-	120	-	.500	4.563		14.34	16.35	27.04	7.09	.849	9.250	
5	5.563	-	-	160	.625	4.313	17.48	13.55	14.61	32.96	6.33	.759	10.796	5
		XS	-	-	.750	4.063		12.76	12.97	38.55	5.61	.674	12.090	

PIPE, FITTING & FLANGE SPECIFICATIONS

PIPE DATA TABLE *(continued)*

Pipe Size (in.)	Outside Diameter (in.)	Weight Class	Carbon Steel Schedule	Stainless Steel Schedule	Wall Thickness (in.)	Inside Diameter (in.)	Circum. (Ext.) (in.)	Circum. (Ext.) (in.)	Flow Area (sq. in.)	Weight of Pipe (lbs/Ft.)	Weight of Water (lbs/Ft.)	Gallons of Water per Ft.	Section Modulus	Pipe Size (in.)				
6	6.625	-	-	5S	.109	6.407	20.81	20.13	32.24	7.60	13.97	1.68	3,576	6				
		-	-	10S	.134	6.357		19.97	31.74	9.29	13.75	1.65	4,346					
		STD	40	40S	.280	6.065		19.05	28.89	18.97	12.51	1.50	8,496					
		XS	80	80S	.432	5.761		18.10	26.07	28.57	11.29	1.35	12.22					
		-	120	-	.562	5.501		17.28	23.77	36.39	10.30	1.24	14.98					
		-	160	-	.719	5.187		16.30	21.15	45.35	9.16	1.10	17.81					
		XXS	-	-	.864	4.897		15.38	18.84	53.16	8.16	.978	20.02					
8	8.625	-	-	5S	.109	8.407	27.10	26.41	55.51	9.93	24.06	2.88	6,131	8				
		-	-	10S	.148	8.329		26.17	54.48	13.40	23.61	2.83	8,212					
		-	20	-	.250	8.125		25.53	51.85	22.36	22.47	2.69	13.39					
		-	30	-	.277	8.071		25.36	51.16	24.70	22.17	2.66	14.69					
		STD	40	40S	.322	7.981		25.07	50.03	28.55	21.70	2.60	16.81					
		-	60	-	.406	7.813		24.55	47.94	35.64	20.77	2.49	20.58					
		XS	80	80S	.500	7.625		23.95	45.66	43.39	19.78	2.37	24.51					
		-	100	-	.594	7.437		23.36	43.46	50.95	18.83	2.26	28.14					
		-	120	-	.719	7.187		22.58	40.59	60.71	17.59	2.11	32.58					
		-	140	-	.812	7.001		21.99	38.50	67.76	16.68	2.00	35.65					
		XXS	-	-	.875	6.875		21.60	37.12	72.42	16.10	1.93	37.56					
		-	160	-	.906	6.813		21.40	36.46	74.69	15.80	1.89	38.48					
		10	10.750	-	-	5S		.134	10.482	33.77	32.93	86.29	15.19		37.39	4.48	11.71	10
-	-			10S	.165	10.420	32.74	85.28	18.65		36.95	4.43	14.30					
-	20			-	.250	10.250	32.20	82.52	28.04		35.76	4.29	21.15					
-	30			-	.307	10.136	31.84	80.69	34.24		34.96	4.19	25.57					
STD	40			40S	.365	10.020	31.48	78.86	40.48		34.20	4.10	29.90					
XS	60			80S	.500	9.750	30.63	74.66	54.74		32.35	3.88	39.43					
-	80			-	.594	9.562	30.04	71.84	64.43		31.13	3.73	45.54					
-	100			-	.719	9.312	29.25	68.13	77.03		29.53	3.54	53.22					
-	120			-	.844	9.062	28.47	64.53	89.29		27.96	3.35	60.32					
XXS	140			-	1.000	8.750	27.49	60.13	104.13		26.06	3.12	68.43					
-	160			-	1.125	8.500	26.70	56.75	115.64		24.59	2.95	74.29					
