Tubing

Contents

Tubing Selection

Proper selection, handling, and installation of tubing, when combined with proper selection of FITOK tube fittings, are essential for reliable tubing systems.

The following variables should be considered when ordering tubing for use with FITOK tube fittings:

◎ Material
◎ Hardness
◎ Wall thickness
◎ Surface finish

Material

Our suggested ordering instructions for each type of tubing are shown under the respective tables.

Hardness

The key to selecting proper tubing for use with metal FITOK tube fittings is that the tubing must be softer than the fitting material. FITOK tube fittings are designed to work properly with the tubing that is suggested in the ordering instructions.

Composition and Properties

UNS	Grade	ASTM Standard	FITOK Designator	Composition %							Mechanical Properties			
				C ⩽	Cr	Ni	Mo	Cu	Ti	Others	Yield Strength MPa ⩾	Tensile Strength MPa ⩾	Elongation % ⩾	Hardness ⩽
S31600/ S31603	316/316L	A269	SS	0.035①	16-18	10-14	2.0-3.0	-	-	-	205	515	35	80 HRB
Enhanced-S31600/ S31603	Enhanced-316/316L		SH		17-18	12-14	2.6-3.0							
S30400/ S30403	304/304L		S4		18-20	8-11	-							
S31254	6Mo	A269	S12	0.02	19.5-20.5	17.5-18.5	6.0-6.5	-	-	-	310	675	35	96 HRB
S32750	2507	A789	D7	0.03	24-26	6-8	3.0-5.0	⩽0.5	-	N	550	800	15	32 HRC
N04400	Alloy 400	B165	M	0.30	-	⩾63	-	28.0-34.0	-	-	195	480	35	75 HRB
N08020	Alloy 20	B729	A20	0.07	19-21	32-38	2.0-3.0	3.0-4.0	-	Nb, Ta	240	550	30	95 HRB
N06600	Alloy 600	B167	INC	0.15	14-17	⩾72	-	⩽0.5	-	-	205	550	35	92 HRB
N06625	Alloy 625	B444	A65	0.10	20-23	⩾58	8.0-10.0	-	0.4	Cb,Ta	414	827	30	25 HRC
N08825	Alloy 825	B163	A85	0.05	19.5-23.5	38-46	2.5-3.5	1.5-3.0	1.6-1.2	-	241	586	30	90 HRB
N10276	Alloy C-276	B622	HC	0.01	14.5-16.5	BAL	15.0-17.0	-	-	W	283	690	40	100 HRB
C12200	C12200	B75	CU	-	-	-	-	⩾99.90	-	P	62	205	-	-
R50400	Ti Gr2	B338	TI2	0.08	-	-	-	-	BAL	-	275-450	345	20	-

① The carbon content of tubing with outside diameter smaller than 1/2" or wall thickness smaller than 0.049" is allowed up to 0.04%.

Wall Thickness

The accompanying tables show working pressure of tubing in a wide range of wall thicknesses. Allowable working pressures are calculated from S values as specified by ASME B31.3, Process Piping. FITOK tube fittings have been repeatedly tested in both the minimum and maximum wall thicknesses shown. FITOK tube fittings are not recommended for tube wall thicknesses outside the ranges shown in the accompanying tables for each size.

Tubing Surface Finish

Many ASTM specifications cover the above requirements, but they often are not very detailed on surface finish. For example, ASTM A450, a general tubing specification, it is specified as below:
12. Straightness and Finish
12.1 Finished tubes shall be reasonably straight and have smooth ends free of burrs. They shall have a workmanlike finish. Surface imperfections (Note) may be removed by grinding, provided that a smooth curved surface is maintained, and the wall thickness is not decreased to less than that permitted by this or the product specification. The outside diameter at the point of grinding may be reduced by the amount so removed.
A good finish of FITOK tubing is guaranteed by the mechanically polished external surface and scale-free internal surface.
Note: An imperfection is any discontinuity or irregularity found in the tube.

