Tubing

TMP, TCT, TBA, TEP, PEP, TCA, T15A, T20D, T20M, T60H, TJT, TIT and TST Series

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Content

General Information

Types of Tubing

Instrumentation Tubing

Available in TMP series and TCT series.

TMP series seamless straight-length tubing, internal surface pickled, bright annealed or cold worked followed by bright annealing, external surface machined finished.

TCT series seamless coiled tubing, internal surface bright annealed, external surface machined finished.

Materials: stainless steel, duplex stainless steel or nickel-based alloy. Enhanced-316/316L available: within the range as defined by ASTM A479, Ni, Cr and Mo contents are controlled closer to the maximum value and Nieq≥28.5%.

Sizes: TMP series: 1/16" to 2", 2 mm to 50 mm. TCT series: 1/32" to 1/2", 0.8 mm to 12 mm.

Standard length: TMP series: 40 in, 80 in, 10 ft, 20 ft, 1 m, 2 m, 3 m and 6 m. TCT series: 180 ft to 7218 ft, 60 m to 2108 m. Customized length as per customer requirement is also available

High Purity Tubing

Available in TBA, TEP, PEP and TCA series.

TBA series seamless straight-length tubing, bright annealed, internal surface roughness of Ra 20 μin. (0.51 μm) max.; ultrasonically cleaned and purged and dried; suitable for high purity gas systems.

TEP and PEP series seamless straight-length tubing, electropolished internal surface roughness of Ra 10 μin. (0.25 μm) max.; ultrasonically cleaned in clean room and purged with filtered hot nitrogen; suitable for ultra high purity systems.

TCA series coaxial tubing and fittings, electropolished internal surface of inner tube with roughness of Ra 10 μin. (0.25 μm) max; ultrasonically cleaning, purged with filtered hot nitrogen, dried and assembled in clean room.

Material: 316L, 316L VAR, 316L VIM-VAR

Sizes: TBA, TEP, PEP Series: 1/4" to 2 1/2 ", 6A to 50A

TCA Series: inner tube: 1/4"-2", outer tube: 1/2"-2 1/2"

Standard length: 20 ft, 4 m and 6 m.

Medium and High Pressure Tubing

Available in T15A, T20D, T20M and T60H series.

T15A series tubing, seamless in straight lengths, annealed, with working pressure up to 15,000 psig (1034 bar).

T20D series tubing, seamless in straight lengths, 1/8-hard, with working pressure up to 20,000 psig (1379 bar).

T20M series medium pressure tubing, seamless in straight lengths, cold-drawn and full hard, with working pressure up to 20,000 psig (1379 bar), for coned and threaded connections.

T60H series high pressure tubing, seamless in straight lengths, cold-drawn and full hard, with working pressure up to 60,000 psig (4137 bar), for coned and threaded connections.

Materials: 316/316L stainless steel, enhanced-316/316L.

Sizes: T15A series: 1/8", 1/4", 3/8", 1/2", 3/4" and 1"

T20D series: 1/4", 3/8", 1/2", 3/4" and 1"

T20M series: 1/4", 3/8", 9/16", 3/4" and 1"

T60H series: 1/4", 3/8"and 9/16"

Standard length:

T15A, T20D series: 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.

T20M, T60H series: 40 in, 80 in, 10 ft, 20 ft, 1 m, 2 m, 3 m and 6 m, straight-length tubing and coned and threaded nipples in custom length are also available.

Jacketed Tubing

TJT series jacketed tubing, seamless, corrosion and abrasion resistant, available in straight lengths or coils.

Materials: stainless steel or copper.

Tubing sizes: 1/4" to 1 1/4", 6 mm to 32 mm.

Standard length: 20 ft and 6 m in straight lengths, 130 ft to 6560 ft or 40 m to 1600 m in coils.

Insulated Tubing

TIT series insulated tubing, seamless, thermal insulating, corrosion and abrasion resistant, supplied in coils.

