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# ASTM A312 Pipe



# INTRODUCTION

## What is ASTM A312 Pipe?

The **ASTM A312 Pipe** is a seamless pipe made following the American Standard specification. The pipes can be straight seam welded and heavily cold worked too. This austenitic stainless steel pipe is primarily used for applications that take place in high temperatures and generally corrosive environments. The **A312 Pipe** is more popular in industries that have demanding service conditions. The chemical composition of this stainless steel has added elements like chromium and nickel in its alloy, which increases the corrosion resisting properties of the material. There are different grades of this stainless steel available and each possesses some unique properties.

## A312 Pipe Manufacturing Types

The manufacturing types of the **ASTM A312 Stainless Steel Pipe** are listed below:

- Seamless pipe- This one covers pipes or tubes in hot rolling and cold drawing procedures.
- Welded pipe- These are manufactured by automatic welding process, without the use of any filler material.
- Cold worked pipe- Herein cold working of more than or equal to 35% is applied and there is a thickness reduction of both the walls. Here too, no fillers are used in the welding process.
- Welded and HCW pipe- herein welded and HCW **ASME SA312** pipe of NPS 14 or less is used and they should have a single longitudinal weld.

## ASTM A312 Tubing Testing

The mechanical properties of the **ASTM A312M** material can be easily determined through different types of mechanical testing procedures like:

- Transverse or longitudinal tension test- Here from a lot of not more than 100 specimens, a single **ASTM A312 Seamless Stainless Steel Pipe** pipe or tube is chosen for tensile testing. If the lot has more than 100 pipes, then two pipes should be chosen as the specimen.

- Flatten Test- Herein the **A312 pipe material** is heat treated in a batch furnace. 5% steel pipes from the total heat treated lot should be taken for the test.

The pipes shall also be subjected to non-destructive hydrostatic or electric tests.

### Annealing Requirements for A312 pipe material

The annealing requirements for all the grades of **ASTM A312 Tubing** material is that they should be heat treated at the temperature of 1040 degrees C. Then they should be rapidly cooled by any means or quenched in water at a rate that can prevent carbide re-precipitation. The heat treatment on the **ASTM A312 Seamless Pipe** should be done by separate solution annealing, or by the process of direct quenching.



# SPECIFICATION

Specification	ASTM A312
Outside Diameter Range	1/8 to 4 Inch Nominal Bore
Wall Thickness Range	Schedule 80, Schedule 160, XS, Schedule 120, XXS, STD, Schedule 60, Schedule 140, Schedule 40, Schedule 20, Schedule 30
Standard length	6 metres
Grades	<ul style="list-style-type: none"> <li>➤ 304/L/H/LN</li> <li>➤ 316/L/H/LN/Ti</li> <li>➤ 309</li> <li>➤ 310/L/H/S</li> <li>➤ 317/L/H</li> <li>➤ 321/H</li> <li>➤ 347/H</li> </ul>
Supply Condition	Solution-Annealed pickled and passivated
Product-contacting surfaces	<ul style="list-style-type: none"> <li>➤ Average roughness value: Ra &lt; 0.8 µm</li> <li>➤ Weld seam area: Ra &lt; 1.6 µm</li> </ul>
Nominal diameters	<ul style="list-style-type: none"> <li>➤ DN 10 – 200 not annealed</li> <li>➤ DN 10 – 150 annealed</li> </ul>
Use	<ul style="list-style-type: none"> <li>➤ Beverage</li> <li>➤ Food</li> <li>➤ Chemical Industries</li> </ul>

