

# Instrumentation Tubing

TMP and TCT Series

## TMP Series

### Features

- Materials: stainless steel, duplex stainless steel or Nickel-based alloy
- Sizes: 1/16" to 2" and 2 mm to 50 mm
- Working temperature: -325°F to 1000°F (-198°C to 537°C)
- Pickled, or bright annealed or cold rolled followed by bright annealing, mechanically polished external surface
- For use with FITOK 6 series tube fittings, 4:1 safety factor for the tubing and connection part of fitting and tubing
- Marked with brand, material grade, standard, specification and heat number
- Standard length: 1 m, 2 m, 3 m, 6 m, 10 ft, 20 ft  
Customized length as per customer requirement is also available



### Materials

UNS	Grade	ASTM Standard	FITOK Designator	Composition %					Mechanical Properties			
				C ≤	Cr	Ni	Mo	Others	Yield Strength MPa ≥	Tensile Strength MPa ≥	Elongation % ≥	Hardness ≤
S31600/ S31603	316/316L	A269	SS	0.035 <sup>①</sup>	16-18	10-14	2.0-3.0	-	205	515	35	80 HRB
Enhanced- S31600/ S31603	Enhanced- 316/316L <sup>②</sup>		SH	0.030	17-18	12-14	2.6-3.0	-				
S30400/ S30403	304/304L		S4	0.035 <sup>①</sup>	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
S31803	2205	A789	D5	0.03	21-23	4.5-6.5	2.5-3.5	-	450	620	25	30 HRC
S32750	2507	A789	D7	0.03	24-26	6-8	3.0-5.0	Cu,N	550	800	15	32 HRC
N04400	Alloy 400	B165	M	0.30	-	≥63	-	Cu 28-34	195	480	35	75 HRB
N08020	Alloy 20	B729	A20	0.07	19-21	32-38	2.0-3.0	Cu,Nb,Ta	240	550	30	95 HRB
N06600	Alloy 600	B167	INC	0.15	14-17	≥72	-	Cu	205	550	35	92 HRB
N06625	Alloy 625	B444	A65	0.10	20-23	≥58	8.0-10.0	Cb,Ta	414	827	30	25 HRC
N08825	Alloy 825	B163	A85	0.05	19.5-23.5	38-46	2.5-3.5	Cu,Ti	241	586	30	201 HV
N10276	Alloy C-276	B622	HC	0.01	14.5-16.5	BAL	15.0-17.0	W	283	690	40	100 HRB

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%.

② Enhanced-316/316L complying with GB50516-2010 Technical Code for Hydrogen Fuelling Station (2021 version) is available, in which Ni<sub>eq</sub> is not less than 28.5%. Leave a note for your requirements when placing order.

## Dimensional Tolerance

Materials	Tube O.D. (D) in. (mm)	O.D. Tolerance in. (mm)	Wall Thickness Tolerance %
316/316L Enhanced-316/316L 304/304L 6Mo	$D < 3/32$ (2.38)	+0.002 (0.05)/-0	+/-10
	$3/32$ (2.38) $\leq D < 3/16$ (4.76)	+0.003 (0.08)/-0	
	$3/16$ (4.76) $\leq D \leq 1$ (25.4)	+/-0.004 (0.10)	
	$1$ (25.4) $< D < 1\ 1/2$ (38.1)	+/-0.005 (0.13)	
	$1\ 1/2$ (38.1) $\leq D < 2$ (50.8)	+/-0.008 (0.2)	
	$D \geq 2$ (50.8)	+/-0.010 (0.25)	
2205 2507	$D < 1/2$ (12.7)	+/-0.005 (0.13)	+/-15
	$1/2$ (12.7) $\leq D \leq 3/4$ (19.05)		+/-10
Alloy 400 Alloy 20	$D < 5/8$ (16)	+/-0.005 (0.13)	+/-15
	$5/8$ (16) $\leq D < 1$ (25)		+/-10
Alloy 600	$D < 5/8$ (16)	+/-0.005 (0.13)	+/-12.5
Alloy 625	$3/16$ (4.8) $\leq D < 1/2$ (12.7)	+0.004 (0.10)/-0	+/-10
	$D \geq 1/2$ (12.7)	+0.005 (0.13)/-0	
Alloy 825	$D \leq 1/2$ (12.7)	+/-0.005 (0.13)/-0	+/-12.5
Alloy C-276		+/-0.005 (0.13)	