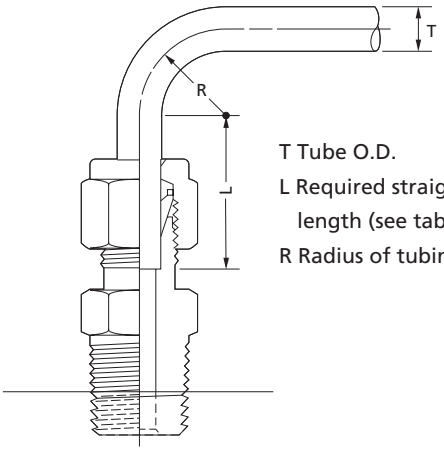
Tubing Handling

It is important to properly handle the tubing in order to reduce the scratches and protect the surface finish.
◎ Tubing should never be dragged out of a tubing rack or across a rough surface.
◎ Tube cutters or hacksaws should be sharp. Do not take deep cuts with each turn of the cutter or stroke of the saw.
◎ Removing burrs on the tube end which will be helpful for the tubing to go through the ferrules without damaging the ferrule sealing edge.

Gas Service

Gases (air, hydrogen, helium, nitrogen, etc.) have very small molecules that can escape through even the most minute leak path. Some surface defects on the tubing can provide such a leak path. As tube outside diameter (O.D.) increases, so does the likelihood of a scratch or other surface defect interfering with proper sealing.
The most successful connection for gas service will occur if all installation instructions are carefully followed and the heavier wall thicknesses of tubing on the accompanying tables are selected.
A heavy-wall tube resists ferrule action more than a thin-wall tube, allowing the ferrules to coin out minor surface imperfections and grip the tube more firmly. Within the applicable suggested allowable working pressure table, select a tube wall thickness whose working pressure is outside of the shaded areas.

Tubing Installation



T Tube O.D.
L Required straight tube length (see tables)
R Radius of tubing bend

Tubing properly selected and handled, combined with properly installed FITOK tube fittings, will give you a leaktight system and provide reliable service in a wide variety of applications.
When installing fittings near tube bends, there must be a sufficient straight length of tubing to allow the tubing to be bottomed in the FITOK fitting (see tables). For maximum assurance of reliable performance, FITOK tube fittings shall be assembled in accordance with catalog instructions, and use properly selected and handled high-quality tubing——such as provided by FITOK.

Fractional, in.	
T Tube O.D.	L①
1/16	1/2
1/8	23/32
3/16	3/4
1/4	13/16
5/16	7/8
3/8	15/16
1/2	1 3/16
5/8	1 1/4
3/4	
7/8	1 5/16
1	1 1/2
1 1/4	2
1 1/2	2 13/32
2	3 1/4

① Required straight tube length.

Metric, mm	
T Tube O.D.	L①
3	19
6	21
8	23
10	25
12	31
14	32
15	
16	
18	
20	34
22	
25	40
28	46
30	50
32	54
38	63
50	80

Hydraulic Presetting Tools

A FITOK hydraulic presetting tool must be used to install FITOK tube fittings over 1 in. (25 mm). For tube fittings in 1 1/4, 1 1/2, and 2 in. (28, 30, 32, 38, and 50 mm), a presetting tool can be used to preset ferrules onto the tubing tightly. For more information about installation instructions, please contact FITOK or our authorized distributors.

Types of Tubing

Available in TMP series and TCT series. Materials include austenitic stainless steel, super duplex stainless steel, Nickel-based alloys and etc.
Enhanced-316/316L SS material is also available, with Ni, Cr and Mo contents in close approximation to upper values specified in ASTM standard. Enhanced-316/316L SS tubing has better pitting corrosion resistance.