Materials: stainless steel or copper.

Tubing sizes: 1/4" to 1 1/4", 6 mm to 32 mm.

Standard length: 20 ft and 6 m in straight lengths, 130 ft to 1640 ft or 40 m to 500 m in coils.

Heat Trace Tubing

TST series steam trace tubing, seamless, maintains process temperature 50°F to 200°F (10°C to 93°C) and 200°F to 355°F (93°C to 179°C), light heat trace and heavy heat trace available, supplied in coils.
Materials: stainless steel or copper
Tubing sizes: 1/4" to 1/2", 6 mm to 14 mm.
Standard length: 20 ft and 6 m in straight lengths, 130 ft to 1312 ft or 40 m to 400 m in coils.

Materials

		TMP	TCT	TBA	TEP	PEP	TCA	T15A	T20D	T20M	T60H	TJT	TIT	TST
Stainless Steel	316/316L	√	√					√	√	√	√	√	√	√
	Enhanced-316/316L (higher Cr, Ni and Mo content)	√	√					√	√	√	√			
	316L			√	√		√							
	316L VAR				√		√							
	316L VIM-VAR				√		√							
	316L (JIS standard)					√								
	304/304L	√	√											
	6Mo (S31254)	√												
Duplex Stainless Steel	2205	√												
	2507	√												
Nickel -Based Alloy	400	√												
	20	√												
	600	√												
	625	√												
	825	√												
	C-276	√												
Copper	C12200	√	√									√	√	√

Notes: 1. √ means materials are provided as standard.
2. Materials not marked with standard comply with ASTM standard.
3. Other materials are available subject to confirmation from FITOK.

Match of Tubing and Fittings

√ Recommended application
○ Applicable but not optimal
☐ Limited application subject to confirmation from FITOK
× Not applicable

Series / Heat Treatment / Hardness / Connection	TMP	TCT	TBA	TEP	PEP	TCA	T15A	T20D	T20M	T60H	TJT	TIT	TST
	Annealed							1/8-Hard	Hard		Annealed		
	⩽ 80 HRB			⩽ 90 HRB				⩽ 26 HRC	⩾ 98 HRB	-	⩽ 80 HRB		
6D Series Tube Fittings	√	√	○	○	×	×	☐	×	×	×	√	√	√
6 Series Single-Ferrule Tube Fittings	√	√	○	○	×	×	☐	×	×	×	√	√	√
37° Flared Fittings	○	○	○	○	×	×	×	×	×	×	○	○	○
Orbital Welding	○	○	√	√	√	√	☐	×	×	×	○	○	○
15S Series Single-Ferrule Tube Fittings	☐	☐	☐	☐	×	×	√	×	×	×	☐	☐	☐
20D Series Tube Fittings	☐	☐	☐	☐	×	×	√	√	○①	×	☐	☐	☐
20M Series Medium Pressure Fittings	×	×	×	×	×	×	×	×	√	☐	×	×	×
60 Series High Pressure Fittings	×	×	×	×	×	×	×	×	×	√	×	×	×

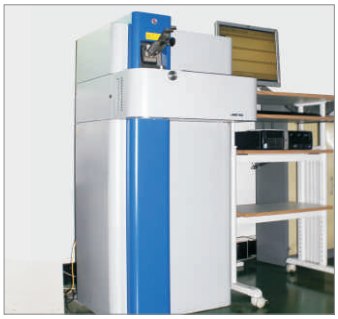
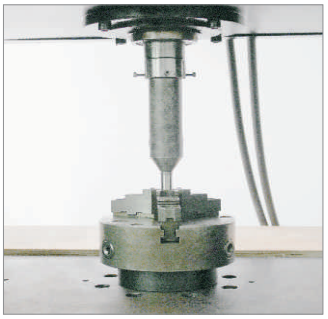
① Contact FITOK Group for installation methods of 20D series tube fittings with 20M series tubing.

