

ASTM A106 seamless steel pipe

ASTM A106 is seamless steel pipe specification for high-temperature service. The pipe is commonly used in the construction of power plant, boiler, firefighting pipeline and ship where the piping must transport fluids and gases in higher temperatures and pressure levels.



- Certificate: ISO
- Standard: ASTM A106, Grade B
- Length: 6m / 5.8m / 11.8m / 12m / 20ft, etc.
- End: Plain (square cut) / beveled to 30° / roll groove as AWWA C606 / NPT thread as ANSI B1.20.1 / BSPT as ISO 7-1
- Surface: Fusion bonded epoxy (FBE) / polyester resin / hot dip galvanized / red paint / black paint, etc.

Available size for Sch40 (STD) pipe

Size			Thickness T (mm)		Test pressure (Mpa)		Ref. No.
NPS	DN	OD (mm)	Sch40	STD	Sch40	STD	
1/4"	8	13.7	2.24	2.24	17.0	17.0	P1101
3/8"	10	17.1	2.31	2.31	17.0	17.0	P1102
1/2"	15	21.3	2.77	2.77	17.0	17.0	P1103
3/4"	20	26.7	2.87	2.87	17.0	17.0	P1104
1"	25	33.4	3.38	3.38	17.0	17.0	P1105
1-1/4"	32	42.2	3.56	3.56	17.0	17.0	P1106
1-1/2"	40	48.3	3.68	3.68	17.0	17.0	P1107
2"	50	60.3	3.91	3.91	17.0	17.0	P1108
2-1/2"	65	73.0	5.16	5.16	17.0	17.0	P1109
3"	80	88.9	5.49	5.49	17.0	17.0	P1110
4"	100	114.3	6.02	6.02	15.2	15.2	P1111
5"	125	141.3	6.55	6.55	13.4	13.4	P1112
6"	150	168.3	7.11	7.11	12.2	12.2	P1113
8"	200	219.1	8.18	8.18	10.8	10.8	P1114
10"	250	273.0	9.27	9.27	9.8	9.8	P1115
12"	300	323.8	10.31	9.53	9.2	8.5	P1116
14"	350	355.6	11.13	9.53	9.0	7.7	P1117
16"	400	406.4	12.70	9.53	9.0	6.8	P1118
18"	450	457.0	14.27	9.53	9.0	6.0	P1119
20"	500	508.0	15.09	9.53	8.6	5.4	P1120
24"	600	610.0	17.48	9.53	8.3	4.5	P1121

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Available size for Sch80 (XS) pipe

Size			Thickness T (mm)		Test pressure (Mpa)		Ref. No.
NPS	DN	OD (mm)	Sch80	XS	Sch80	XS	
1/4"	8	13.7	3.02	3.02	17.0	17.0	P1131
3/8"	10	17.1	3.20	3.20	17.0	17.0	P1132
1/2"	15	21.3	3.73	3.73	17.0	17.0	P1133
3/4"	20	26.7	3.91	3.91	17.0	17.0	P1134
1"	25	33.4	4.55	4.55	17.0	17.0	P1135
1-1/4"	32	42.2	4.85	4.85	17.0	17.0	P1136
1-1/2"	40	48.3	5.08	5.08	17.0	17.0	P1137
2"	50	60.3	5.54	5.54	17.0	17.0	P1138
2-1/2"	65	73.0	7.01	7.01	17.0	17.0	P1139
3"	80	88.9	7.62	7.62	17.0	17.0	P1140
4"	100	114.3	8.56	8.56	19.0	19.0	P1141
5"	125	141.3	9.53	9.53	19.0	19.0	P1142
6"	150	168.3	10.97	10.97	18.8	18.8	P1143
8"	200	219.1	12.70	12.70	16.7	16.7	P1144
10"	250	273.0	15.09	12.70	15.9	13.4	P1145
12"	300	323.8	17.48	12.70	15.5	11.3	P1146
14"	350	355.6	19.05	12.70	15.4	10.3	P1147
16"	400	406.4	21.44	12.70	15.2	9.0	P1148
18"	450	457.0	23.83	12.70	15.0	8.0	P1149
20"	500	508.0	26.19	12.70	14.8	7.2	P1150
24"	600	610.0	30.96	12.70	14.6	6.0	P1151