- ◎ TMP series seamless straight-length tubing, pickled, or bright annealed or cold rolled followed by bright annealing, external surface mechanically polished
- ◎ TCT series seamless coiled tubing, bright annealed, external surface mechanically polished

Suggested Allowable Working Pressure for Tubing

Figures and tables are for reference only. No implication is made that these values can be used for design work. Applicable codes and practices in industry should be considered. ASME Codes are the successor to and replacement of ASA Piping Codes.

- ◎ All pressures are calculated from equations in ASME B31.3, Process Piping. See factors for calculating working pressures in accordance with ASME B31.1, Power Piping.
- ◎ Calculations are based on maximum O.D. and minimum wall thickness, except as noted in individual tables.
  Example: ˝ in. O.D.×0.035 in. wall thickness stainless steel tubing according to ASTM A269:
  O.D. Tolerance ±0.005 in. / Wall Thickness Tolerance ±10%
  Calculations are based on 0.505 in.O.D.×0.0315 in. wall thickness tubing.
- ◎ No allowance is made for corrosion or erosion.

Stainless Steel Tubing

Table 1 — Fractional Seamless Tubing

Allowable working pressures are calculated from an S value of 20 000 psig (137.8 MPa) for ASTM A269 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and 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.)	Tube 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	10200							
5/16							4000	5800	8000							
3/8							3300	4800	6500	7500						
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
2												2000	2200	2500	2900	3600

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

Table 2—Metric Seamless Tubing

Tube O.D. (mm)	Tube 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	5.0
	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	
50										150	180	210	240	270

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, Enhanced-316/316L) (seamless or welded and drawn) stainless steel hydraulic tubing, ASTM A269 or A213, or equivalent. Hardness not to exceed 80 HRB. Tubing to be free of scratches, suitable for bending and flaring.

Note: Certain austenitic stainless tubing has an allowable ovality tolerance double the O.D. tolerance and may not fit into FITOK precision tube fittings.

S31254 Tubing

Allowable working pressures are calculated from an S value of 27100 psig (186.8 MPa) for ASTM A269 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B 31.3 and ASME B31.1.

Table 3 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.			
	0.028	0.035	0.049	0.065
	Working Pressure, psig			
1/4	5400	6900	10100	13900
3/8		4500	6500	8900
1/2		3500	5000	6900

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

Table 4 — Metric

Tube O.D. (mm)	Tube Wall Thickness, mm				
	0.8	1	1.2	1.5	1.8
	Working Pressure, bar				
6	430	580	740	980	
8		420	530	710	
10		330	420	550	700
12		270	340	450	570

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

Suggested Ordering Information

High-quality, fully annealed S31254 tubing, ASTM A269 or equivalent. Hardness not to exceed 96 HRB. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

Super Duplex 2507 Tubing

Allowable working pressures are calculated from an S value of 38 700 psig (266.8 MPa) for ASTM A789 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3.

Table 5 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.				
	0.035	0.049	0.065	0.083	0.095
	Working Pressure, psig				
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

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

Suggested Ordering Information

High-quality, fully annealed super duplex 2507 tubing, ASTM A789 or equivalent. Hardness not to exceed 32 HRC. Tubing to be free of scratches, suitable for bending and flaring.

Alloy 400 Tubing

Allowable working pressures are calculated from an S value of 18 700 psig (128.9 MPa) for ASTM B165 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and ASME B31.1.

Table 6 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.							
	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120
	Working Pressure, psig							
1/8	7900	10100						
1/4	3700	4800	7000	9500				
5/16		3700	5400	7300				
3/8		3100	4400	6100				
1/2		2300	3200	4400				
3/4			2200	3000	4000	4600		
1				2200	2900	3400	3900	4300

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

Table 7 — Metric

Tube O.D. (mm)	Tube Wall Thickness, mm									
	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0
	Working Pressure, bar									
6	310	390	490	620						
8		290	350	450						
10		220	280	350						
12		180	230	290						
14		160	190	240	270					
18			150	200	240	270	300			
20				180	210	240	270	290		
25					170	190	210	240	270	290

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

Suggested Ordering Information

High-quality, fully annealed seamless alloy 400 hydraulic tubing, ASTM B165 or equivalent. Hardness not to exceed 75 HRB. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

Alloy 20 Tubing

Allowable working pressures are calculated from an S value of 20 000 psi (137.8 MPa) for ASTM B729 tubing at 20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and ASME B31.1.