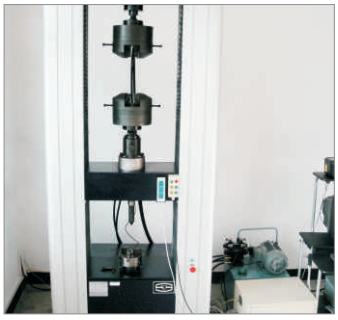
Working Pressure

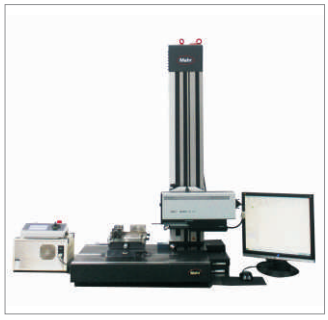
Working pressures are calculated based on ASME B31.3. To determine working pressures at elevated temperatures, multiply the working pressures at ambient temperature by the elevated temperature factors.
For more details, refer to applicable sections below.

Inspection Items

- Chemical Analysis
- Eddy Current Test
- Pressure Test
- Hardness Test
- Tensile Test
- Flaring Test
- Corrosion Test
- Grain Size Analysis
- Surface Roughness Measurement
- Particle Test
- Moisture Test
- Scanning Electron Microscope (SEM)
- Auger Electron Spectroscopy (AES)
- X-Ray Photoelectron Spectroscopy (ESCA or XPS)

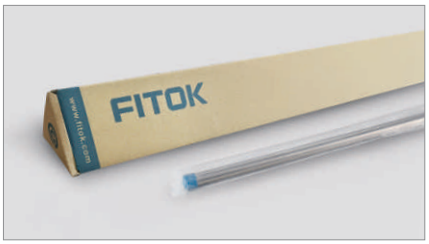


Packaging

Seamless Straight-Length Tubing

Tubing ends polyethylene capped; tubing bulk packed in cardboard box, cardboard tubes or wooden cases.
However, in between the two processes, TBA series tubing should be additionally packed in a single polyethylene bag, and TEP series tubing in double polyethylene bags.



Seamless Coiled Tubing

Two kinds of packaging methods:
Tubing ends polyethylene capped; tubing packed in coils and wrapped with a polyethylene film.
Tubing ends polyethylene capped; tubing packed in coils on wooden reel and firmly anchored by a polyethylene plate.
The first packaging method is standard, if packaging with wooden reel is needed, please contact FITOK Group or our authorized distributors.

