

**Stainless Steel Tubing**

 Table 2. **Fractional Seamless Stainless Steel Tubing**

Fully annealed austenitic Type 304 or 316 seamless tubing ASTM A269 or ASTM A213, or equivalent. Tubing to be free from scratches, draw mark, dirt, dust, flat spots, and suitable for bending and flaring. Recommended hardness:90 HRB or less.

OD in.	Wall Thickness (in.)																		
	0.012	0.014	0.016	0.02	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.12	0.134	0.156	0.188				
1/16	6800	8100	9400	12000															
1/8					8500	10900													
3/16					5400	7000	10200												
1/4					4000	5100	7500	10200											
5/16						4000	5800	8000											
3/8							3300	4800	6500	7500									
1/2								2400	3500	4700	6200								
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
2															2000	2200	2500	2900	3600

 Table 3. **Metric Seamless Stainless Steel Tubing**

OD mm	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	
3	710													
6	330	420	520	670										
8		310	380	490										
10		240	300	380										
12		200	240	310	380	430								
14		180	220	280	340	390	430							
15		170	200	260	320	360	400							
16			190	240	300	330	370							
18			170	210	260	290	320	370						
20			150	190	230	260	290	330	380					
22			130	170	210	230	260	300	340					
25				180	200	230	260	300	320					
28					180	200	230	260	280	330				
30						170	190	210	240	260	310			
32							160	170	200	230	240	290	330	
38								140	170	190	200	240	280	310
50										150	180	210	240	

- According to the requirements of ASME B31.3 Process Piping Code and ASME B31.1 Power Piping Code, allowable working pressure calculated at -20 to 100°F (-28 to 37°C) using S value of 20,000 psi.
- Pressure calculations are based on maximum O.D. and minimum wall thickness and no allowance is made for corrosion and erosion. i.e., ASTM A269 1/2 in. OD x 0.035 in. WT: OD tolerance ± 0.005 in., WT tolerance ± 15%. Calculations are based on 0.505 in. OD x 0.0298 in. WT.
- Safety Factor is 3.75 to 1, considering ultimate tensile strength of 75,000 psi.

**Weld Stainless Steel Tubing Allowable Working Pressure**

To determine the working pressure of weld tubing to the requirements of ASME B31.3 Code, de-rating factors below must be applied. For single weld tubing multiply by 0.80, and for double weld tubing multiply by 0.85.

Example: SS316 seamless 1/2 in. O.D. x 0.065 in. WT allowable working pressure: 4700 psi.

To determine the work pressure of the single weld tubing, multiply 4700 psi by 0.80.  
 4700 psig x 0.80 = 3760 psig at -20 to 100°F (-28 to 37°C).

## Copper Tubing

Table 4. **Fractional Seamless Copper Tubing**

Soft annealed seamless copper tubing ASME B75 or equivalent. Soft annealed (Temper 0) copper water tube, type K or Type L to ASTM B88. Recommended hardness: 60 HRB or less.

OD in.	Wall Thickness (in.)											
	0.010	0.012	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120		
1/8			2700	3600								
3/16			1800	2300	3400							
1/4			1300	1600	2500	3500						
5/16				1300	1900	2700						
3/8				1000	1600	2200						
1/2				800	1100	1600	2100					
5/8					900	1200	1600	1900				
3/4					700	1000	1300	1500	1800			
7/8					600	800	1100	1300	1500			
1					500	700	900	1100	1300	1500		

Table 5. **Metric Seamless Copper Tubing**

OD mm	Wall Thickness (mm)									
	0.7	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	
3	225	260								
4	165	191	244	295						
6		122	157	192	245					
8			114	140	179					
10			89	109	140					
12			73	89	114	140	158			
14			62	76	96	118	133			
16					83	102	114	127	147	
18					74	90	101	112	129	
22					59	72	81	90	103	
25					52	63	71	78	90	

- According to the requirements of ASME B31.3 Process Piping Code and ASME B31.1 Power Piping Code, allowable working pressure calculated at -20 to 100°F (-28 to 37°C) using S value of 6000 psi.
- Safety Factor is 5 to 1, considering ultimate tensile strength of 30,000 psi.