Table 8 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.			
	0.028	0.035	0.049	0.065
	Working Pressure, psig			
1/4	4000	5100	7500	10200
3/8		3300	4800	6500
1/2		2600	3700	5100

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

Table 9 — Metric

Tube O.D. (mm)	Tube Wall Thickness, mm			
	0.8	1.0	1.2	1.5
	Working Pressure, bar			
6	310	420	520	670
10		240	300	380
12		200	240	310

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

Suggested Ordering Information

High-quality, fully annealed seamless or welded and drawn alloy 20 tubing, ASTM B729, B468 or equivalent. Hardness not to exceed 95 HRB. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

Alloy 600 Tubing

Allowable working pressures are calculated from an S value of 20 000 psi (137.8 MPa) for ASTM B167 tubing at 20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and ASME B31.1.

Table 10 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.			
	0.028	0.035	0.049	0.065
	Working Pressure, psig			
1/4	4000	5100	7500	10200
3/8		3300	4800	6500
1/2		2600	3700	5100

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

Table 11 — Metric

Tube O.D. (mm)	Tube Wall Thickness, mm			
	0.8	1.0	1.2	1.5
	Working Pressure, bar			
6	310	420	520	670
10		240	300	380
12		200	240	310

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

Suggested Ordering Information

High-quality, fully annealed, cold drawn #1 temper alloy 600 seamless alloy tubing, ASTM B167 or equivalent. Hardness not to exceed 92 HRB. Tubing to be free of scratches, suitable for bending and flaring. Order to outside diameter and wall thickness only, not to inside diameter, average wall specification. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

Alloy 625 Tubing

Allowable working pressures are calculated from an S value of 26 700 psig (184.1 MPa) for ASTM B444 Grade 2 tubing at -20 to 100°F (-28 to 37°C) in accordance with ASME BPV 2007 Section II, Part D, Table 1B, tubing outside diameter and wall thickness tolerances from ASTM B444 for small-diameter tube.

Table 12 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.		
	0.035	0.049	0.065
	Working Pressure, psig		
1/4	7300	10700	14600
3/8	4700	6800	9400
1/2	3500	5000	6800

Table 13 — Metric

Tube O.D. (mm)	Tube Wall Thickness, mm				
	0.8	1.0	1.2	1.5	1.8
	Working Pressure, bar				
6	470	610	750		
10		350	430	550	
12		290	350	450	550

Suggested Ordering Information

High-quality, fully annealed seamless alloy 625 tubing, ASTM B444, Grade 2 or equivalent. Hardness not to exceed 25 HRC. Tubing to be free of scratches, suitable for bending and flaring.

Note: For sizes not listed in the tables above, we recommend that a sample of the tubing and all pertinent information relating to system parameters be provided for evaluation before installation. Give tubing sample and system information to any of authorized FITOK distributors to forward to the factory.

Alloy 825 Tubing

Allowable working pressures are calculated from an S value of 23 300 psi (160.6 MPa) for ASTM B704 tubing at 20 to 100°F (-28 to 37°C), as listed in ASME B31.3 or ASME BPV 2007 Section II, Part D, Table 1B.

