

PRODUCTS - Hydrostatic Test Pressure

PRODUCTS - ASTM A53 Carbon Steel Pipes for Ordinary Piping



Hydrostatic Test Pressure, P, expressed in megapascals(product per square inch), for plain-end shall be determined using Equation with the result rounded to the nearest 0.1MPa(10psi)

$$P = \frac{2St}{D}$$

where

S is the hoop stress, expressed in megapascals(pounds per square inch), equal to a percentage of the specified minimum yield strength of the pipe, as given in Table 26;

t is the specified wall thickness, expressed in millimetres(inches);

D is the specified outside diameter, expressed in millimetres(inches)

Percentage of specified minimum yield strength for determination of S

Pipe grade	Specified outside diameter D	Percentage of specified minimum yield strength for determination of S	
	mm(in)	Standard test pressure	Alternative test pressure
L210 or A	any	60 ^a	75 ^a
L245 or B	any	60 ^a	75 ^a
L290 or X42 to L830 or X120	≤ 141.3(5.563)	60 ^a	75 ^c
	> 141.3(5.563) to ≤ 219.1(8.625)	75 ^b	75 ^c
	> 219.1(8.625) to < 508(20.000)	85 ^b	85 ^c
	≥ 508(20.000)	90 ^b	90 ^c

a For D ≤ 88.9mm(3.500 in), it is not necessary that the test pressure exceed 17.0 Mpa(2470 psi); for D > 88.9mm(3.500 in), it is not necessary that the test pressure exceed 19.0 Mpa(2760 psi)

b It is not necessary that the test pressure exceed 20.5MPa(2970 psi).

c For D ≤ 406.4 mm(16.000 in), it is not necessary that the test pressure exceed 50.0 Mpa(7260 psi); for D > 406.4 mm (16.000 in), it is not necessary that the test pressure exceed 25.0 Mpa(3630 psi).

For Example

1 Spec & Size : API 5L X42 4-1/2"x0.083"

$$P = \frac{2St}{D} = \frac{2 \times 0.6(\%) \times 42100(\text{psi}) \times 2.1(\text{mm})}{114.3\text{mm}} = 930\text{psi}$$

Nominal Size	Outside Diameter		Wall Thickness			Nominal Weight			Hydrostatic Test Pressure			
	in	mm	in	mm	Schedule No.	lb/ft	kg/ft	kg/m	Grade A		Grade B	
									psi	kPa	psi	kPa
3/4	1.050	26.7	0.154	3.91	80(XS)	1.48	0.67	2.20	850	5900	850	5900
			0.219	5.56	160	1.95	0.88	2.90	950	6500	950	6500
1	1.315	33.4	0.133	3.38	40(STD)	1.68	0.76	2.50	700	4800	700	4800
			0.179	4.55	80(XS)	2.17	0.98	3.24	850	5900	850	5900
1 1/4	1.660	42.2	0.250	6.35	160	2.85	1.29	4.24	950	6500	950	6500
			0.140	3.56	40(STD)	2.27	1.03	3.39	1200	8300	1300	9000
1 1/2	1.900	48.3	0.191	4.85	80(XS)	3.00	1.36	4.47	1800	12400	1900	13100
			0.250	6.35	160	3.77	1.71	5.61	1900	13100	2000	13800
2	2.375	60.3	0.145	3.68	40(STD)	2.72	1.23	4.05	1200	8300	1300	9000
			0.200	5.08	80(XS)	3.63	1.65	5.41	1800	12400	1900	13100
2 1/2	2.875	73.0	0.281	7.14	160	4.86	2.20	7.25	1950	13400	2050	14100
			0.154	3.91	40(STD)	3.66	1.66	5.44	2300	15900	2500	17200
			0.218	5.54	80(XS)	5.03	2.28	7.48	2500	17200	2500	17200
3	3.500	88.9	0.344	8.74	160	7.47	3.39	11.11	2500	17200	2500	17200
			0.436	11.07	XXS	9.04	4.10	13.44	2500	17200	2500	17200
			0.203	5.16	40(STD)	5.80	2.63	8.63	2500	17200	2500	17200
			0.276	7.01	80(XS)	7.67	3.48	11.41	2500	17200	2500	17200
3-1/2	4.000	101.6	0.375	9.52	160	10.02	4.54	14.90	2500	17200	2500	17200
			0.125	3.18	-	4.51	2.05	6.72	1290	8900	1500	1000
			0.156	3.96	-	5.58	2.53	8.29	1600	11000	1870	12900
			0.188	4.78	-	6.66	3.02	9.92	1930	13330	2260	15600
4	4.500	114.3	0.216	5.49	40(STD)	7.58	3.44	11.29	2220	15300	2500	17200
			0.250	6.35	-	8.69	3.94	12.93	2500	17200	2500	17200
			0.281	7.14	-	9.67	4.39	14.40	2500	17200	2500	17200
			0.300	7.62	80(XS)	10.26	4.65	15.27	2500	17200	2500	17200
4	4.500	114.3	0.438	11.13	160	14.34	6.50	21.35	2500	17200	2500	17200
			0.156	3.96	-	6.41	2.91	9.53	1400	9700	1640	11300
			0.188	4.78	-	7.66	3.47	11.41	1690	11700	1970	13600
			0.226	5.74	40(STD)	9.12	4.14	13.57	2030	14000	2370	16300
4	4.500	114.3	0.250	6.35	-	10.02	4.54	14.92	2250	15500	2500	17200
			0.281	7.14	-	11.17	5.07	16.63	2500	17200	2500	17200
			0.318	8.08	80(XS)	12.52	5.68	18.63	2800	19300	2800	19300
			0.156	3.96	-	7.24	3.28	10.78	1250	8600	1460	10100
			0.188	4.78	-	8.67	3.93	12.91	1500	10300	1750	12100
			0.219	5.56	-	10.02	4.54	14.91	1750	12100	2040	14100
			0.237	6.02	40(STD)	10.80	4.90	16.07	1900	13100	2210	15200
			0.250	6.35	-	11.36	5.15	16.90	2000	13800	2330	16100
			0.281	7.14	-	12.67	5.75	18.87	2250	15100	2620	18100
			0.312	7.92	-	13.97	6.34	20.78	2500	17200	2800	19300
4	4.500	114.3	0.337	8.56	80(XS)	15.00	6.80	22.32	2700	18600	2800	19300
			0.438	11.13	120	19.02	8.63	28.32	2800	19300	2800	19300
4	4.500	114.3	0.531	13.49	160	22.53	10.22	33.54	2800	19300	2800	19300