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 from an S value of 20,000 psi (137,800 kPa) at -20 to 100 °F (-28 to 37°C) for 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	0.035 ②	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	0.035 ②	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	1341-1640 (408-499)	2683-3280 (818-999)	4026-4921 (1226-1499)	5368-6561④ (1636-1999)	+1.640 (+0.50)
-TCT-1-016-		0.016	1230-1503 (374-457)	2460-3007 (749-916)	3690-4511 (1125-1375)	4921-6014④ (1499-1832)	
-TCT-1-020-		0.020	1077-1316 (327-400)	2154-2633 (656-801)	3232-3951 (984-1203)	4310-5267④ (1313-1604)	
-TCT-1.5-014-	3/32	0.014	815-996 (248-303)	1630-1993 (496-607)	2447-2990 (745-910)	3262-3987④ (993-1214)	
-TCT-1.5-020-		0.020	617-754 (188-229)	1234-1509 (376-459)	1853-2264 (564-689)	2470-3019④ (752-919)	
-TCT-1.5-028-		0.028	495-605 (150-183)	990-1211 (301-368)	1485-1816 (452-553)	1981-2422④ (603-738)	
-TCT-2-016-	1/8	0.016	522-639 (159-194)	1046-1279 (318-389)	1570-1919 (477-584)	2093-2558④ (638-779)	
-TCT-2-020		0.020	433-530 (132-161)	868-1061 (264-323)	1302-1591 (396-485)	1737-2123④ (529-646)	
-TCT-2-028-		0.028	335-410 (101-124)	672-821 (204-249)	1008-1233 (306-375)	1344-1643④ (409-500)	
-TCT-2-035-		0.035	288-353 (88-107)	578-707 (176-215)	868-1061 (264-323)	1157-1414④ (352-431)	
-TCT-3-020-	3/16	0.020	271-332 (82-101)	544-665 (165-202)	817-998 (248-303)	1089-1331④ (332-405)	
-TCT-3-028-		0.028	204-249 (62-75)	408-499 (124-151)	612-749 (186-227)	817-998④ (249-304)	
-TCT-3-035-		0.035	171-209 (51-62)	342-418 (103-126)	513-627 (155-190)	684-836④ (207-254)	
-TCT-4-028-	1/4	0.028	738-902 (225-275)	1476-1804 (450-550)	2952-3609 (900-1100)	5905-7218 (1800-2200)	
-TCT-4-035-		0.035	605-740 (184-225)	1212-1481 (369-451)	2425-2964 (738-903)	4851-5930 (1478-1807)	
-TCT-4-049-		0.049	500-611 (152-185)	926-1131 (281-344)	1853-2264 (564-689)	3707-4530 (1129-1380)	
-TCT-4-065-		0.065	469-574 (143-174)	910-1113 (277-338)	1517-1854 (462-565)	3035-3710 (925-1130)	
-TCT-6-035-	3/8	0.035	382-467 (116-141)	765-936 (233-284)	1532-1873 (467-570)	3066-3747 (934-1141)	
-TCT-6-049-		0.049	307-376 (93-114)	570-697 (173-212)	1142-1395 (347-424)	2284-2791 (695-850)	
-TCT-6-065-		0.065	279-342 (85-104)	542-663 (164-201)	905-1106 (275-336)	1810-2213 (551-674)	
-TCT-8-035-	1/2	0.035	279-342 (84-103)	560-685 (170-207)	1121-1370 (341-416)	2243-2742 (683-834)	
-TCT-8-049-		0.049	222-271 (67-82)	413-504 (125-152)	826-1009 (251-306)	1652-2019 (503-614)	
-TCT-8-065-		0.065	199-244 (60-73)	387-473 (117-144)	645-788 (196-239)	1290-1577 (393-480)	
-TCT-8-083-		0.083	162-199 (49-60)	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	143-174	287-350	431-526	574-701④	+0.50
-TCT-3MM-0.8-		0.8	101-124	203-248	306-374	407-498④	
-TCT-6MM-0.8-	6	0.8	215-262	431-526	862-1053	1725-2108	
-TCT-6MM-1.0-		1.0	180-220	360-440	720-880	1440-1760	
-TCT-6MM-1.2-		1.2	167-204	311-380	622-761	1246-1523	
-TCT-6MM-1.5-		1.5	164-201	319-390	531-650	1064-1301	
-TCT-8MM-1.0-	8	1.0	127-156	256-313	513-628	1027-1256	
-TCT-8MM-1.2-		1.2	117-144	219-268	439-536	879-1074	
-TCT-8MM-1.5-		1.5	114-139	220-269	368-449	737-900	
-TCT-10MM-1.0-	10	1.0	99-121	198-243	398-487	797-974	
-TCT-10MM-1.2-		1.2	91-112	169-206	339-414	679-830	
-TCT-10MM-1.5-		1.5	86-105	168-205	280-343	562-687	
-TCT-12MM-1.0-	12	1.0	81-99	162-199	325-398	652-797	
-TCT-12MM-1.2-		1.2	74-91	137-168	276-337	553-676	
-TCT-12MM-1.5-		1.5	70-85	135-166	227-278	455-556	
-TCT-12MM-2.0-		2.0	54-67	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.