Table 14 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.		
	0.035	0.049	0.065
	Working Pressure, psig		
1/4	6400	9300	11 600
3/8	4100	5900	8 200
1/2	3000	4300	5 900

Table 15 — Metric

Tube O.D. (in.)	Tube Wall Thickness, mm				
	0.8	1.0	1.2	1.5	1.8
	Working Pressure, bar				
6	410	530	660		
10		300	370	480	
12		250	300	390	480

Suggested Ordering Information

High-quality, fully annealed seamless alloy 825 tubing, ASTM B163, or equivalent. Fully annealed welded alloy 825 tubing, ASTM B704, class 1 or equivalent. Hardness not to exceed 90 HRB. Tubing to be free of scratches, suitable for bending and flaring. Wall thickness tolerances not to exceed ±10%.

Alloy C-276 Tubing

Allowable working pressures are calculated from an S value of 20 000 psi (137.8 MPa) for ASTM B622 tubing at 20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and ASME B31.1.

Table 16 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.			
	0.028	0.035	0.049	0.065
	Working Pressure, psig			
1/4	4000	5100	7500	10200
5/16		4000	5800	7800
3/8		3300	4800	6500
1/2		2600	3700	5100

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

Table 17 — Metric

Tube O.D. (mm)	Tube Wall Thickness, mm			
	0.8	1.0	1.2	1.5
	Working Pressure, bar			
6	310	420	520	670
8		310	390	500
10		240	300	380
12		200	240	310

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

Suggested Ordering Information

High-quality, fully annealed alloy C-276 tubing, ASTM B622 or equivalent. Hardness not to exceed 100 HRB. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

Copper Tubing

Allowable working pressures are calculated from an S value of 6000 psi (41.3 MPa) for ASTM B75 tubing at 20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and ASME B31.1.

Table 18 —Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.									
	0.028	0.030	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134
	Working Pressure, psig									
1/8	2700	3000	3600							
3/16	1800	1900	2300	3400						
1/4	1300	1400	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	
1 1/8					600	800	1000	1100	1300	1400

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

Table 19 —Metric

Tube O.D. (mm)	Tube Wall Thickness, mm									
	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0
	Working Pressure, bar									
6	110	140	170	220						
8		100	120	160						
10		80	100	130						
12		60	80	100	130	140				
14		50	60	90	110	120	130			
15			60	80	100	110	120			
16				70	90	100	110	120		
18				60	80	90	100	110		
20				60	70	80	90	100	110	
22				50	60	70	80	90	100	
25				40	50	60	70	80	90	100
28					40	50	60	70	80	90

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

Suggested Ordering Information

High-quality, soft annealed seamless copper tubing, ASTM B75 (B75M) or equivalent. Also soft annealed (Temper O) copper water tube, type K or type L to ASTM B88.

Grade 2 Titanium Tubing

Allowable working pressures are calculated from an S value of 16 700 psi (115.1 MPa) for ASTM B338 tubing at 20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and ASME B31.1. For working pressure in accordance with ASME B31.1, multiply by 0.85.

Table 20 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.			
	0.028	0.035	0.049	0.065
	Working Pressure, psig			
1/4	3500	4500	6700	9100
3/8		2900	4200	5800
1/2		2100	3100	4200

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

Table 21 — Metric

Tube O.D. (mm)	Tube Wall Thickness, mm			
	0.8	1.0	1.2	1.5
	Working Pressure, bar			
6	290	380	470	600
10		210	260	340
12		180	220	280

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

Suggested Ordering Information

High-quality, fully annealed seamless or welded and drawn grade 2 titanium tubing, ASTM B338 or equivalent. Tubing to be free of scratches, suitable for bending. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

Pressure Ratings at Elevated Temperatures

Table 22 — Elevated Temperature Factors

Temperature		Tubing Materials											
°F	°C	316/316L①	304/304L①	6 Mo	Super Duplex 2507	Alloy 400	Alloy 20②	Alloy 600②	Alloy 625	Alloy 825	Alloy C-276②	Copper	Ti
200	93	1.00	1.00	0.90	0.90	0.87	1.00	1.00	0.93	1.00	1.00	0.80	0.86
400	204	0.96	0.93	0.74	0.82	0.79	0.96	0.96	0.85	0.90	0.96	0.50	0.61
600	315	0.85	0.82	0.67	0.80	0.79	0.85	0.85	0.79	0.84	0.85		0.45
800	426	0.79	0.76			0.75	0.79	0.79	0.75	0.81	0.79		
1000	537	0.76	0.69					0.35	0.73		0.76		

① Dual-certified grades such as 304/304L and 316/316L meet the minimum chemistry and the mechanical properties of both alloy grades.
② Based on the lower derating factor for stainless steel, in accordance with ASME B31.3.