PRODUCTS - ASTM A53 Carbon Steel Pipes for Ordinary Piping



Nominal Size	Outside Diameter		Wall Thickness			Nominal Weight			Hydrostatic Test Pressure			
									Grade A		Grade B	
	in	mm	in	mm	Schedule No.	lb/ft	kg/ft	kg/m	psi	kPa	psi	kPa
5	5.563	141.3	0.156	3.96	-	9.02	4.09	13.41	1010	7000	1180	8100
			0.188	4.78	-	10.80	4.90	16.09	1220	8400	1420	9800
			0.219	5.56	-	12.51	5.67	18.61	1420	9800	1650	11400
			0.258	6.55	40(STD)	14.63	6.64	21.77	1670	11500	1950	13400
			0.281	7.14	-	15.87	7.20	23.62	1820	12500	2120	14600
			0.312	7.92	-	17.51	7.94	26.05	2020	13900	2360	16300
			0.344	8.74	-	19.19	8.70	28.57	2230	15400	2600	17900
			0.375	9.52	80(XS)	20.80	9.43	30.94	2430	16800	2800	19300
			0.500	12.70	120	27.06	12.27	40.28	2800	19300	2800	19300
			6	6.625	168.3	0.188	4.78	-	12.94	5.87	19.27	1020
0.219	5.56	-				15.00	6.80	22.31	1190	8200	1390	9600
0.250	6.35	-				17.04	7.73	25.36	1360	9400	1580	10900
0.280	7.11	40(STD)				18.99	8.61	28.26	1520	10500	1780	12300
0.312	7.92	-				21.06	9.55	31.32	1700	11700	1980	13700
0.344	8.74	-				23.10	10.48	34.39	1870	12900	2180	15000
0.375	9.52	-				25.05	11.36	37.28	2040	14100	2380	16400
0.432	10.97	80(XS)				28.60	12.97	42.56	2350	16200	2740	18900
0.562	14.27	120				36.43	16.52	54.20	2800	19300	2800	19300
8	8.625	219.1				0.188	4.78	-	16.96	7.69	25.26	780
			0.203	5.16	-	18.28	8.29	27.22	850	5900	1000	6900
			0.219	5.56	-	19.68	8.93	29.28	910	6300	1070	7400
			0.250	6.35	20	22.38	10.15	33.31	1040	7200	1220	8400
			0.277	7.04	30	24.72	11.21	36.31	1160	7800	1350	9300
			0.312	7.92	-	27.73	12.58	41.24	1300	9000	1520	10500
			0.322	8.18	40(STD)	28.58	12.96	42.55	1340	9200	1570	10800
			0.344	8.74	-	30.45	13.81	45.34	1440	9900	1680	11600
			0.375	9.52	-	33.07	15.00	49.20	1570	10800	1830	12600
			0.406	10.31	60	35.67	16.18	53.08	1700	11700	2000	13800
10	10.750	273.0	0.438	11.13	-	38.33	17.39	57.08	1830	12600	2130	14700
			0.500	12.70	80(XS)	43.43	19.70	64.64	2090	14400	2430	16800
			0.594	15.09	100	51.00	23.13	75.92	2500	17200	2800	19300
			0.719	18.26	120	60.77	27.56	90.44	2800	19300	2800	19300
			0.188	4.78	-	21.23	9.63	31.62	630	4300	730	5000
			0.203	5.16	-	22.89	10.38	34.08	680	4700	800	5500
			0.219	5.56	-	24.65	11.18	36.67	730	5000	860	5900
			0.250	6.35	20	28.06	12.73	41.75	840	5800	980	6800
			0.279	7.09	-	31.23	14.17	46.49	930	6400	1090	7500
			0.307	7.80	30	34.27	15.54	51.01	1030	7100	1200	8300
12	12.750	323.8	0.344	8.74	-	38.27	17.36	56.96	1150	7900	1340	9200
			0.356	9.27	40(STD)	40.52	18.38	60.29	1220	8400	1430	9900
			0.438	11.13	-	48.28	21.90	71.87	1470	10100	1710	11800
			0.500	12.70	60(XS)	54.79	24.85	81.52	1670	11500	1950	13400
			0.594	15.09	80	64.49	29.25	95.97	1990	13700	2320	16000
			0.719	18.26	100	77.10	34.97	114.70	2410	16600	2800	19300