High Purity Tubing

TBA Series

Introduction

TBA series are suitable for high purity and ultra high purity fluid systems such as in the semiconductor industry. FITOK adopts strict specifications for materials and machining processes, etc., as well as eliminates undesired contaminant residues through high standard cleaning and packaging process to meet high cleanliness and high performance requirements of valves, fittings and tubing in the semiconductor manufacturing industry.

Features

◎ Material: 316L
◎ Standards: ASTM A269/A632
◎ Sizes: 1/4"-2 1/2"
◎ Process: internal surface cold worked followed by bright annealing to roughness of Ra≤20 μin (0.51 μm)
◎ Inspection: visual inspection, surface roughness measurement, particle testing, moisture testing
◎ Cleaning: ultrasonically cleaned, purged and dried
◎ Packaging: tubing ends are capped and tubing is packed in individual polyethylene bag
◎ Marking: tubing is marked with brand, material grade, standard, specification and heat number
◎ Standard length: 20 ft, 4 m and 6 m

Materials

Grade	Standard	FITOK Designator	Composition %							
			C	Mn	P	S	Si	Ni	Cr	Mo
316L	ASTM	6L	≤0.035①	≤2.00	≤0.045	≤0.03	≤1.00	10.0-15.0	16.0-18.0	2.0-3.0

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%.

Surface Roughness

Tube O.D. (D) mm	External Surface μin. (μm)	Internal Surface μin. (μm)
6.35≤D≤48.6	Ra≤63 (1.6)	Ra≤15 (0.38)
48.6<D≤63.5		Ra≤20 (0.51)

Dimensional Tolerance and Scope of Supply

Tube O.D.	Wall Thickness	O.D. Tolerance	Wall Thickness Tolerance	Tubing Length		Process	
in.	in.	in. (mm)	%	m	ft	Seamless	Welded
1/4	0.035	+/-0.004 (0.10)	+/-10	4 or 6	20	√	√
	0.039						
3/8	0.035						
	0.039						
	0.049						
1/2	0.035						
	0.039						
	0.049						
3/4	0.049						
	0.065						
1	0.049						
	0.065						
1 1/2	0.065	+/-0.008 (0.20)					
2	0.065	+/-0.010 (0.25)					
2 1/2	0.065						

Working Pressure at Ambient Temperature

For seamless tubing, working pressures are calculated from an S value of 20,000 psi (137,800 kPa) at -20 °F to 100 °F (-28°C to 37°C) for ASME B31.3:
For single butt weld tubing, multiply the pressure rating by 0.8.

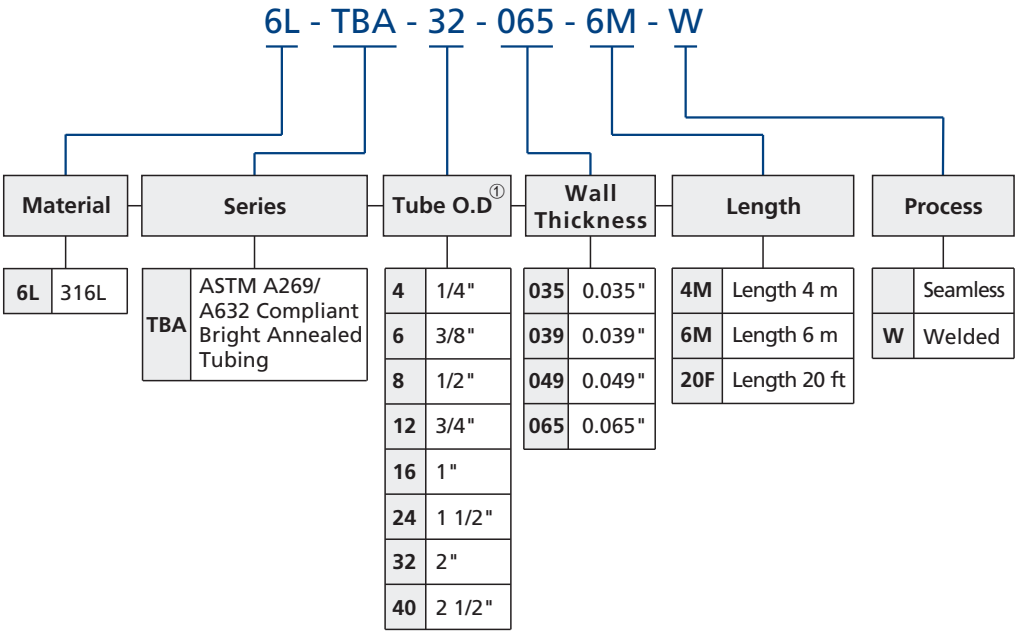
Tube O.D. in.	Wall Thickness in.			
	0.035	0.039	0.049	0.065
	Working Pressure psig			
1/4	5100	5700	-	-
3/8	3300	3700	4800	-
1/2	2600	3000	3700	-
3/4	-	-	2400	3300
1	-	-	1800	2400
1 1/2	-	-	-	1600
2	-	-	-	1200
2 1/2	-	-	-	950