12	12.750			-	-	5S	.156	12.438	40.06		39.08	121.50	20.98	52.65	6.31	19.2	12	
				-	-	10S	.180	12.390			38.92	120.57	24.17	52.25	6.26	22.0		
		-	20	-	.250	12.250	38.48	117.86		33.38	51.07	6.12	30.2					
		-	30	-	.330	12.090	37.98	114.80		43.77	49.74	5.96	39.0					
		STD	40	40S	.375	12.000	37.70	113.10		49.56	49.00	5.88	43.8					
		-	40	-	.406	11.938	37.50	111.93		53.52	48.50	5.81	47.1					
		XS	60	80S	.500	11.750	36.91	108.43		65.42	46.92	5.63	56.7					
		-	80	-	.562	11.626	36.52	106.16		73.15	46.00	5.51	62.8					
		-	100	-	.688	11.374	35.73	101.64		88.63	44.04	5.28	74.6					
		-	120	-	.844	11.062	34.75	96.14		107.32	41.66	4.99	88.1					
		XXS	140	-	1.000	10.750	33.77	90.76		125.49	39.33	4.71	100.7					
		-	160	-	1.125	10.500	32.99	86.59		139.67	37.52	4.50	109.9					
		-	160	-	1.312	10.126	31.81	80.53		160.27	34.89	4.18	122.6					
14	14.000	-	-	5S	.156	13.688	43.98	43.00	147.15	23.07	63.77	7.64	23.2	14				
		-	-	10S	.188	13.624		42.80	145.78	27.73	63.17	7.57	27.8					
		-	10	-	.250	13.500		42.41	143.14	36.71	62.03	7.44	36.6					
		-	20	-	.312	13.376		42.02	140.52	45.61	60.89	7.30	45.0					
		STD	30	-	.375	13.250		41.63	137.88	54.57	59.75	7.16	53.2					
		-	40	-	.438	13.124		41.23	135.28	63.44	58.64	7.03	61.3					
		XS	60	-	.500	13.000		40.84	132.73	72.09	57.46	6.90	69.1					
		-	80	-	.594	12.812		40.25	128.96	85.05	55.86	6.70	80.3					
		-	100	-	.750	12.500		39.27	122.72	106.13	53.18	6.37	98.2					
		-	120	-	.938	12.124		38.09	115.49	130.85	50.04	6.00	117.8					
		-	140	-	1.094	11.812		37.11	109.62	150.79	47.45	5.69	132.8					
		-	160	-	1.250	11.500		36.13	103.87	170.28	45.01	5.40	146.8					
		-	160	-	1.406	11.188		35.15	98.31	189.11	42.60	5.11	159.6					
16	16.000	-	-	5S	.165	15.670	50.27	49.23	192.85	27.90	83.57	10.02	32.2	16				
		-	-	10S	.188	15.624		49.08	191.72	31.75	83.08	9.96	36.5					
		-	10	-	.250	15.500		48.69	188.69	42.05	81.74	9.80	48.0					
		-	20	-	.312	15.376		48.31	185.69	52.27	80.50	9.65	59.2					
		STD	30	-	.375	15.250		47.91	182.65	62.58	79.12	9.49	70.3					
		XS	40	-	.500	15.000		47.12	176.72	82.77	76.58	9.18	91.5					
		-	60	-	.656	14.688		46.14	169.44	107.50	73.42	8.80	116.6					
		-	80	-	.844	14.312		44.96	160.92	136.61	69.73	8.36	144.5					
		-	100	-	1.031	13.938		43.79	152.58	164.82	66.12	7.93	170.5					
		-	120	-	1.219	13.562		42.61	144.50	192.43	62.62	7.50	194.5					
		-	140	-	1.438	13.124		41.23	135.28	233.64	58.64	7.03	220.0					
		-	160	-	1.594	12.812		40.26	128.96	245.25	55.83	6.70	236.7					