## Working Pressure at Ambient Temperature

Working pressures in the table below apply only to 316/316L, enhanced-316/316L and 304/304L. For working pressures of other materials, please contact FITOK Group or our authorized distributors.

### Fractional

Tube O.D. in.	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 when the tube is used with 6 series tube fittings.

## Metric

Tube O.D. 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	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 when the tube is used with 6 series tube fittings.

## Elevated Temperature Factors

Temperature		Factor	
°F	°C	316/316L and Enhanced-316/316L	304/304L
200	93	1.00	1.00
400	204	0.96	0.93
600	315	0.85	0.82
800	426	0.79	0.76
1000	537	0.76	0.69

## TCT Series

### Features

- ⦿ Materials: 316/316L, enhanced-316/316L or 304/304L
- ⦿ Sizes: 1/16" to 1/2" and 1.5 mm to 12 mm
- ⦿ Working temperature: -325°F to 1000°F (-198°C to 537°C)
- ⦿ Bright annealed with mechanically polished external surface
- ⦿ For use with FITOK 6 series tube fittings, 4:1 safety factor for the tubing and connection part of fitting and tubing
- ⦿ Marked with brand, material grade, standard, specification and heat number



### Materials

UNS	Grade	ASTM Standard	FITOK Designator	Composition %				Mechanical Properties			
				C	Cr	Ni	Mo	Yield Strength MPa	Tensile Strength MPa	Elongation %	Hardness
S31600/S31603	316/316L	A269	SS	0.035 <sup>①</sup>	16-18	10-14	2.0-3.0	≥205	≥515	≥35	≤80 HRB
Enhanced-31600/31603	Enhanced-316/316L <sup>②</sup>		SH	0.030	17-18	12-14	2.6-3.0				
S30400/S30403	304/304L		S4	0.035 <sup>①</sup>	18-20	8-11	-				

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%.

② Enhanced-316/316L complying with GB50516-2010 Technical Code for Hydrogen Fuelling Station (2021 version) is available, in which Ni<sub>eq</sub> is not less than 28.5%. Leave a note for your requirements when placing order.

### Working Pressure

Refer to the working pressure of TMP series tubing.

### Scope of Supply

#### Fractional

Tube O.D. in.	Wall Thickness in.	Standard Coil Length <sup>①</sup> ft	Max. Coil Length <sup>②</sup> ft
1/16	0.016	200	400
1/8	0.028	200	400
1/4	0.035	600	2130
	0.049	400	1550
	0.065		1280
3/8	0.035	400	1300
	0.049	300	970
	0.065		
1/2	0.035 <sup>③</sup>	300	950
	0.049	220	700
	0.065		550
	0.083		450

① Minimum guaranteed length.

② Customized shorter length available subject to confirmation from FITOK.

③ Not recommended for use with 6 series tube fittings in gas service.