Elevated Temperature Factors

Temperature		Factor
°F	°C	316L
200	93	1.00
400	204	0.96
600	315	0.85
800	426	0.79
1000	537	0.76

Example:
1/2 in. O.D. × 0.035 in. wall thickness TBA series tubing at 600 °F (315 °C):
1. Working pressure is 2600 psig at -20 °F to 100 °F (-28 °C to 37 °C);
2. Elevated temperature factor is 0.85 at 600 °F (315 °C);
2600 psig × 0.85 = 2210 psig
conclude the working pressure of 1/2 in. O.D. × 0.035 in. wall thickness TBA series tubing at 600 °F (315 °C) is 2210 psig.

Ordering Number Description



① To order metric sizes, please contact FITOK Group.

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
2. Purity test reports are available. Please contact FITOK Group for more information.

TEP and PEP Series

Introduction

TEP/PEP series are suitable for high purity and ultra high purity fluid systems such as in the semiconductor industry. FITOK adopts strict specifications for materials, machining and electropolishing processes, etc., as well as eliminates undesired contaminant residues through high standard cleaning and packaging process to meet high cleanliness and high performance requirements of valves, fittings and tubing in the semiconductor manufacturing industry.

Features

◎ Materials: 316L, 316L VAR, 316L VIM-VAR
◎ Standards: ASTM A269, A632, A312 or JIS G3459
◎ Sizes: TEP series ASTM A269/A632: 1/4"-2 1/2"
PEP series JIS G3459: 6A-50A
PEP series ASTM A312: NPS 1/8-NPS 2
◎ Process: internal surface electropolished to roughness of Ra≤10 μin (0.25 μm), Ra≤7 μin (0.18 μm), Ra≤5 μin (0.13 μm); external surface roughness of Ra≤40 μin (1 μm)

◎ Inspection: visual inspection, surface roughness measurement, particle test, moisture test, scanning electron microscopy (SEM), Auger electron spectroscopy (AES), X-ray photoelectron spectroscopy (ESCA or XPS)
◎ Cleaning: ultrasonically cleaned, washed, rinsed, and purged and dried with high purity hot nitrogen in ISO Class 6 cleanroom
◎ Packaging: packaged in ISO Class 4 cleanroom, cleaned with ultra high pressure nitrogen, tubing ends are capped and tubing is packed in double polyethylene bags with inner bag filled with 99.999% nitrogen
◎ Marking: packing bags are marked with brand, material grade, specification and heat number
◎ Standard length: 20 ft, 4 m and 6 m

Materials

Grade	Standard	FITOK Designator	Composition %							
			C	Mn	P	S	Si	Ni	Cr	Mo
316L	ASTM	6L	≤0.035①	≤2.00	≤0.045	≤0.03	≤1.00	10.0-15.0	16.0-18.0	2.0-3.0
	JIS G3459		≤0.03					12.0-16.0		
316L VAR	ASTM	6LV		≤1.50	≤0.045	≤0.01		10.0-15.0		
316L VIM-VAR		6LW								

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%.

