

ASTM A312 seamless stainless steel pipe

ASTM A312 seamless stainless steel pipe (304/316) from TPMC is manufactured by piercing solid billets, involving no welding at any stage. This ensures a uniform structure with exceptional strength and reliability. As austenitic stainless steel, it offers excellent formability, non-magnetic properties, and superior corrosion resistance. Suitable for high-temperature and general corrosive service, it is widely used in petroleum, chemical, marine, automotive, and mechanical structural applications.



- Certificate: ISO
- Standard: ASTM A312 Seamless (SML), TP304 / TP304L / TP316 / TP316L
- Length: 6m / 5.8m / 11.8m / 12m / 20ft, etc.
- End: Plain: square cut
Beveled: 37.5° angle per ASME B16.25
Roll/cut-grooved: per AWWA C606
Threaded (NPT): per ASME B1.20.1
Threaded (BSPT): per ISO 7-1 / BS 21
- Surface: Pickling white / No.2B matte finish / BA finish (Bright Annealed)

Available sizes for Schedule 10S pipe

Outside diameter			Wall thickness		Weight	Test pressure	Ref. No.
NPS	DN	OD (mm)	Schedule No.	T (mm)	kg/m	MPa, min	
1/2"	15	21.3	10S	2.11	1.02	17.0	P2901-10S (ISO)
3/4"	20	26.7	10S	2.11	1.31	16.0	P2902-10S (ISO)
1"	25	33.4	10S	2.77	2.13	17.0	P2903-10S (ISO)
1-1/4"	32	42.2	10S	2.77	2.75	14.0	P2904-10S (ISO)
1-1/2"	40	48.3	10S	2.77	3.17	12.0	P2905-10S (ISO)
2"	50	60.3	10S	2.77	4.01	9.0	P2906-10S (ISO)
2-1/2"	65	73.0	10S	3.05	5.37	9.0	P2907-10S (ISO)
3"	80	88.9	10S	3.05	6.59	7.0	P2908-10S (ISO)
4"	100	114.3	10S	3.05	8.54	5.5	P2909-10S (ISO)
5"	125	141.3	10S	3.40	11.79	5.0	P2910-10S (ISO)
6"	150	168.3	10S	3.40	14.10	4.0	P2911-10S (ISO)
8"	200	219.1	10S	3.76	20.37	3.5	P2912-10S (ISO)
10"	250	273.0	10S	4.19	28.33	3.0	P2913-10S (ISO)
12"	300	323.8	10S	4.57	36.70	3.0	P2914-10S (ISO)
14"	350	355.6	10S	4.78	42.18	3.0	P2915-10S (ISO)
16"	400	406.4	10S	4.78	48.29	2.5	P2916-10S (ISO)

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Available sizes for Schedule 10S pipe

Outside diameter			Wall thickness		Weight	Test pressure	Ref. No.
NPS	DN	OD (mm)	Schedule No.	T (mm)	kg/m	MPa, min	
18"	450	457.2	10S	4.78	54.40	2.0	P2917-10S (ISO)
20"	500	508.0	10S	5.54	70.02	2.0	P2918-10S (ISO)
24"	600	609.6	10S	6.35	96.36	2.0	P2919-10S (ISO)

- Note:**
- TPMC references ASME B36.19M-2022 for austenitic stainless steel pipe weight, which is about 2% greater than carbon steel equivalents.
 - Test pressure is not tabulated in ASTM A312-2025. TPMC calculates it using the formula $P = 2St/D$ (304 grade), with pressure not to exceed 2500 psi (17.0 MPa) for NPS 1/2" to 3", and 2800 psi (19.0 MPa) for NPS > 3", in accordance with the standard ASTM A999. Actual mill test pressures are documented in the MTC/MTR.

