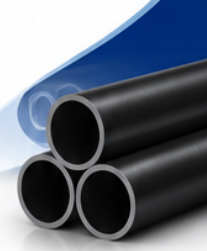


CARBON STEEL PIPE PRESSURE RATING TABLE

Based on ASTM A53 Grade B and A106 Grade B Seamless Steel Pipe

☑ Design Standard: ASME B31.1 | 🔥 Temperature: 100°F (Ambient)



PIPE PRESSURE RATING TABLE (PSI)

PIPE SIZE (NPS)	OD (inch)	WORKING PRESSURE (PSI)				BURST PRESSURE (PSI)				WATER HAMMER FACTOR
		SCH 40	SCH 80	SCH 160	XXS	SCH 40	SCH 80	SCH 160	XXS	
1/8	0.405	3500	4800	7300	12300	20,200	28,000	43,000	68,000	63.4
1/4	0.540	2100	4350	8500	14400	19,500	26,400	40,500	64,000	36.1
3/8	0.675	1700	3800	10000	16000	16,200	22,500	35,000	56,000	22.3
1/2	0.840	2300	4100	10300	17000	15,600	21,000	33,000	52,000	12.9
3/4	1.050	2000	3500	8500	12300	12,900	17,600	25,000	40,000	44.5
1	1.315	3100	5700	10000	14400	22,300	31,900	45,000	64,000	18.2
1 1/4	1.660	1800	3000	7900	11000	10,100	13,900	20,500	31,000	12.9
1 1/2	1.900	1700	2800	7200	9500	9,100	12,600	18,500	27,000	10.9
2	2.375	1500	2500	6300	8300	8,500	11,700	17,500	24,500	6.52
2 1/2	2.875	1500	2100	5700	7200	7,800	10,600	15,000	21,000	5.60
3	3.500	1400	1800	4800	6300	6,800	9,200	12,500	18,000	4.68
4	4.500	1100	1500	3500	4600	5,600	7,500	9,500	13,500	3.42
6	6.625	900	1300	2800	3700	4,400	5,800	7,200	10,200	1.82
8	8.625	700	1100	2300	3300	3,600	4,800	6,000	8,500	1.28
10	10.750	600	900	1800	2700	2,900	3,900	4,800	6,800	0.96
12	12.750	500	800	1600	2300	2,300	3,200	4,100	5,800	0.66

WORKING PRESSURE FORMULA

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

P = Allowable working pressure (psi)
S = Allowable stress of material (psi)
t = Wall thickness (inch)
D = Outside diameter (inch)



Values are based on 100°F (ambient temperature).
For higher temperatures, apply derating per ASME B31.3.

WATER HAMMER FACTOR



Water hammer (hydraulic shock) occurs when the fluid flow changes suddenly, causing a temporary pressure surge in the pipe.

PIPE SIZE (NPS)	1/2 & Smaller	3/4 - 1	1 1/4 - 2	2 1/2 - 4	6 & Larger
WATER HAMMER FACTOR RANGE	> 40	20 - 40	10 - 20	5 - 10	< 5



Design pressure should consider both working pressure and additional surge pressure caused by water hammer.

WORKING PRESSURE vs BURST PRESSURE

WORKING PRESSURE



- Maximum pressure allowed for continuous operation.
- Used for pipeline design and normal service.
- Includes safety factors for long-term reliability.

BURST PRESSURE



- The pressure at which the pipe will rupture.
- Used for destructive testing only.
- Does not include safety factors.



Burst pressure is significantly higher than working pressure.

Never use burst pressure as the operating pressure!



NOTES

- Pressure ratings are calculated in accordance with ASME B31.1.
- For welded pipes, joint efficiency (E) as required by the code.
- XXS (Double Extra Strong) is not available for 12" standard weight pipe.
- Always consult the latest ASME, ASTM, or API standards for critical service.

APPLICABLE MATERIAL STANDARDS



- ASTM A53 Grade B
- ASTM A106 Grade B
- API 5L Grade B

Seamless Steel Pipe

TYPICAL APPLICATIONS



- Oil & Gas
- Petrochemical
- Power Generation
- Water Treatment
- Fire Protection Systems
- HVAC & Industrial Piping



SAFE DESIGN

Ensure system safety & reliability



ACCURATE DATA

Based on ASME & ASTM standards



OPTIMIZED PERFORMANCE

Improve efficiency & reduce cost



GLOBAL APPLICATIONS

Suitable for various industries worldwide



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HOW TO USE



1. Select the pipe size (NPS).
2. Find the schedule you are using.
3. Read the ID and flow rate at your design velocity (FPS).

