Instrumentation Tubing

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 worked followed by bright annealing, machined finished external surface
- ◎ For use with FITOK 6D 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: 40 in, 80 in, 10 ft, 20 ft, 1 m, 2 m, 3 m and 6 m
  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	⩽0.035②	16-18	10-14	2.0-3.0	-	⩾205	⩾515	⩾35	⩽80 HRB
Enhanced-S31600/ S31603	Enhanced-316/316L①		SH	⩽0.03	17-18	12-14	2.6-3.0					
S30400/ S30403	304/304L		S4	⩽0.035②	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 Enhanced-316/316L complying with GB50516-2021 Technical Code for Hydrogen Fuelling Station is available, in which Ni_{eq} is not less than 28.5%. Contact FITOK Group for more information.

② 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%.

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)≤D＜3/16 (4.76)	+0.003 (0.08)/-0	
	3/16 (4.76)≤D≤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)＜D＜2 (50.8)	+/-0.008 (0.2)	
	D≥2 (50.8)	+/-0.010 (0.25)	
2205 2507	D＜1/2 (12.7)	+/-0.005 (0.13)	+/-15
	1/2 (12.7)≤D≤3/4 (19.05)		+/-10
Alloy 400 Alloy 20	D＜5/8 (16)	+/-0.005 (0.13)	+/-15
	5/8 (16)≤D＜1 (25)		+/-10
Alloy 600	D＜5/8 (16)	+/-0.005 (0.13)	+/-12.5
Alloy 625	3/16 (4.8)≤D＜1/2 (12.7)	+0.004 (0.10)/-0	+/-10
	D≥1/2 (12.7)	+0.005 (0.13)/-0	
Alloy 825	D≤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.
For seamless tubing, working pressures are calculated in accordance with ASME B31.3: for single butt weld tubing, multiply the pressure rating by 0.8.

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 6D 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 6D 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: 1/32" to 1/2" and 0.8 mm to 12 mm
- ◎ Working temperature: -325°F to 1000°F (-198°C to 537°C)
- ◎ Bright annealed with machined finished external surface
- ◎ For use with FITOK 6D 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	⩽0.035②	16-18	10-14	2.0-3.0	⩾205	⩾515	⩾35	⩽80 HRB
Enhanced-S31600/31603	Enhanced-316/316L①		SH	⩽0.030	17-18	12-14	2.6-3.0				
S30400/S30403	304/304L		S4	⩽0.035②	18-20	8-11	-				

① Enhanced-316/316L complying with GB50516-2021 Technical Code for Hydrogen Fuelling Station is available, in which Ni_{eq} is not less than 28.5%. Contact FITOK Group for more information.

② 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%.

Working Pressure and Elevated Temperature Factors

Refer to the working pressure of TMP series tubing.

Ordering Information and Dimensions

Random length example
Customer requirement: coiled tubing, 316/316L stainless steel , 12 mm O. D. x 1.5 mm wall thickness, about 150 m/coil length, total length 1500 m.
Recommended ordering number: SS-TCT-12MM-1.5-CL21M
Actual supply length is 135-166 m/coil, about 10 coils, total 1500 m.