## Carbon Steel Tubing

Table 6. **Fractional Seamless Carbon Steel Tubing**

Soft annealed seamless carbon steel hydraulic tubing ASTM A179 or equivalent. Tubing to be free from scratches, draw mark, dirt, dust, flat spots, and suitable for bending and flaring. Recommended hardness: 72 HRB or less.

OD in.	Wall Thickness (in.)												
	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134	0.148	0.165	0.180	0.220
1/8	8000	10200											
3/16	5100	6600	9600										
1/4	3700	3700	7000	9600									
5/16		3800	5500	7600									
3/8		3100	4500	6200									
1/2		2300	3300	4500	5900								
5/8		1800	2600	3500	4600	5300							
3/4			2100	2900	3700	4300	5100						
7/8			1800	2400	3200	3700	4300						
1			1500	2100	2700	3200	3700	4100					
1 1/4				1600	2100	2500	2900	3200	3600	4000	4600	5000	
1 1/2					1800	2000	2400	2600	3000	3300	3700	4100	5100
2						1500	1700	1900	2200	2400	2700	3000	3700

Table 7. **Metric Seamless Carbon Steel Tubing**

OD mm	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
3	670	830											
6	310	400	490	630									
8		290	360	460									
10		230	280	360									
12		190	230	290	360	410	450						
14		160	190	250	300	340	380						
15		150	180	230	280	320	350						
16			170	210	260	290	330	380					
18			150	190	230	260	290	330					
20			130	170	200	230	250	290	330				
22			120	150	180	210	230	260	300				
25					160	180	200	230	260	280			
28						160	180	200	230	250	290		
30						150	160	190	210	230	270		
32						140	150	170	200	210	250	290	
38							130	140	160	180	210	240	280

Working Pressure in bar

- Allowable working pressure calculated at -20 to 100°F (-28 to 37°C) using S value of 15,700 psi according to ASME B31.3 Process Piping Code.
- Safety Factor is 3 to 1, considering ultimate tensile strength of 47,000 psi.
- To determine working pressure of ASME B31.1 Power Piping Code, multiply the ASME B31.3 rating by 0.85

Table 8. **Fractional Seamless Alloy 400 Tubing**

Fully annealed seamless Alloy 400 Tubing ASTM B165 or equivalent. Tubing to be free from scratches, draw mark, dirt, dust, at spots, and suitable for bending and aring. Recommended hardness: 75 HRB or less.

OD in.	Wall Thickness (in.)							
	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120
1/8	7900	10100						
1/4	3700	4800	7000	9500				
3/8		3100	4400	6100				
1/2		2300	3200	4400				
3/4			2200	3000	4000	4600		
1				2200	2900	3400	3900	4300

- According to the requirements of ASME B31.3 Process Piping Code and ASME B31.1 Power Piping Code, allowable working pressure calculated at -20 to 100°F (-28 to 37°C) using S value of 18,700 psi.
- Safety Factor is 3.74 to 1, considering ultimate tensile strength of 70,000 psi.

Table 9. **Fractional Seamless Alloy C276 Tubing**

Fully annealed seamless Alloy C276 Tubing ASTM B622 or equivalent. Tubing to be free from scratches, draw mark, dirt, dust, at spots, and suitable for bending and aring. Recommended hardness: 100 HRB or less.

OD in.	Wall Thickness (in.)			
	0.028	0.035	0.049	0.065
1/4	4000	5100	7500	10200
5/16		4000	5800	7800
3/8		3300	4800	6500
1/2		2600	3700	5100

- According to the requirements of ASME B31.3 Process Piping Code and ASME B31.1 Power Piping Code, allowable working pressure calculated at ambient temperature using S value of 27,300 psi.
- Safety Factor is 3.66 to 1, considering ultimate tensile strength of 100,000 psi.

\* Working Pressure in psig

Table 10. **Fractional Seamless Alloy 825 Tubing**

Fully annealed seamless Alloy 825 Tubing ASTM B423 or equivalent. Tubing to be free from scratches, draw mark, dirt, dust, at spots, and suitable for bending and aring. Recommended hardness: 95 HRB or less.

OD in.	Wall Thickness (in.)		
	0.035	0.049	0.065
1/4	6400	9300	11600
3/8	4100	5900	8200
1/2	3000	4300	5900

- According to the requirements of ASME B31.3 Process Piping Code and ASME B31.1 Power Piping Code, allowable working pressure calculated at ambient temperature using S value of 23,300 psi.
- Safety Factor is 3.64 to 1, considering ultimate tensile strength of 85,000 psi.