FLOW RATE FORMULA

$$Q = A \times V \times 448.8$$

Where:

Q = Flow rate (GPM)

A = Area (in.²)

V = Velocity (ft/s)

448.8 = Conversion factor

NOTES



- Flow rates are based on water @ 60°F (15.6°C).
- For other fluids, apply correction factors.
- Actual flow may vary due to fittings, roughness, valves and system design.
- Pressure ratings must be checked according to temperature and code requirements.

STANDARD PIPE — SCHEDULE 40

PIPE SIZE (NPS)	OD (in.)	WALL THICKNESS (in.)	ID (in.)	CROSS-SECTIONAL AREA (in. ²)	FLOW RATE – GPM @ FPS					
					2 FPS	5 FPS	10 FPS	15 FPS	20 FPS	25 FPS
1/2	0.840	0.109	0.622	0.304	1.9	4.8	9.5	14.2	19.0	23.8
3/4	1.050	0.113	0.824	0.533	3.3	8.4	16.7	25.1	33.4	41.8
1	1.315	0.133	1.049	0.864	5.4	13.5	27.0	40.6	54.1	67.7
1 1/4	1.660	0.140	1.380	1.495	9.4	23.4	46.8	70.3	93.7	117
1 1/2	1.900	0.145	1.610	2.036	12.7	31.9	63.7	95.6	127	159
2	2.375	0.154	2.067	3.353	21.0	52.5	105	157	210	263
2 1/2	2.875	0.203	2.469	4.788	30.0	75.0	150	225	300	375
3	3.500	0.216	3.068	7.393	46.3	116	232	347	463	579
4	4.500	0.237	4.026	12.73	79.7	199	399	598	797	997
6	6.625	0.280	6.065	28.89	181	452	904	1357	1810	2262
8	8.625	0.322	7.981	50.03	313	783	1567	2350	3134	3917
10	10.750	0.365	10.020	78.85	494	1235	2470	3705	4940	6175
12	12.750	0.406	11.938	111.90	701	1753	3506	5259	7012	8765

EXTRA STRONG PIPE (XS) — SCHEDULE 80

PIPE SIZE (NPS)	OD (in.)	WALL THICKNESS (in.)	ID (in.)	CROSS-SECTIONAL AREA (in. ²)	FLOW RATE – GPM @ FPS					
					2 FPS	5 FPS	10 FPS	15 FPS	20 FPS	25 FPS
1/2	0.840	0.147	0.546	0.234	1.5	3.7	7.3	11.0	14.7	18.3
3/4	1.050	0.154	0.742	0.433	2.7	6.8	13.6	20.2	27.1	33.9
1	1.315	0.179	0.957	0.719	4.5	11.3	22.5	33.8	45.0	56.3
1 1/4	1.660	0.191	1.278	1.283	8.0	20.0	40.0	60.0	80.3	100
1 1/2	1.900	0.200	1.500	1.767	11.1	27.7	55.3	83.0	110	138
2	2.375	0.218	1.939	2.953	18.5	46.2	92.5	139	185	231
2 1/2	2.875	0.276	2.323	4.238	26.5	66.4	133	199	265	332
3	3.500	0.300	2.900	6.605	41.4	103	207	310	414	517
4	4.500	0.337	3.826	11.48	55.7	139	278	418	557	696
6	6.625	0.432	5.761	26.07	163	408	816	1225	1633	2041
8	8.625	0.500	7.625	45.66	286	715	1430	2145	2861	3576
10	10.750	0.594	9.562	71.81	450	1125	2249	3374	4498	5623
12	12.750	0.688	11.374	101.61	636	1591	3182	4774	6365	7956



SAFE DESIGN

Ensure system safety & reliability



ACCURATE DATA

Based on ASME & ASTM standards



OPTIMIZED PERFORMANCE

Improve efficiency & reduce cost



GLOBAL APPLICATION

Suitable for various industries worldwide



SCHEDULE 160 & DOUBLE EXTRA STRONG (XXS) PIPE FLOW RATE CHARTS & SCHEDULE COMPARISON GUIDE

🕒 Based on ASTM A53 Grade B / A106 Grade B Seamless Steel Pipe

🔧 Design Standard: ASME B36.10M

💧 Fluid: Water @ 60°F (15.6°C)