Available sizes for Schedule 40S pipe

Outside diameter			Wall thickness		Weight	Test pressure	Ref. No.
NPS	DN	OD (mm)	Schedule No.	T (mm)	kg/m	MPa, min	
1/2"	15	21.3	40S	2.77	1.29	17.0	P2901-40S (ISO)
3/4"	20	26.7	40S	2.87	1.72	17.0	P2902-40S (ISO)
1"	25	33.4	40S	3.38	2.55	17.0	P2903-40S (ISO)
1-1/4"	32	42.2	40S	3.56	3.46	17.0	P2904-40S (ISO)
1-1/2"	40	48.3	40S	3.68	4.13	16.0	P2905-40S (ISO)
2"	50	60.3	40S	3.91	5.55	13.0	P2906-40S (ISO)
2-1/2"	65	73.0	40S	5.16	8.81	15.0	P2907-40S (ISO)
3"	80	88.9	40S	5.49	11.52	13.0	P2908-40S (ISO)
4"	100	114.3	40S	6.02	16.40	11.0	P2909-40S (ISO)
5"	125	141.3	40S	6.55	22.20	10.0	P2910-40S (ISO)
6"	150	168.3	40S	7.11	28.83	9.0	P2911-40S (ISO)
8"	200	219.1	40S	8.18	43.40	8.0	P2912-40S (ISO)
10"	250	273.0	40S	9.27	61.50	7.0	P2913-40S (ISO)
12"	300	323.8	40S	9.52	75.26	6.0	P2914-40S (ISO)
14"	350	355.6	40S	9.52	82.88	5.5	P2915-40S (ISO)
16"	400	406.4	40S	9.52	95.04	5.0	P2916-40S (ISO)
18"	450	457.2	40S	9.52	107.21	4.5	P2917-40S (ISO)
20"	500	508.0	40S	9.52	119.37	4.0	P2918-40S (ISO)
24"	600	609.6	40S	9.52	143.70	3.0	P2919-40S (ISO)

- Note:**
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 - Test pressure is not tabulated in ASTM A312-2025. TPMC calculates it using the formula $P = 2St/D$ (304 grade), with pressure not to exceed 2500 psi (17.0 MPa) for NPS 1/2" to 3", and 2800 psi (19.0 MPa) for NPS > 3", in accordance with the standard ASTM A999. Actual mill test pressures are documented in the MTC/MTR.

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Available sizes for Schedule 80S pipe

Outside diameter			Wall thickness		Weight	Test pressure	Ref. No.
NPS	DN	OD (mm)	Schedule No.	T (mm)	kg/m	MPa, min	
1/2"	15	21.3	80S	3.73	1.65	17.0	P2901-80S (ISO)
3/4"	20	26.7	80S	3.91	2.24	17.0	P2902-80S (ISO)
1"	25	33.4	80S	4.55	3.30	17.0	P2903-80S (ISO)
1-1/4"	32	42.2	80S	4.85	4.56	17.0	P2904-80S (ISO)
1-1/2"	40	48.3	80S	5.08	5.52	17.0	P2905-80S (ISO)
2"	50	60.3	80S	5.54	7.63	17.0	P2906-80S (ISO)
2-1/2"	65	73.0	80S	7.01	11.64	17.0	P2907-80S (ISO)
3"	80	88.9	80S	7.62	15.58	17.0	P2908-80S (ISO)
4"	100	114.3	80S	8.56	22.77	15.0	P2909-80S (ISO)
5"	125	141.3	80S	9.53	31.59	14.0	P2910-80S (ISO)
6"	150	168.3	80S	10.97	43.41	12.0	P2911-80S (ISO)
8"	200	219.1	80S	12.70	65.94	12.0	P2912-80S (ISO)
10"	250	273.0	80S	12.70	83.16	10.0	P2913-80S (ISO)
12"	300	323.8	80S	12.70	99.39	8.0	P2914-80S (ISO)
14"	350	355.6	80S	12.70	109.54	7.0	P2915-80S (ISO)
16"	400	406.4	80S	12.70	125.77	6.5	P2916-80S (ISO)
18"	450	457.2	80S	12.70	142.00	6.0	P2917-80S (ISO)
20"	500	508.0	80S	12.70	158.23	5.0	P2918-80S (ISO)
24"	600	609.6	80S	12.70	190.69	4.5	P2919-80S (ISO)

- Note:**
- TPMC references ASME B36.19M-2022 for austenitic stainless steel pipe weight, which is about 2% greater than carbon steel equivalents.
 - Test pressure is not tabulated in ASTM A312-2025. TPMC calculates it using the formula $P = 2St/D$ (304 grade), with pressure not to exceed 2500 psi (17.0 MPa) for NPS 1/2" to 3", and 2800 psi (19.0 MPa) for NPS > 3", in accordance with the standard ASTM A999. Actual mill test pressures are documented in the MTC/MTR.