\* Working Pressure in psig

**Table 11. Fractional Seamless Alloy 625 Tubing**

Fully annealed seamless Alloy 625 Tubing ASTM B444 Grade 1 or equivalent.  
Tubing to be free from scratches, draw mark, dirt, dust, flat spots, and suitable for bending and flaring.

OD in.	Wall Thickness (in.)		
	0.035	0.049	0.065
1/4	7300	10700	14600
3/8	4700	6800	9400
1/2	3500	5000	6800

- Allowable working pressure is calculated at ambient temperature using S value of 40,000 psi according to ASME B31.3 Code.
- Safety Factor is 3 to 1, considering ultimate tensile strength of 120,000 psi.
- To determine working pressure of ASME B31.1 Power Piping Code, multiply the ASME B31.3 rating by 0.86.

\* Working Pressure in psig

**Table 12. Fractional Seamless Super Duplex Tubing**

Fully annealed Super Duplex Tubing ASTM A789 S32750 or equivalent. Tubing to be free from scratches, draw mark, dirt, dust, at spots, and suitable for bending and aring. Recommended hardness: 32 HRC or less.

OD in.	Wall Thickness (in.)				
	0.035	0.049	0.065	0.083	0.095
1/4	10000	15000			
3/8	6500	10100	12700		
1/2	5000	7200	10100	12900	
5/8		5800	7600	10100	
3/4		4700	6300	8500	10000

- Allowable working pressure calculated at ambient temperature using S value of 38,700 psi according to ASME B31.3 Code.
- Safety Factor is 3 to 1, considering ultimate tensile strength of 116,000 psi.

\* Working Pressure in psig

**Table 13. Fractional Seamless Alloy 20 Tubing**

Fully annealed seamless Alloy 20 Tubing ASTM B729 or equivalent. Tubing to be free from scratches, draw mark, dirt, dust, flat spots, and suitable for bending and flaring. Recommended hardness: 95 HRB or less.

OD in.	Wall Thickness (in.)			
	0.028	0.035	0.049	0.065
1/8	Working Pressure in psig			
3/16	Working Pressure in psig			
1/4	4500	5100	7500	10200
5/16				
3/8		3300	4800	6500
1/2		2600	3700	5100

- Allowable working pressure calculated at ambient temperature using S value of 23,300 psi according to ASME B31.3 Process Piping Code.
- To determine working pressure of ASME B31.1 Power Piping Code, multiply the ASME B31.3 rating by 0.98.

\* Working Pressure in psig

**Temperature De-rating Factors**

The pressure rating of DK-Lok port is governed by the connective tubing pressure rating.  
To determine allowable working pressure at elevated temperature, multiply working pressure by applicable factor shown in table 14.

Example: SS316 seamless tubing 1/2 in. O.D. x 0.065 in.WT at 700 °F. 4700 psig x 0.82 = 3854 psi.  
Allowable working pressure of SS316 seamless 1/2 in. O.D. x 0.065 in. WT is 3854 psi at 700 °F.

Table 14.

Temp.		Stainless		C.steel	Copper	825	C276	625	20	400	Super Duplex
°F	°C	304	316	A179	B75	B423	B622	B444	B729	B165	A789
100	38	1	1	1	1	1	1	1	1	1	1
200	93	1	1	0.96	0.8	0.92	1	1	0.9	0.88	0.9
300	149	1	1	0.9	0.78	0.87	1	1	0.86	0.79	0.85
400	204	0.94	0.97	0.86	0.5	0.83	1	1	0.83	0.79	0.82
500	260	0.88	0.9	0.82	0.13	0.79	0.98	0.97	0.79	0.79	0.81
600	316	0.82	0.85	0.77		0.76	0.93	0.95	0.77	0.79	0.8
700	371	0.8	0.82	0.73		0.74	0.87	0.93	0.76	0.79	
800	427	0.76	0.8	0.59		0.73	0.84	0.93	0.73	0.76	
900	482	0.73	0.78			0.73	0.81	0.93			
1000	538	0.69	0.77			0.71	0.79	0.93			
1200	649	0.3	0.37				0.35	0.33			