To determine allowable working pressure at elevated temperatures, multiply allowable working pressures from Tables 1 through 21 by a factor shown in Table 22.

Example: Type 316/316L stainless steel 1/2 in. O.D.×0.035 in. wall at 1000°F

1. The allowable working pressure at -20 to 100°F (-28 to 37°C) is 2600 psig (Table 1, page F-07).
2. The elevated temperature factor for 1000°F (537°C) is 0.76 (Table 22, above):
   2600 psig×0.76 = 1976 psig

The allowable working pressure for 316/316L 1/2 in. O.D.×0.035 in. wall tubing at 1000°F (537°C) is 1976 psig.

Basic Ordering Number

Fractional Stainless Steel Seamless Tubing

Tube O.D. (in.)	Wall Thickness (in.)	Basic Ordering Number		Weight
		316/316L	304/304L	lb/ft
1/4	0.035	SS-TMP-4-035-	S4-TMP-4-035-	0.082
	0.049	SS-TMP-4-049-	S4-TMP-4-049-	0.107
3/8	0.049	SS-TMP-6-049-	S4-TMP-6-049-	0.173
	0.065	SS-TMP-6-065-	S4-TMP-6-065-	0.219
1/2	0.049	SS-TMP-8-049-	S4-TMP-8-049-	0.240
	0.065	SS-TMP-8-065-	S4-TMP-8-065-	0.307
3/4	0.065	SS-TMP-12-065-	S4-TMP-12-065-	0.484
1	0.083	SS-TMP-16-083-	S4-TMP-16-083-	0.827
1 1/2	0.134	SS-TMP-24-134-	S4-TMP-24-134-	1.989

Metric Stainless Steel Seamless Tubing

Tube O.D. (mm)	Wall Thickness (mm)	Basic Ordering Number		Weight
		316/316L	304/304L	Kg/m
6	1.0	SS-TMP-6MM-1.0-	S4-TMP-6MM-1.0-	0.125
8	1.0	SS-TMP-8MM-1.0-	S4-TMP-8MM-1.0-	0.175
10	1.0	SS-TMP-10MM-1.0-	S4-TMP-10MM-1.0-	0.226
	1.5	SS-TMP-10MM-1.5-	S4-TMP-10MM-1.5-	0.320
12	1.5	SS-TMP-12MM-1.5-	S4-TMP-12MM-1.5-	0.395
	2.0	SS-TMP-12MM-2.0-	S4-TMP-12MM-2.0-	0.501
14	1.5	SS-TMP-14MM-1.5-	S4-TMP-14MM-1.5-	0.470
	2.0	SS-TMP-14MM-2.0-	S4-TMP-14MM-2.0-	0.602
16	1.5	SS-TMP-16MM-1.5-	S4-TMP-16MM-1.5-	0.545
	2.0	SS-TMP-16MM-2.0-	S4-TMP-16MM-2.0-	0.702
18	1.5	SS-TMP-18MM-1.5-	S4-TMP-18MM-1.5-	0.620
	2.0	SS-TMP-18MM-2.0-	S4-TMP-18MM-2.0-	0.802
20	2.0	SS-TMP-20MM-2.0-	S4-TMP-20MM-2.0-	0.903
25	2.5	SS-TMP-25MM-2.5-	S4-TMP-25MM-2.5-	1.410
28	2.5	SS-TMP-28MM-2.5-	S4-TMP-28MM-2.5-	1.769
30	3.0	SS-TMP-30MM-3.0-	S4-TMP-30MM-3.0-	2.031
32	3.5	SS-TMP-32MM-3.5-	S4-TMP-32MM-3.5-	2.501
38	4.0	SS-TMP-38MM-4.0-	S4-TMP-38MM-4.0-	3.410