Surface Roughness

Tube O.D. (D) mm	External Surface μin. (μm)	Internal Surface μin. (μm)		
	TEP/PEP	TEP/PEP		
		A	B	C
6.35≤D≤63.5	Ra≤40 (1.0)	Ra≤5 (0.13)	Ra≤7 (0.18)	Ra≤10 (0.25)

Tubing

Dimensional Tolerance and Scope of Supply

ASTM A269/A632 Compliant TEP Series							
Tube O.D.	Wall Thickness	O.D. Tolerance	Wall Thickness Tolerance	Tubing Length		Process	
in.	in.	in. (mm)	%	m	ft	Seamless	Welded
1/4	0.035	+/-0.004 (0.10)	+/-10	4 or 6	20	√	√
	0.039						
3/8	0.035						
	0.039						
	0.049						
1/2	0.035						
	0.039						
	0.049						
3/4	0.049						
	0.065						
1	0.049						
	0.065						
1 1/2	0.065	+/-0.008 (0.20)					
2	0.065	+/-0.010 (0.25)					
2 1/2	0.065						

Working Pressure at Ambient Temperature

For seamless tubing, working pressures are calculated from an S value of 20,000 psi (137,800 kPa) at -20 °F to 100 °F (-28°C to 37°C) for ASME B31.3:
For single butt weld tubing, multiply the pressure rating by 0.8.

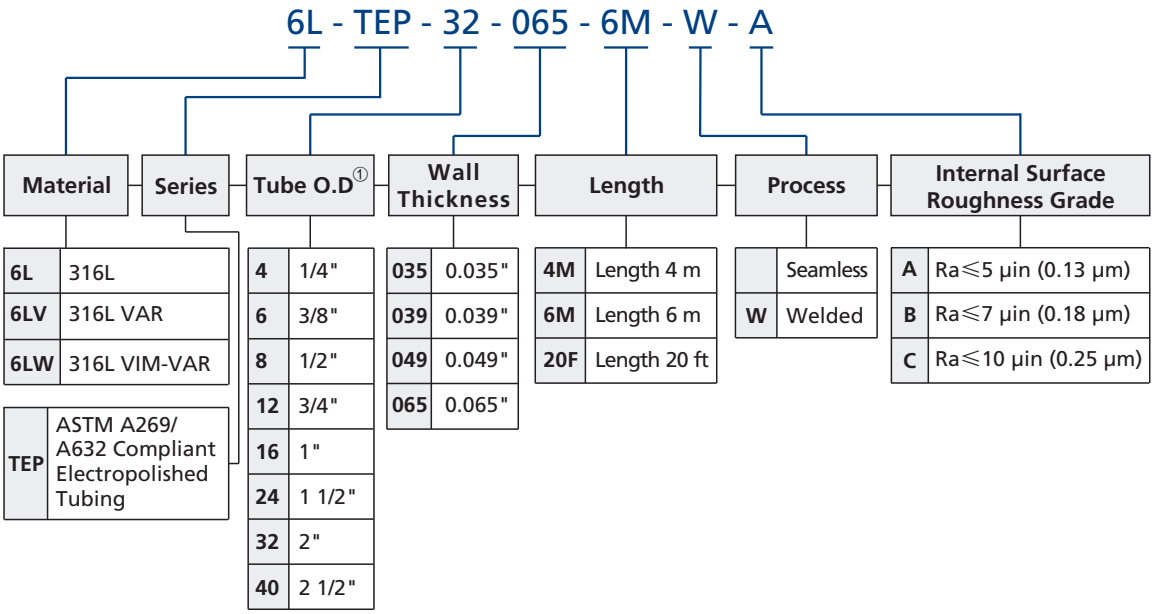
ASTM A269/A632 Compliant TEP Series				
Tube O.D.	Wall Thickness in.			
	0.035	0.039	0.049	0.065
	Working Pressure psig			
1/4	5100	5700	-	-
3/8	3300	3700	4800	-
1/2	2600	3000	3700	-
3/4	-	-	2400	3300
1	-	-	1800	2400
1 1/2	-	-	-	1600
2	-	-	-	1200
2 1/2	-	-	-	950