# DIMENSION

Nominal size in Inch	Outside diameter in Inch	Outside diameter in mm	Wall thickness in mm	Wall thickness in Inch	Weight	Weight
1 1/4 Inch	1.660 Inch	42.2 mm	1.65	0.065	1.12	1.66
3/4 Inch	1.050 Inch	26.7 mm	1.65	0.065	0.69	1.03
16 Inch	16.000 Inch	406.4 mm	4.19	0.165	28.11	41.83
1 Inch	1.315 Inch	33.4 mm	1.65	0.065	0.87	1.30
22 Inch	22.000 Inch	559.0 mm	4.78	0.188	44.18	65.75
2 Inch	2.375 Inch	60.3 mm	1.65	0.065	1.61	2.40
30 Inch	30.000 Inch	762.0 mm	6.35	0.250	80.02	119.09
3 Inch	3.500 Inch	88.9 mm	2.11	0.083	3.05	4.54
8 Inch	8.625 Inch	219.1 mm	2.77	0.109	9.99	14.87
2 1/2 Inch	2.875 Inch	73.0 mm	2.11	0.083	2.49	3.71
1/2 Inch	0.840 Inch	21.3 mm	1.65	0.065	0.54	0.80
3 1/2 Inch	4.000 Inch	101.6 mm	2.11	0.083	3.50	5.21
4 Inch	4.500 Inch	114.3 mm	2.11	0.083	3.95	5.88
14 Inch	14.000 Inch	355.6 mm	3.96	0.156	23.22	34.56
10 Inch	10.750 Inch	273.1 mm	3.4	0.134	15.29	22.76
5 Inch	5.563 Inch	141.3 mm	2.77	0.109	6.40	9.52
18 Inch	18.000 Inch	457.0 mm	4.19	0.165	31.64	47.09
6 Inch	6.625 Inch	168.3 mm	2.77	0.109	7.65	11.38
12 Inch	12.750 Inch	323.9 mm	3.96	0.156	21.13	31.44
1 1/2 Inch	1.900 Inch	48.3 mm	1.65	0.065	1.28	1.91
20 Inch	20.000 Inch	508.0 mm	4.78	0.188	40.12	59.70
24 Inch	24.000 Inch	610.0 mm	5.54	0.218	55.85	83.11

# PRESSURE RATING

Outside Diameter Inch	Pipe Size in Inch	Temperature								
		100	200	300	400	500	600	650	700	750
		Allowable Stress (psi)								
		16700	16700	16700	15500	14400	13500	13200	12900	12600
6.625	6	877	877	877	814	756	709	693	677	661
6.625		1379	1379	1379	1280	1189	1115	1090	1065	1040
6.625		2382	2382	2382	2211	2054	1925	1883	1840	1797
1.315	1	2205	2205	2205	2047	1902	1783	1743	1703	1664
1.315		3061	3061	3061	2841	2640	2475	2420	2365	2310
1.315		4493	4493	4493	4170	3874	3632	3552	3471	3390
2.375	2	1371	1371	1371	1272	1182	1108	1083	1059	1034
2.375		1985	1985	1985	1843	1712	1605	1569	1534	1498
2.375		3283	3283	3283	3047	2831	2654	2595	2536	2477
1.900	1 1/2	1629	1629	1629	1512	1404	1317	1287	1258	1229
1.900		2303	2303	2303	2138	1986	1862	1821	1779	1738
1.900		3362	3362	3362	3120	2899	2717	2657	2597	2536
5.563	5	965	965	965	896	832	780	763	746	728
5.563		1428	1428	1428	1325	1231	1154	1129	1103	1077
5.563		2474	2474	2474	2296	2133	2000	1955	1911	1866
3.500	3	1301	1301	1301	1208	1122	1052	1028	1005	982
3.500		1844	1844	1844	1712	1590	1491	1458	1425	1391
3.500		2787	2787	2787	2587	2403	2253	2203	2153	2103
8.625	8	771	771	771	716	665	623	610	596	582
8.625		1218	1218	1218	1131	1050	985	963	941	919
8.625		2298	2298	2298	2133	1982	1858	1817	1775	1734
4.500	4	1102	1102	1102	1023	950	891	871	851	831
4.500		1596	1596	1596	1482	1377	1291	1262	1233	1204
4.500		2611	2611	2611	2424	2552	2111	2064	2017	1970
10.750	10	699	699	699	649	603	565	553	540	528
10.750		1159	1159	1159	1075	999	937	916	895	874
10.750		2289	2289	2289	2124	1974	1850	1809	1768	1727

