

TUBASYS: DATA SHEET

ASTM STEEL PIPES A-106: Seamless Carbon Steel Pipes

Scope and Application

Carbon steel seamless tubes of nominal wall for according to ASME B36.10M for high temperature service.

Pipe ordered under this specification shall be suitable for bending, flanging, and similar forming operations, and for welding. When the steel is to be welded, it is presupposed that a welding procedure suitable to the grade of steel and intended use or service will be utilized.

For pipe NPS 1 1/2 [DN 40] and under, it shall be permissible to furnish hot finished or cold drawn. Unless otherwise specified, pipe NPS 2 [DN 50] and over shall be furnished hot finished. When agreed upon between the manufacturer and the purchaser, it is permissible to furnish cold-drawn pipe.

Hot-finished pipe need not be heat treated. Cold-drawn pipe shall be heat treated after the final cold draw pass at a temperature of 1200 °F (650 °C) or higher

Chemical composition

Grade	C %max (A)	Mn %	P %max	S %max	Si % min	Cr %max (B)	Cu %max (B)	Mo %max (B)	Ni %max (B)	V %max (B)
A	0.25	0.27-0.93	0.035	0.035	0.10	0.40	0.40	0.15	0.40	0.08
B	0.30	0.29-1.06	0.035	0.035	0.10	0.40	0.40	0.15	0.40	0.08
C	0.35	0.29-1.06	0.035	0.035	0.10	0.40	0.40	0.15	0.40	0.08

(A) For each reduction of 0.01 % below the specified carbon maximum, an increase of 0.06 % manganese above the specified maximum will be permitted up to a maximum of 1.35 %.

(B) B These five elements combined shall not exceed 1 %.

Tensile Requirements

The material shall conform to the requirements as to tensile properties given in following Table.

	Grado A	Grado B	Grado C
Tensile strength, min, psi (MPa)	48000 (330)	60000 (415)	70000 (485)
Yield strength, min, psi (MPa)	30000 (205)	35000 (240)	40000 (275)

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Lengths

The required lengths must be specified in the order. No jointers are permitted unless otherwise specified.

If definite lengths are not required, pipe may be ordered as follows:

- Single random lengths of 16 to 22 ft [4.8 to 6.7 m] with 5 % 12 to 16 ft [3.7 to 4.8 m],
- Double random lengths with a minimum average of 35 ft [10.7 m] and a minimum length of 22 ft [6.7 m] with 5 % 16 to 22 ft [4.8 to 6.7 m].

Tolerances on the wall Thickness

The minimum wall thickness at any point shall not be more than 12.5 % under the specified wall thickness.

Tolerances in Mass

The mass of any length of pipe shall not vary more than 10 % over and 3.5 % under that specified.

Tolerances in diameter

Except for pipe ordered as special outside diameter tolerance pipe or as inside diameter tolerance pipe, variations in outside diameter shall not exceed those given in Table:

- | | |
|------------------|----------------|
| • 1/8' a 1-1/2' | +0.4 mm-0.4 mm |
| • de 1-1/2' a 4' | +0.8 mm-0.8 mm |
| • de 4' a 8' | +1.6 mm-0.8 mm |
| • de 8' a 18' | +2.4 mm-0.8 mm |

For pipe over 10 in. [250 mm] ID ordered as inside diameter tolerance pipe, the inside diameter shall not vary more than 1 % over or 1 % under the specified inside diameter

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Bending Requirements.

For pipe NPS 2 [DN 50] and under, a sufficient length of pipe shall stand being bent cold through 90° around a cylindrical mandrel, the diameter of which is twelve times the outside diameter of the pipe, without developing cracks.

When ordered for close coiling, the pipe shall stand being bent cold through 180° around a cylindrical mandrel, the diameter of which is eight times the outside diameter (as shown in ASME B 36.10M) of the pipe, without failure.

Hydrostatic test.

Each tube should be tested hydrostatically unless an alternative test is performed by purchase specification.

The hydrostatic test referred has the capability of finding defects of a size permitting the test fluid to leak through the tube wall and may be either visually seen or detected by a loss of pressure. Hydrostatic testing is not necessarily capable of detecting very tight, through-the-wall imperfections or imperfections that extend an appreciable distance into the wall without complete penetration.

Inspection test pressures produce a tension in the tube wall equal to 60% of the specified minimum elastic limit at room temperature.

Maximum pressures should not exceed 2,500 psi for NPS 3 and under 2,800 psi for larger sizes. The pressure is maintained for not less than 5 seconds.

Non destructive Electric Test.

Instead of the hydrostatic test specified in the purchase order.

The ultrasonic testing referred to in this specification is capable of detecting the presence and location of significant longitudinally or circumferentially oriented imperfections: however, different techniques need to be employed for the detection of such differently oriented imperfections. Ultrasonic testing is not necessarily capable of detecting short, deep imperfections.

The eddy current examination referenced in this specification has the capability of detecting significant imperfections, especially of the short abrupt type.

The flux leakage examination referred to in this specification is capable of detecting the presence and location of significant longitudinally or transversely oriented imperfections: however, different techniques need to be employed for the detection of such differently oriented imperfections.

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Schedule Dimensions and Weights

NPS	OD (mm)	Units	10	30	40/STD	80/80S	160
1'	33.4	mm	2.77	2.90	3.38	4.55	6.35
		Kg/m	2.09	2.18	2.50	3.24	4.24
1.25'	42.2	mm	2.77	2.97	3.56	4.85	6.35
		Kg/m	2.69	2.87	3.39	4.47	5.61
1.5'	48.3	mm	2.77	3.18	3.68	5.08	7.14
		Kg/m	3.11	3.53	4.05	5.41	7.25
2'	60.3	mm	2.77	3.18	3.91	5.54	8.74
		Kg/m	3.93	4.48	5.44	7.48	11.11
2.5'	73.0	mm	3.05	4.78	5.16	7.01	9.53
		Kg/m	5.26	8.04	8.63	11.41	14.92
3'	88.9	mm	3.05	4.78	5.49	7.62	11.13
		Kg/m	6.46	9.92	11.29	15.27	21.35

NPS	OD (mm)	Units	10	30	40/STD	80/80S	120	160
4'	114.3	mm	3.05	4.78	6.02	8.56	11.13	13.49
		Kg/m	8.37	12.91	16.08	22.32	28.32	33.54
5'	141.3	mm	3.4		6.55	9.53	12.70	15.88
		Kg/m	11.56		21.77	30.97	40.28	49.12
6'	168.3	mm	3.40		7.11	10.97	14.27	18.26
		Kg/m	13.83		28.26	42.56	54.21	67.57

NPS	OD (mm)	Units	10	20	30	40/STD	60	80/80S	100	120	140	160
8'	219.1	mm	3.76	6.35	7.04	8.18	10.31	12.70	15.09	18.26	20.62	23.01
		Kg/m	19.97	33.32	36.82	42.55	53.09	64.64	75.92	90.44	100.93	111.27
10'	273.0	mm	4.19	6.35	7.8	9.27	12.70	15.09	18.26	21.44	25.40	28.58
		Kg/m	27.78	41.76	51.01	60.29	81.53	95.98	114.71	133.01	155.10	172.27
12'	323.8	mm	4.57	6.35	8.38	10.31	14.27	17.48	21.44	25.40	28.58	33.32
		Kg/m	35.98	49.71	65.19	79.71	108.93	132.05	159.87	186.92	208.08	238.69