PIPE, FITTING & FLANGE SPECIFICATIONS

PIPE DATA TABLE *(continued)*

Pipe Size (in.)	Outside Diameter (in.)	Weight Class	Carbon Steel Schedule	Stainless Steel Schedule	Wall Thickness (in.)	Inside Diameter (in.)	Circum. (Ext.) (in.)	Circum. (Ext.) (in.)	Flow Area (sq. in.)	Weight of Pipe (lbs/Ft.)	Weight of Water (lbs/Ft.)	Gallons of Water per Ft.	Section Modulus	Pipe Size (in.)				
18	18.00	-	-	5S	.165	17.67	56.55	55.51	245.22	31.43	106.26	12.74	40.8	18				
		-	-	10S	.188	17.62		55.37	243.95	35.76	105.71	12.67	46.4					
		-	10	-	.250	17.50		54.98	240.53	47.39	104.21	12.49	61.1					
		-	20	-	.312	17.38		54.59	237.13	58.94	102.77	12.32	75.5					
		STD	-	-	.375	17.25		54.19	233.71	70.59	101.18	12.14	89.6					
		-	30	-	.438	17.12		53.80	230.30	82.15	99.84	11.96	103.4					
		XS	-	-	.500	17.00		53.41	226.98	93.45	98.27	11.79	117.0					
		-	40	-	.562	16.88		53.02	223.68	104.87	96.93	11.62	130.1					
		-	60	-	.750	16.50		51.84	213.83	138.17	92.57	11.11	168.3					
		-	80	-	.938	16.12		50.66	204.24	170.92	88.50	10.61	203.8					
		-	100	-	1.156	15.69		49.29	193.30	207.96	83.76	10.04	242.3					
		-	120	-	1.375	15.25		47.91	182.66	244.14	79.07	9.49	277.6					
		-	140	-	1.562	14.88		46.73	173.80	274.22	75.32	9.03	305.5					
		-	160	-	1.781	14.44		45.36	163.72	308.50	70.88	8.50	335.6					
20	20.00	-	-	5S	.188	19.62	62.83	61.65	302.46	39.78	131.06	15.71	57.4	20				
		-	-	10S	.218	19.56		61.46	300.61	46.06	130.27	15.62	66.3					
		-	10	-	.250	19.50		61.26	298.65	52.73	129.42	15.51	75.6					
		-	20	-	.375	19.25		60.48	290.04	78.60	125.67	15.12	111.3					
		STD	30	-	.500	19.00		59.69	283.53	104.13	122.87	14.73	145.7					
		XS	40	-	.594	18.81		59.10	278.00	123.11	120.46	14.44	170.4					
		-	60	-	.812	18.38		57.73	265.21	166.40	114.92	13.78	225.7					
		-	80	-	1.031	17.94		56.35	252.72	208.87	109.51	13.13	277.1					
		-	100	-	1.281	17.44		54.78	238.83	256.10	103.39	12.41	331.5					
		-	120	-	1.500	17.00		53.41	226.98	296.37	98.35	11.79	375.5					
		-	140	-	1.750	16.50		51.84	213.82	341.09	92.66	11.11	421.7					
		-	160	-	1.969	16.06		50.46	202.67	379.17	87.74	10.53	458.5					
		22	22.00	-	-	5S		.188	21.62	69.12	67.93	367.25	43.80		159.14	19.08	69.7	22
				-	-	10S		.218	21.56		67.75	365.21	50.71		158.26	18.97	80.4	
-	10			-	.250	21.50	67.54	363.05	58.07		157.32	18.86	91.8					
-	20			-	.375	21.25	66.76	354.66	86.61		153.68	18.42	135.4					
STD	30			-	.500	21.00	65.97	346.36	114.81		150.09	17.99	177.5					
XS	40			-	.594	20.75	65.36	342.06	139.56		149.41	17.73	225.0					
-	60			-	.812	20.32	63.62	322.06	197.41		132.76	17.13	285.0					
-	80			-	1.031	19.89	62.05	306.35	250.81		126.12	16.51	350.0					
-	100			-	1.281	19.46	60.48	291.04	302.88		126.12	15.91	425.0					
-	120			-	1.500	19.03	58.90	276.12	353.61		119.65	15.31	500.0					
-	140			-	1.750	18.60	57.33	261.59	403.00		113.36	14.71	575.0					
-	160			-	2.125	18.17	55.76	247.45	451.06		107.23	14.11	650.0					
24	24.00			-	-	5S	.218	23.56	75.40		74.03	436.10	55	188.98	22.65	96.0	24	
				-	10	10S	.250	23.50			73.83	433.74	63	187.95	22.53	109.6		
		-	20	-	.375	23.25	73.04	424.56		95	183.95	22.05	161.9					
		STD	30	-	.500	23.00	72.26	415.48		125	179.87	21.58	212.5					
		XS	40	-	.562	22.88	71.86	411.00		141	178.09	21.35	237.0					
		-	60	-	.688	22.62	71.08	402.07		171	174.23	20.88	285.1					
		-	80	-	.969	22.06	69.31	382.35		238	165.52	19.86	387.7					
		-	100	-	1.219	21.56	67.74	365.22		297	158.26	18.97	472.8					
		-	120	-	1.531	20.94	65.78	344.32		367	149.06	17.89	570.8					
		-	140	-	1.812	20.38	64.01	326.08		430	141.17	16.94	652.1					
		-	160	-	2.062	19.88	62.44	310.28		483	134.45	16.12	718.9					
		-	160	-	2.344	19.31	60.67	292.98		542	126.84	15.22	787.9					
		30	30.00	-	-	5S	.250	29.50		94.25	92.68	683.49	79	296.18	35.51	172.3		30
				-	10	10S	.312	29.38			92.29	677.71	99	293.70	35.21	213.8		
STD	-			-	.375	29.25	91.89	671.96	119		291.18	34.91	255.3					
XS	20			-	.500	29.00	91.11	660.52	158		286.22	34.31	336.1					
-	30			-	.625	28.75	90.32	649.18	196		281.31	33.72	414.9					