# CHEMICAL COMPOSITION

Grades	Phosphorus	Carbon	Manganese	Nickel	Chromium	Sulfur	Silicon	Other
SS 304	0.04	0.08	2	8.00 11.00	18.00 20.00	0.03	0.075	
SS 304L	0.04	0.035	2.00	8.00 13.00	18.00 20.00	0.03	0.75	
SS 304H	0.04	0.04 0.1	2	8.00 11	18.00 20	0.03	0.75	
SS 310	0.04	0.15	2	19.00 22	24.00 26	0.03	0.75	
SS 316	0.040	0.08	2.00	11.00 4.00	16.00 18.00	0.030	0.75	Mo2.00-3.00
SS 316L	0.04	0.035	2	10.00 15	16.00 18	0.03	0.75	Mo 2.00 3.00
SS 316H	0.040	0.04 0.10	2.00	11.00 14.00	16.00 18.00	0.030	0.75	Mo2.00-3.00
SS 317	0.04	0.08	2	11.00 14	18.00 20	0.03	0.75	Mo 3.00 4.00
SS 321	0.04	0.48	2.03	9.00 13	17.00 20	0.03	0.75	Ti 5XC-0.60
SS 347	0.04	0.08	2.00	7.00 13	17.00 20	0.03	0.75	Cb + Ta 10 XC-1.00
SS 21-6-9	0.06	0.04	8.00	5.50 7.5	19.00 21.5	0.03	1	N 0.15 0.40
SS 416	0.066	0.15	1.25	—	12.00 14.00	0.15	1.00	—

# MECHANICAL PROPERTIES

Grade	Tensile Strength	Rockwell Hardness	Elongation	Yield Strength
SS 304	85000 105000	RB80 RB95	55 20	35000 75000
SS 304L	80000 105000	RB75 RB95	55 20	30000 75000
SS 304H	85,000	RB80	55	35,000
SS 21-6-9	100000 142000	RB9,0 RC30.	45 20	60000 120000
SS 316 SS 316L SS 316H	85000 80000 85000	RB80 RB75 RB80	50 50 50	35000 30000 35000
SS 347	95,000	RB85	50	40,000
SS 321	90,000 105000	RB80 RB95	55 20	35000 75000
SS 310	95,000	RB85	45	45,000
SS 317	90,000	RB85	45	40,000
SS 416	75,000	RB95	20	35,000



# FEATURES

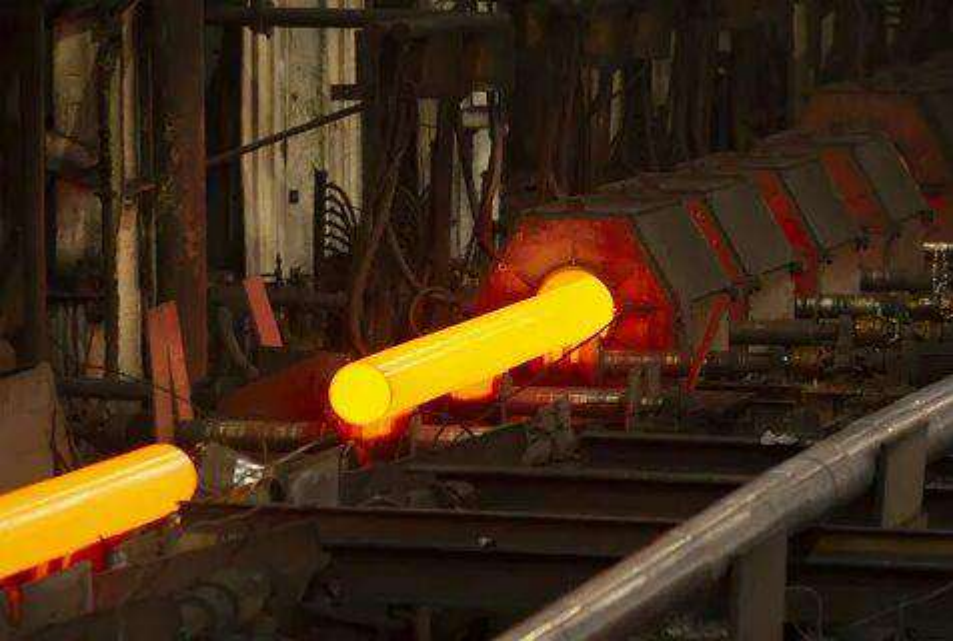
## ASME SA312 Stainless Steel Pipe Features

- Higher Resistance to Corrosion
- Cryogenic Toughness That Is Higher
- Higher Rate of Work Hardening
- Increased Hot Strength
- Increased Ductility
- More Toughness and Strength
- A Look That Is More Appealing
- Reduced Upkeep
- Corrosion Protection

## Tolerance of ASTM A312 Pipe

Nominal Pipe Size	Over Inch	Under Inch
Over 1-1/2 to 4, Include	1/32 (0.031)	1/32 (0.031)
Over 4 to 8, Include	1/16 (0.062)	1/32 (0.031)
1/8 to 1-1/2, Include	1/64 (0.015)	1/32 (0.031)
Over 8 to 18, Include	3/23 (0.093)	1/32 (0.031)





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