Chemical composition (%) per ASTM A312 304/316

Grade	C	Mn	P	S	Si	Cr	Ni	Mo	Other
TP304	≤ 0.08	≤ 2.00	≤ 0.045	≤ 0.030	≤ 1.00	18.0 ~ 20.0	8.0 ~ 11.0	...	...
TP304L	≤ 0.035	≤ 2.00	≤ 0.045	≤ 0.030	≤ 1.00	18.0 ~ 20.0	8.0 ~ 13.0	...	...
TP316	≤ 0.08	≤ 2.00	≤ 0.045	≤ 0.030	≤ 1.00	16.0 ~ 18.0	10.0 ~ 14.0	2.0 ~ 3.0	...
TP316L	≤ 0.035	≤ 2.00	≤ 0.045	≤ 0.030	≤ 1.00	16.0 ~ 18.0	10.0 ~ 14.0	2.0 ~ 3.0	...

Note: Where ellipses (...) appear, there is no requirement for the element, and analysis need not be determined or reported.

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Mechanical properties per ASTM A312 304/316

Grade	Tensile strength	Yield strength	Longitudinal elongation
TP304	≥ 75 ksi (515 MPa)	≥ 30 ksi (205 MPa)	≥ 35%
TP304L	≥ 70 ksi (485 MPa)	≥ 25 ksi (170 MPa)	≥ 35%
TP316	≥ 75 ksi (515 MPa)	≥ 30 ksi (205 MPa)	≥ 35%
TP316L	≥ 70 ksi (485 MPa)	≥ 25 ksi (170 MPa)	≥ 35%



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Standard requirements

- Heat Treatment: Furnished in solution-annealed condition at $\geq 1900^{\circ}\text{F}$ (1040°C), followed by rapid cooling. For seamless pipe, heat treatment may be performed by direct quenching after hot forming.
- Product analysis: Chemical composition verified by product analysis.
- Tensile test: Tensile, yield, and elongation tested per standard.
- Flattening test: Performed on a sufficient number per ASTM A999.
- Bending test: Not for seamless pipe.



Hydrostatic test (when performed)

- Each pipe is subjected to a hydrostatic test at the specified pressure, held for at least 5 seconds with no leakage.
- Test pressures meet specification minimums but do not exceed 2500 psi (17.0 MPa) for NPS $\leq 3"$ and 2800 psi (19.0 MPa) for larger sizes.



Hydrostatic test pressure formula

- The minimum hydrostatic test pressure is calculated using the formula

$$P = 2St/D$$

Where:

P = Minimum hydrostatic test pressure (MPa).

S = 50% of the specified minimum yield strength (MPa, for austenitic stainless steel).

t = Specified wall thickness (mm).

D = Specified outside diameter (mm).

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Nondestructive electric test (NDE)

- As an alternative to hydrostatic test, nondestructive electric test (NDE) is permitted for full length of each pipe in accordance with any of the following Practices:
ASTM E213 (ultrasonic),
ASTM E426 (eddy current),
ASTM E570 (flux leakage).



Dimensional tolerances

- Outside diameter: per ASTM A999, $+1/64"$ / $-1/32"$ for NPS $\leq 1-1/2"$, $\pm 1/32"$ for NPS 2" to 4", $+1/16"$ / $-1/32"$ for NPS 5" to 8", $+3/32"$ / $-1/32"$ for NPS 10" to 18", $+1/8"$ / $-1/32"$ for NPS 20" to 24".
- Wall thickness: Minimum not more than 12.5% under nominal, upper varies by T/D ratio.
- Cut length: $+1/4"$ (6.4 mm) / $-0"$ per ASTM A999 (for specified length).
- Weight: NPS $\leq 12"$, $+10\%$ / -3.5% ; measured per bundle for NPS $\leq 4"$, per individual length for NPS $> 4"$.



Other quality assurance

- Straightness: Reasonably straight.
- Coating inspection: Not applicable (per ASTM A312, no external coating is required).
- Marking: Legibly marked per standard (see TPMC PA71).
- Packaging: End protection, bundling, and shipping marks (see TPMC PA81).
- Test certificate: Issued by TPMC with full traceability to MTC/MTR.