Nominal Size	Outside Diameter		Wall Thickness			Nominal Weight			Hydrostatic Test Pressure						
									Grade A		Grade B				
	in	mm	in	mm	Schedule No.	lb/ft	kg/ft	kg/m	psi	kPa	psi	kPa			
12	12.750	323.8	0.219	5.56	-	29.34	13.31	43.63	620	4300	720	5000			
			0.250	6.35	20	33.41	15.15	49.71	710	4900	820	5700			
			0.281	7.14	-	37.46	16.99	55.75	790	5400	930	6400			
			0.312	7.92	-	41.48	18.81	61.69	880	6100	1030	7100			
			0.330	8.38	30	43.81	19.87	65.18	930	6400	1090	7500			
			0.344	8.74	-	45.62	20.69	67.90	970	6700	1130	7800			
			0.375	9.52	STD	49.61	22.50	73.78	1060	7300	1240	8500			
			0.406	10.31	40	53.57	24.30	79.70	1150	7900	1340	9200			
			0.438	11.13	-	57.65	26.15	85.82	1240	8500	1440	9900			
			0.500	12.70	XS	65.48	29.70	97.43	1410	9700	1650	11400			
			0.562	14.27	60	73.22	33.21	108.92	1590	11000	1850	12800			
			0.688	17.48	80	88.71	40.24	132.04	1940	13400	2270	15700			
			14	14.000	355.6	0.250	6.35	10	36.75	16.67	54.69	640	4400	750	5200
						0.281	7.14	-	41.21	18.69	61.35	720	5000	840	5800
						0.312	7.92	20	45.65	20.71	67.90	800	5500	940	6500
						0.344	8.74	-	50.22	22.78	74.76	880	6100	1030	7100
0.375	9.52	30(STD)				54.62	24.78	81.25	960	6600	1120	7700			
0.438	11.13	40				63.50	28.80	94.55	1130	7800	1310	9000			
0.469	11.91	-				67.84	30.77	100.94	1210	8300	1410	9700			
0.500	12.70	XS				72.16	32.73	107.39	1290	8900	1500	10300			
0.594	15.09	60				85.13	38.61	126.71	1530	10500	1790	12300			
0.750	19.05	80				106.23	48.18	158.10	1930	13300	2250	15500			
16	16.000	406.4	0.250	6.35	10	42.09	19.09	62.64	560	3900	660	4500			
			0.281	7.14	-	47.22	21.42	70.30	630	4300	740	5100			
			0.312	7.92	20	52.32	23.73	77.83	700	4800	820	5700			
			0.344	8.74	-	57.57	26.11	85.71	770	5300	900	6200			
			0.375	9.52	30(STD)	62.64	28.41	93.17	840	5800	980	6800			
			0.438	11.13	-	72.86	33.05	108.49	990	6800	1150	7900			
			0.469	11.91	-	77.87	35.32	115.86	1060	7300	1230	8500			
			0.500	12.70	40(XS)	82.85	37.58	123.30	1120	7700	1310	9000			
			0.656	16.66	60	107.60	48.81	160.12	1480	10200	1720	11900			