Random Length Grade Table

Fractional

FITOK P/N	Tube O.D. in.	Wall① Thickness in.	Random Length Grade②				Cut Length③ Tolerance ft, (m)
			CL11F (CL11M)	CL21F (CL21M)	CL31F (CL31M)	CL41F (CL41M)	
			Length Range/ft, (m)				
-TCT-1-014-	1/16	0.014	1341-1714 (408-522)	2683-3280 (818-999)	4026-4921 (1226-1499)	5368-6561④ (1636-1999)	+1.640 (+0.50)
-TCT-1-016-		0.016	1230-1572 (374-478)	2460-3007 (749-916)	3690-4511 (1125-1375)	4921-6014④ (1499-1832)	
-TCT-1-020-		0.020	1077-1376 (327-418)	2154-2633 (656-801)	3232-3951 (984-1203)	4310-5267④ (1313-1604)	
-TCT-1.5-014-	3/32	0.014	815-1041 (248-317)	1630-1993 (496-607)	2447-2990 (745-910)	3262-3987④ (993-1214)	
-TCT-1.5-020-		0.020	617-788 (188-240)	1234-1509 (376-459)	1853-2264 (564-689)	2470-3019④ (752-919)	
-TCT-1.5-028-		0.028	495-632 (150-192)	990-1211 (301-368)	1485-1816 (452-553)	1981-2422④ (603-738)	
-TCT-2-016-	1/8	0.016	522-668 (159-203)	1046-1279 (318-389)	1570-1919 (477-584)	2093-2558④ (638-779)	
-TCT-2-020		0.020	433-554 (132-169)	868-1061 (264-323)	1302-1591 (396-485)	1737-2123④ (529-646)	
-TCT-2-028-		0.028	335-428 (101-129)	672-821 (204-249)	1008-1233 (306-375)	1344-1643④ (409-500)	
-TCT-2-035-		0.035	288-369 (88-112)	578-707 (176-215)	868-1061 (264-323)	1157-1414④ (352-431)	
-TCT-3-020-	3/16	0.020	271-347 (82-105)	544-665 (165-202)	817-998 (248-303)	1089-1331④ (332-405)	
-TCT-3-028-		0.028	204-261 (62-79)	408-499 (124-151)	612-749 (186-227)	817-998④ (249-304)	
-TCT-3-035-		0.035	171-218 (51-65)	342-418 (103-126)	513-627 (155-190)	684-836④ (207-254)	
-TCT-4-028-	1/4	0.028	738-943 (225-287)	1476-1804 (450-550)	2952-3609 (900-1100)	5905-7218 (1800-2200)	
-TCT-4-035-		0.035	605-773 (184-235)	1212-1481 (369-451)	2425-2964 (738-903)	4851-5930 (1478-1807)	
-TCT-4-049-		0.049	500-639 (152-194)	926-1131 (281-344)	1853-2264 (564-689)	3707-4530 (1129-1380)	
-TCT-4-065-		0.065	469-600 (143-182)	910-1113 (277-338)	1517-1854 (462-565)	3035-3710 (925-1130)	
-TCT-6-035-	3/8	0.035	382-488 (116-148)	765-936 (233-284)	1532-1873 (467-570)	3066-3747 (934-1141)	
-TCT-6-049-		0.049	307-393 (93-119)	570-697 (173-212)	1142-1395 (347-424)	2284-2791 (695-850)	
-TCT-6-065-		0.065	279-357 (85-109)	542-663 (164-201)	905-1106 (275-336)	1810-2213 (551-674)	
-TCT-8-035-	1/2	0.035	279-357 (84-108)	560-685 (170-207)	1121-1370 (341-416)	2243-2742 (683-834)	
-TCT-8-049-		0.049	222-284 (67-86)	413-504 (125-152)	826-1009 (251-306)	1652-2019 (503-614)	
-TCT-8-065-		0.065	199-255 (60-77)	387-473 (117-144)	645-788 (196-239)	1290-1577 (393-480)	
-TCT-8-083-		0.083	162-208 (49-63)	315-386 (96-117)	527-644 (160-195)	1054-1289 (321-392)	

Metric

FITOK P/N	Tube O.D. mm	Wall① Thickness mm	Random Length Grade②				Cut Length③ Tolerance m
			CL11M	CL21M	CL31M	CL41M	
			Length Range/m				
-TCT-3MM-0.5-	3	0.5	143-182	287-350	431-526	574-701④	+0.50
-TCT-3MM-0.8-		0.8	101-129	203-248	306-374	407-498④	
-TCT-6MM-0.8-	6	0.8	215-274	431-526	862-1053	1725-2108	
-TCT-6MM-1.0-		1.0	180-230	360-440	720-880	1440-1760	
-TCT-6MM-1.2-		1.2	167-213	311-380	622-761	1246-1523	
-TCT-6MM-1.5-		1.5	164-210	319-390	531-650	1064-1301	
-TCT-8MM-1.0-	8	1.0	127-163	256-313	513-628	1027-1256	
-TCT-8MM-1.2-		1.2	117-150	219-268	439-536	879-1074	
-TCT-8MM-1.5-		1.5	114-146	220-269	368-449	737-900	
-TCT-10MM-1.0-	10	1.0	99-126	198-243	398-487	797-974	
-TCT-10MM-1.2-		1.2	91-117	169-206	339-414	679-830	
-TCT-10MM-1.5-		1.5	86-110	168-205	280-343	562-687	
-TCT-12MM-1.0-	12	1.0	81-103	162-199	325-398	652-797	
-TCT-12MM-1.2-		1.2	74-95	137-168	276-337	553-676	
-TCT-12MM-1.5-		1.5	70-89	135-166	227-278	455-556	
-TCT-12MM-2.0-		2.0	54-70	107-130	179-218	358-437	

Notes: ① Other wall thicknesses available subject to confirmation from FITOK.
② Custom length outside the Random Length Grade Table and within the max. length range available subject to confirmation from FITOK.
③ Custom shorter cut length available.
④ Custom longer length available subject to confirmation from FITOK.

Cut Length Example
Customer requirement: coiled tubing, 304/304L stainless steel, 8 mm O. D. x 1.2 mm wall thickness, 400 m/coil length, total length 2000 m.
Recommended ordering number: S4-TCT-8MM-1.2-400M
Actual supply length is 400-400.5 m, 5 coils, total 2000 m.

Ordering Number Description

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

Material

SS	316/316L
SH	Enhanced-316/316L
S4	304/304L
S12	6Mo
D5	2205 Duplex
D7	2507 Duplex
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.