⚙️ Flowrate Unit: GPM



SCHEDULE 160 PIPE										
PIPE SIZE (NPS)	OD (in.)	WALL THICKNESS (in.)	ID (in.)	CROSS-SECTIONAL AREA (in. ²)	FLOW RATE – GPM @ FPS					
					2 FPS	5 FPS	10 FPS	15 FPS	20 FPS	25 FPS
1/2	0.840	0.187	0.466	0.171	1.1	2.7	5.4	8.0	10.7	13.4
3/4	1.050	0.218	0.587	0.271	1.7	4.2	8.4	12.7	17.0	21.2
1	1.315	0.250	0.815	0.522	3.3	8.2	16.3	24.5	32.7	40.8
1 1/4	1.660	0.280	1.160	1.056	6.6	16.6	33.1	49.7	66.2	82.8
1 1/2	1.900	0.312	1.338	1.410	8.8	22.0	44.0	66.1	88.1	110
2	2.375	0.344	1.689	2.241	14.0	35.1	70.2	105	140	175
2 1/2	2.875	0.375	2.125	3.542	22.2	55.5	111	167	222	278
3	3.500	0.437	2.626	5.416	33.9	84.8	170	254	339	424
4	4.500	0.531	3.438	9.283	58.2	145	291	436	582	727
6	6.625	0.718	5.199	21.15	132	331	662	994	1325	1656
8	8.625	0.906	6.813	36.44	227	571	1142	1713	2284	2855
10	10.750	1.125	8.500	56.75	355	889	1777	2666	3555	4443
12	12.750	1.312	10.126	80.53	504	1261	2523	3784	5045	6306

DOUBLE EXTRA STRONG PIPE (XXS)										
PIPE SIZE (NPS)	OD (in.)	WALL THICKNESS (in.)	ID (in.)	CROSS-SECTIONAL AREA (in. ²)	FLOW RATE – GPM @ FPS					
					2 FPS	5 FPS	10 FPS	15 FPS	20 FPS	25 FPS
1/2	0.840	0.294	0.252	0.050	0.3	0.8	1.6	2.5	3.3	4.1
3/4	1.050	0.308	0.434	0.148	0.9	2.3	4.6	6.9	9.1	11.6
1	1.315	0.358	0.599	0.282	1.8	4.4	8.8	13.3	17.7	22.1
1 1/4	1.660	0.382	0.896	0.632	4.0	9.9	19.8	29.6	39.5	48.4
1 1/2	1.900	0.436	1.028	0.827	6.0	14.9	29.8	44.9	59.5	74.4
2	2.375	0.436	1.503	1.771	11.1	27.9	55.6	83.6	111	139
2 1/2	2.875	0.552	1.771	2.463	15.4	38.6	77.1	116	154	193
3	3.500	0.600	2.300	4.154	26.0	65.1	130	195	260	325
4	4.500	0.674	3.152	7.803	48.9	122	244	367	488	611
6	6.625	0.864	4.897	18.83	118	295	590	885	1180	1475
8	8.625	1.087	6.875	37.12	233	581	1163	1744	2325	2907
10	10.750	1.000	8.750	60.13	377	942	1883	2825	3767	4709
12	12.750	1.000	10.750	90.76	569	1421	2843	4264	5686	7107

SCHEDULE COMPARISON GUIDE				
FEATURE	SCHEDULE 40 (Standard)	SCHEDULE 80 (Extra Strong)	SCHEDULE 160 (Heavy Wall)	XXS (Double Extra Strong)
Wall Thickness	 Standard	 Thick	 Extra Thick	 Thickest
Pressure Capacity	★★★☆☆ (Medium)	★★★★☆ (High)	★★★★★☆☆ (Very High)	★★★★★★★ (Maximum)
Burst Pressure	★★★☆☆ (Medium)	★★★★☆ (High)	★★★★★☆☆ (Very High)	★★★★★★★ (Maximum)
Inside Diameter	Largest	Smaller	Smaller	Smallest
Pipe Weight	 Light	 Medium	 Heavy	 Heaviest
Material Cost	\$ Low	\$ \$ Medium	\$ \$ \$ High	\$ \$ \$ \$ Highest
Typical Applications	 - Water Supply - HVAC Systems - Low Pressure Lines - General Piping	 - Steam Lines - Oil & Gas - Compressed Air - Fire Protection	 - High Pressure Systems - Petrochemical - Power Plants - Critical Services	 - Ultra High Pressure - Offshore & Subsea - Severe Service - Critical Process Lines

KEY CONSIDERATIONS

- ✓ Select the proper schedule based on design pressure, temperature, fluid, and code requirements.
- ✓ Always check working pressure (MAWP), not burst pressure, for safe operation.
- ✓ Consider corrosion allowance and water hammer in system design.
- ✓ Refer to ASME B31.1 / B31.3 for detailed design rules.

COMMON APPLICATION INDUSTRIES



ABOUT BAOWI STEEL

BAOWI STEEL is a professional manufacturer and supplier of carbon steel pipes and fittings, supplying high-quality products to global industries.

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