PIPE, FITTING & FLANGE SPECIFICATIONS

MAXIMUM ALLOWABLE WORKING PRESSURES (PSIG) FOR SEAMLESS CARBON STEEL PIPE													
Nominal Pipe Size (in.)	Maximum allowable working pressure at -20 to 650 °F ▲												
	SCH 10	SCH 20	SCH 30	STD WALL	SCH 40	SCH 60	XH	SCH 80	SCH 100	SCH 120	SCH 140	SCH 160	XXH
1/2	-	-	-	1694	1694	-	3036	3036	-	-	-	4551	9223
3/4	659	-	-	1450	1450	-	2589	2589	-	-	-	4505	7531
1	1065	-	-	1578	1578	-	2601	2601	-	-	-	4290	7150
1 1/4	556	-	-	1069	1069	-	1941	1941	-	-	-	3001	5593
1 1/2	486	-	-	1004	1004	-	1821	1821	-	-	-	3091	5114
2	388	-	-	903	903	-	1659	1659	-	-	-	3225	4475
2 1/2	431	-	-	1214	1214	-	1936	1936	-	-	-	2963	4936
3	346	-	-	1094	1094	-	1773	1773	-	-	-	2933	4405
3 1/2	303	-	-	1023	1023	-	1671	1671	-	-	-	-	-
4	269	-	-	974	974	-	1598	1598	-	2243	-	2868	3858
5	284	-	-	888	888	-	1475	1475	-	2123	-	2791	3485
6	239	-	-	833	833	-	1473	1473	-	2038	-	2738	3414
8	225	543	628	770	1038	1343	1343	1649	2068	2388	2715	2605	-
10	224	434	578	723	723	1070	1070	1311	1641	1975	2406	2754	-
12	219	366	534	630	696	1033	898	1305	1653	2009	2295	2735	-
14	333	451	573	573	693	999	816	1311	1690	2013	2341	2675	-
16	291	395	500	500	711	980	711	1305	1638	1975	2378	2669	-
18	258	350	538	444	725	1013	631	1303	1648	1998	2303	2665	-
20	233	399	568	399	693	995	568	1299	1653	1970	2338	2663	-
22	211	-	-	363	-	-	515	-	-	-	-	-	-
24	194	331	541	331	683	1004	471	1295	1664	2003	2309	2656	-
26	-	-	-	306	-	-	435	-	-	-	-	-	-
30	209	376	488	265	-	-	376	-	-	-	-	-	-
36	-	-	-	220	-	-	314	-	-	-	-	-	-
42	-	-	-	189	-	-	269	-	-	-	-	-	-

▲ For allowable working pressures at higher temperatures, multiply values listed above by the following factors:

Grade A					
Temperature	700 °F	750 °F	800 °F	850 °F	900 °F
Multiply by	0.971	0.892	0.750	0.708	0.417

Grade B					
Temperature	700 °F	750 °F	800 °F	850 °F	900 °F
Multiply by	0.956	0.853	0.720	0.620	0.333



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