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Available size for Sch160 (XXS) pipe

Size			Thickness T (mm)		Test pressure (Mpa)		Ref. No.
NPS	DN	OD (mm)	Sch160	XXS	Sch160	XXS	
1/2"	15	21.3	4.78	7.47	17.0	17.0	P1163
3/4"	20	26.7	5.56	7.82	17.0	17.0	P1164
1"	25	33.4	6.35	9.09	17.0	17.0	P1165
1-1/4"	32	42.2	6.35	9.70	17.0	17.0	P1166
1-1/2"	40	48.3	7.14	10.15	17.0	17.0	P1167
2"	50	60.3	8.74	11.07	17.0	17.0	P1168
2-1/2"	65	73.0	9.53	14.02	17.0	17.0	P1169
3"	80	88.9	11.13	15.24	17.0	17.0	P1170
4"	100	114.3	13.49	17.12	19.0	19.0	P1171
5"	125	141.3	15.88	19.05	19.0	19.0	P1172
6"	150	168.3	18.26	21.95	19.0	19.0	P1173
8"	200	219.1	23.01	22.23	19.0	19.0	P1174
10"	250	273.0	28.58	25.40	19.0	19.0	P1175
12"	300	323.8	33.32	25.40	19.0	19.0	P1176
14"	350	355.6	35.71	/	19.0	/	P1177
16"	400	406.4	40.49	/	19.0	/	P1178
18"	450	457.0	45.24	/	19.0	/	P1179
20"	500	508.0	50.01	/	19.0	/	P1180
24"	600	610.0	59.54	/	19.0	/	P1181

Chemical compositions (%)

C	Mn	P	S	Si	Cr	Cu	Mo	Ni	V
≤ 0.30	0.29-1.06	≤ 0.035	≤ 0.035	≥ 0.1	≤ 0.40	≤ 0.40	≤ 0.15	≤ 0.40	≤ 0.08

* For each reduction of 0.01% below the specified C max, an increase of 0.06% Mn above the specified max is permitted up to a max of 1.35%.

* The five elements combined of Cr, Cu, Mo, Ni and V (Chromium, Copper, Molybdenum, Nickel, and Vanadium) shall not exceed 1%.

Mechanical properties

Tensile strength / psi (MPa)	Yield strength / psi (MPa)	Longitudinal elongation (%)
≥ 60000 (415)	≥ 35000 (240)	≥ 19 / 20

* The elongation value conforms to TABLE 2 calculation of ASTM A106, and TPMC refers to min value of 19% for Sch40 pipe and 20% for Sch80 pipe.

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Hydrostatic test and NDE test

- It shall be applied to each pipe not less than 5 seconds, without leakage through the pipe wall (Refer to ASTM A530).
- The min test pressure need not exceed 2500 psi (17.0 MPa) for pipe \leq NPS 3", nor 2800 psi (19.0 MPa) for pipe $>$ NPS 3" (Refer to ASTM A530).
- Nondestructive electric test (NDE) is alternative to hydrostatic test, including ASTM E213 Ultrasonic testing, ASTM E309 Eddy current examination, ASTM E570 Flux leakage examination.

Note:

The equation of hydrostatic test pressure follows ASTM A530: $P = 2St/D$.

P = Minimum hydrostatic test pressure in psi or MPa.

S = Pipe wall stress in psi or MPa, 60% of the minimum yield strength.

t = Pipe wall thickness in inch or mm.

D = Pipe outside diameter in inch or mm.



Other tests

- Tensile test, bending test and flattening test.
- Permissible variations: tolerance on outer diameter, thickness, length.
- Straightness: The finished pipe shall be reasonably straight.
- Ovality (out of roundness): It is included in OD tolerance. For thin-wall pipe, any one cross-section shall not exceed 1.5% of OD (Refer to ASTM A530).
- OD / Thickness / Length test.
- Surface / coating test.
- Quantity and weight measurement.