#### Metric

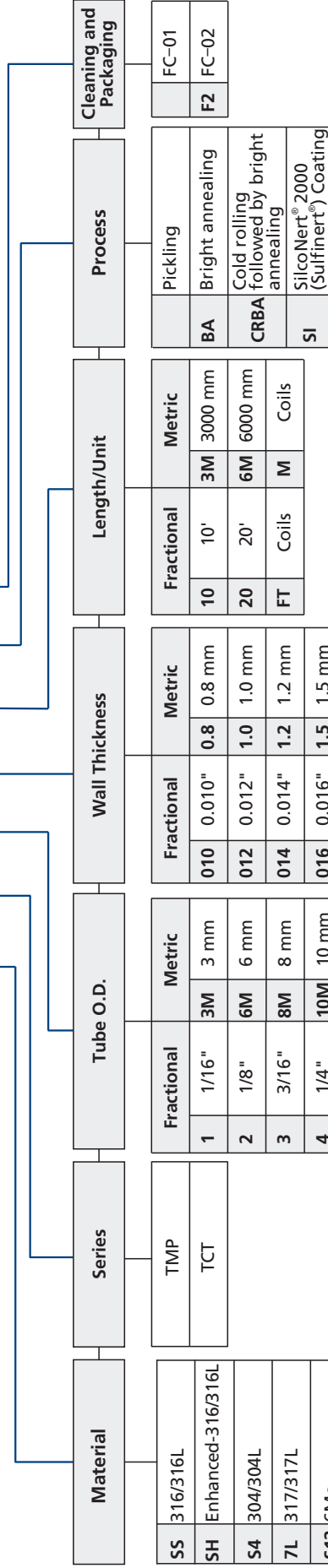
Tube O.D. mm	Wall Thickness mm	Standard Coil Length <sup>①</sup> m	Max. Coil Length <sup>②</sup> m
1.5	0.4	60	120
3	0.7	60	120
6	0.8	120	650
	1.0		600
	1.2		520
	1.5		450
8	1.0	120	380
	1.2		350
	1.5		310
10	1.0	100	320
	1.2		280
	1.5		240
12	1.0	80	240
	1.2		230
	1.5	60	190
	2.0		150

① Minimum guaranteed length.

② Customized shorter length available subject to confirmation from FITOK.

# Ordering Number Description

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



Material	Series	Tube O.D.		Wall Thickness		Length/Unit		Process	Cleaning and Packaging	
SS 316/316L	TMP TCT	Fractional	Metric	Fractional	Metric	Fractional	Metric	Pickling	FC-01	F2
SH Enhanced-316/316L		1 1/16"	3 mm	010	0.8 mm	10	3M 3000 mm		BA	
S4 304/304L		2 1/8"	6 mm	012	1.0 mm	20	6M 6000 mm	CRBA		
7L 317/317L		3 3/16"	8 mm	014	1.2 mm	FT	M Coils	Cold rolling followed by bright annealing		
S12 6Mo		4 1/4"	10 mm	016	1.5 mm		Coils	SilcoNert® 2000 (Sulfinert®) Coating		
D5 2205 Duplex		5 5/16"	12 mm	020	1.8 mm					
D7 2507 Duplex		6 3/8"	14 mm	028	2.0 mm					
M Alloy 400		8 1/2"	15 mm	035	2.2 mm					
A20 Alloy 20		10 5/8"	16 mm	049	2.5 mm					
INC Alloy 600		12 3/4"	18 mm	065	2.8 mm					
A65 Alloy 625		14 7/8"	20 mm	083	3.0 mm					
A85 Alloy 825		16 1"	22 mm	095	3.5 mm					
HC Alloy C-276		20 1 1/4"	25 mm	109	4.0 mm					
		24 1 1/2"	28 mm	120	4.5 mm					
		32 2"	30 mm	134	5.0 mm					
			32 mm	156	0.156"					
			38 mm	188	0.188"					
			50 mm							

Process description:

Pickling: open annealed and pickled.

Bright annealing: bright annealed to deliver scale-free surface. Brighter and smoother than pickled tubing.

Cold rolling followed by annealing: cold rolled, degreased, and bright annealed. Inner surface roughness to Ra 0.8 µm Max.

SilcoNert® 2000 (Sulfinert®) coating: internal surface of tubing is SilcoNert® 2000 (Sulfinert®) coated for use in demanding/corrosive environments.

Notes: 1. "Ordering Number Description" is a reference to understand the combination rules of FITOK

product part number. Not all combinations are available. For any questions, please contact FITOK group or our authorized distributors.

2. Tubing is delivered mechanically polished. If mechanically polished external surface is not required, please specify in the order.