Weight unit conversion:
1 lb/ft=1.488 Kg/m 1 Kg/m=0.672 lb/ft

Ordering Number Description

SS - TMP - 6 - 049 - 20F - BA - F2

Material	
SS	316/316L
SH	Enhanced-316/316L
S4	304/304L
S12	6Mo
D5	Duplex 2205
D7	Super duplex 2507
M	Alloy 400
A20	Alloy 20
INC	Alloy 600
A65	Alloy 625
A85	Alloy 825
HC	Alloy C-276

Series
TMP
TCT

Tube O.D.			
Fractional		Metric	
0.5	1/32"	0.8MM	0.8 mm
1	1/16"	1.5MM	1.5 mm
2	1/8"	3MM	3 mm
3	3/16"	6MM	6 mm
4	1/4"	8MM	8 mm
5	5/16"	10MM	10 mm
6	3/8"	12MM	12 mm
8	1/2"	14MM	14 mm
10	5/8"	15MM	15 mm
12	3/4"	16MM	16 mm
14	7/8"	18MM	18 mm
16	1"	20MM	20 mm
20	1 1/4"	22MM	22 mm
24	1 1/2"	25MM	25 mm
32	2"	28MM	28 mm
		30MM	30 mm
		32MM	32 mm
		38MM	38 mm
		50MM	50 mm

Wall Thickness			
Fractional		Metric	
010	0.010"	0.3	0.3 mm
012	0.012"	0.4	0.4 mm
014	0.014"	0.5	0.5 mm
016	0.016"	0.8	0.8 mm
020	0.020"	1.0	1.0 mm
028	0.028"	1.2	1.2 mm
035	0.035"	1.5	1.5 mm
049	0.049"	1.8	1.8 mm
065	0.065"	2.0	2.0 mm
083	0.083"	2.2	2.2 mm
095	0.095"	2.5	2.5 mm
109	0.109"	2.8	2.8 mm
120	0.120"	3.0	3.0 mm
134	0.134"	3.5	3.5 mm
156	0.156"	4.0	4.0 mm
188	0.188"	4.5	4.5 mm
		5.0	5.0 mm

Length	
40N	Length 40 in. (For Straight-Length Tubing Only)
80N	Length 80 in. (For Straight-Length Tubing Only)
xxM	Length xx m (Except For Random Length Coiled Tubing)
xxF	Length xx ft (Except For Random Length Coiled Tubing)
CL11F	Random Length Grade CL11F (For Coiled Tubing Only)
CL11M	Random Length Grade CL11M (For Coiled Tubing Only)
CL21F	Random Length Grade CL21F (For Coiled Tubing Only)
CL21M	Random Length Grade CL21M (For Coiled Tubing Only)
CL31F	Random Length Grade CL31F (For Coiled Tubing Only)
CL31M	Random Length Grade CL31M (For Coiled Tubing Only)
CL41F	Random Length Grade CL41F (For Coiled Tubing Only)
CL41M	Random Length Grade CL41M (For Coiled Tubing Only)

Internal Surface Condition	
	Pickling
BA	Bright Annealing
CRBA	Cold Working Followed by Bright Annealing

CRBA Process Description: precision cold worked, degreased with special cleaning agent, and bright annealed. Internal surface roughness to Ra 0.8 μm Max.

Cleaning and Packaging	
	FC-01
F2	FC-02

Note: "Ordering Number Description" is a referenc to understand the combination rules of FITOK product part number. Not all combinations aere available. For any questions, please contact FITOK group or our authorized distributors.

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www.fitok.com

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