

Suggested Allowable Working Pressure for Stainless Steel Tubing

Table 1 — Fractional Stainless Steel Seamless Tubing

Allowable working pressures are calculated from an S value of 20 000 psi (137.8 MPa) for ASTM A269 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3, except as noted. Multiply stainless steel rating by 0.94 for working pressure in accordance with ASME B31.1.

For Welded Tubing

For welded and drawn tubing, a derating factor must be applied for weld integrity:

- ⦿ For double-welded tubing, multiply working pressure by 0.85.
- ⦿ For single-welded tubing, multiply working pressure by 0.80.

Tube O.D. (in.)	Nominal Wall Thickness, in.															
	0.010	0.012	0.014	0.016	0.020	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134	0.156	0.188
	Working Pressure, psig															
1/16	5600	6800	8100	9400	12000											
1/8						8500	10900									
3/16						5400	7000	10200								
1/4						4000	5100	7500								
5/16							4000	5800	8000							
3/8							3300	4800	6500							
1/2							2600	3700	5100	6700						
5/8								2900	4000	5200	6000					
3/4								2400	3300	4200	4900	5800				
7/8								2000	2800	3600	4200	4800				
1									2400	3100	3600	4200	4700			
1 1/4										2400	2800	3300	3600	4100	4900	
1 1/2											2300	2700	3000	3400	4000	4900

Note: For gas service, select a tube thickness outside of the shaded area.

Suggested Ordering Information

High-quality, fully annealed (Type 304/304L, 316/316L) (seamless or welded and drawn) stainless steel hydraulic tubing, ASTM A269 or A213, or equivalent. Hardness not to exceed 90 HRB or 200 HV. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed ±0.003 in. for 1/16 in. O.D. tubing.

Note: Certain austenitic stainless tubing has an allowable ovality tolerance double the O.D. tolerance and may not fit into FITOK precision tube fittings. Dual-certified grades such as 304/304L and 316/316L meet the minimum chemistry and the mechanical properties of both alloy grades.

Table 2—Metric Stainless Steel Seamless Tubing

Allowable working pressures are based on equations from ASME B31.3 for EN ISO 1127 tubing (D4, T4 tolerance for 3 to 12 mm; D4, T3 tolerance 14 to 50 mm), using a stress value of 137.8 MPa (20 000 psi) and tensile strength of 516.4 MPa (74 900 psi), except as noted. Multiply stainless steel rating by 0.94 for working pressure in accordance with ASME B31.1.

For Welded Tubing

For welded and drawn tubing, a derating factor must be applied for weld integrity:

- ⦿ For double-welded tubing, multiply working pressure by 0.85.
- ⦿ For single-welded tubing, multiply working pressure by 0.80.

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Tube O.D. (mm)	Nominal Wall Thickness, mm													
	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0	3.5	4.0	4.5	4.5
	Working Pressure, bar													
3	670													
6	310	420	540	710										
8		310	390	520										
10		240	300	400	510	580								
12		200	250	330	410	470								
14		160	200	270	340	380	430							
15		150	190	250	310	360	400							
16			170	230	290	330	370	400						
18			150	200	260	290	320	370						
20			140	180	230	260	290	330	380					
22			140	160	200	230	260	300	340					
25					180	200	230	260	290	320				
28						180	200	230	260	280	330			
30						170	180	210	240	260	310			
32						160	170	200	220	240	290	330		
38							140	160	190	200	240	270	310	

Note: For gas service, select a tube thickness outside of the shaded area.

Suggested Ordering Information

High-quality, fully annealed (Type 304/304L, 316/316L) stainless steel tubing, EN ISO 1127 or equivalent. Hardness not to exceed 90 HRB or 200 HV. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed ± 0.076 mm for 3 mm O.D. tubing.

Note: Dual-certified grades such as 304/304L, 316/316L meet the minimum chemistry and the mechanical properties of both alloy grades.

BA (Bright Annealing) Tubing

Features: Finish-rolling with bright annealing treatment, achieving good internal surface finish; Hardness under HRB90; Low carbon, high nickel, high chromium and molybdenum, better corrosion resistance; Close dimensional tolerance, better consistency in application; Longer service life in marine environment application; Applicable to clean industry, such as semiconductor, biological pharmaceuticals, food processing and other fields.

Composition:

Material	Chemical Component							
	C	Mn	P	S	Si	Ni	Cr	Mo
316/316L	≤ 0.03	≤ 2.00	≤ 0.04	≤ 0.03	≤ 0.75	12.0-14.0	17.0-18.0	2.50-3.00

Internal Surface States:

Dimension in. (mm)	Internal Surface Finish	
	Ra (μm)	Ra (μinch)
1/8 (3) \leq OD \leq 2 (50)	≤ 0.38	≤ 15

MP (Mechanical Polishing) Tubing

Features: Cold drawn and with mechanical polishing, acid pickling of internal surface; Hardness under HRB90.

Composition: In accordance with the standard requirements, please refer to the corresponding standard.

Dimensions and Tolerance: In accordance with the standard requirements, please refer to the corresponding standard.

Internal surface state: acid pickling, surface finish $Ra \leq 3.2 \mu\text{m}$.