Elevated Temperature Factors

Temperature		Factor
°F	°C	316L
200	93	1.00
400	204	0.96
600	315	0.85
800	426	0.79
1000	537	0.76

Example:
1/2 in. O.D. × 0.035 in. wall thickness EP tubing at 600 °F (315 °C):
1. Working pressure is 2600 psig at -20 °F to 100 °F (-28 °C to 37 °C);
2. Elevated temperature factor is 0.85 at 600 °F (315 °C);
2600 psig × 0.85 = 2210 psig
conclude the working pressure of 1/2 in. O.D. × 0.035 in. wall thickness EP tubing at 600 °F (315 °C) is 2210 psig.

Ordering Number Description



① To order metric sizes, please contact FITOK Group.

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
2. Purity test reports are available. Please contact FITOK Group for more information.

Pipes

Dimensional Tolerance and Scope of Supply

JIS G3459 Compliant PEP Series

Nominal O.D.	Pipe O.D.	Nominal Wall Thickness		O.D. Tolerance	Wall Thickness Tolerance	Pipe Length		Process	
		SCH5S	SCH10S						
A Size	mm	Wall Thickness, mm		in. (mm)	%	m	ft	Seamless	Welded
6A	10.5	1. 0	1.2	+/-0.004 (0.10)	+/-10	4 or 6	-	√	√
8A	13.8	1. 2	1.65						
10A	17.3	1. 2	1.65						
15A	21.7	1. 65	2.1						
20A	27.2	1.65	2.1						
25A	34.0	1.65	2.8						
32A	42.7	1.65	2.8	+/-0.012 (0.30)					
40A	48.6	1.65	2.8						
50A	60.5	1.65	2.8	+/-0.020 (0.50)					

ASTM A312 Compliant PEP Series

Nominal O.D.	Pipe O.D.	Nominal Wall Thickness				O.D. Tolerance	Wall Thickness Tolerance	Pipe Length		Process	
		B36.19M		B36.10M							
		SCH5S	SCH10S	SCH5	SCH10						
NPS	mm	Wall Thickness, mm				in. (mm)	%	m	ft	Seamless	Welded
1/8	10.3	-	1.24	-	1.24	+0.016 (0.40)/ -0.031 (0.80)	+20/ -12.5	4 or 6	20	√	√
1/4	13.7	-	1.65	-	1.65						
3/8	17.1	-	1.65	-	1.65						
1/2	21.3	1. 65	2.11	1. 65	2.11						
3/4	26.7	1.65	2.11	1.65	2.11						
1	33.4	1.65	2.77	1.65	2.77						
1 1/4	42.2	1.65	2.77	1.65	2.77						
1 1/2	48.3	1.65	2.77	1.65	2.77						
2	60.3	1.65	2.77	1.65	2.77	+/-0.031 (0.80)					

Working Pressure at Ambient Temperature

For seamless pipes, working pressures are calculated from an S value of 20,000 psi (137,800 kPa) at -20 °F to 100 °F (-28 °C to 37 °C) for ASME B31.3:
For single butt weld pipes, multiply the pressure rating by 0.8.

JIS G3459 Compliant PEP Series

Nominal Diameter A Size	Pipe O.D. mm	Wall Thickness	
		SCH5S	SCH10S
		Working Pressure psig	
6A	10.5	3300	4000
8A	13.8	3000	4300
10A	17.3	2400	3300
15A	21.7	2600	3400
20A	27.2	2100	2700
25A	34.0	1600	2900
32A	42.7	1300	2200
40A	48.6	1100	2000
50A	60.5	910	1600

ASTM A312 Compliant PEP Series

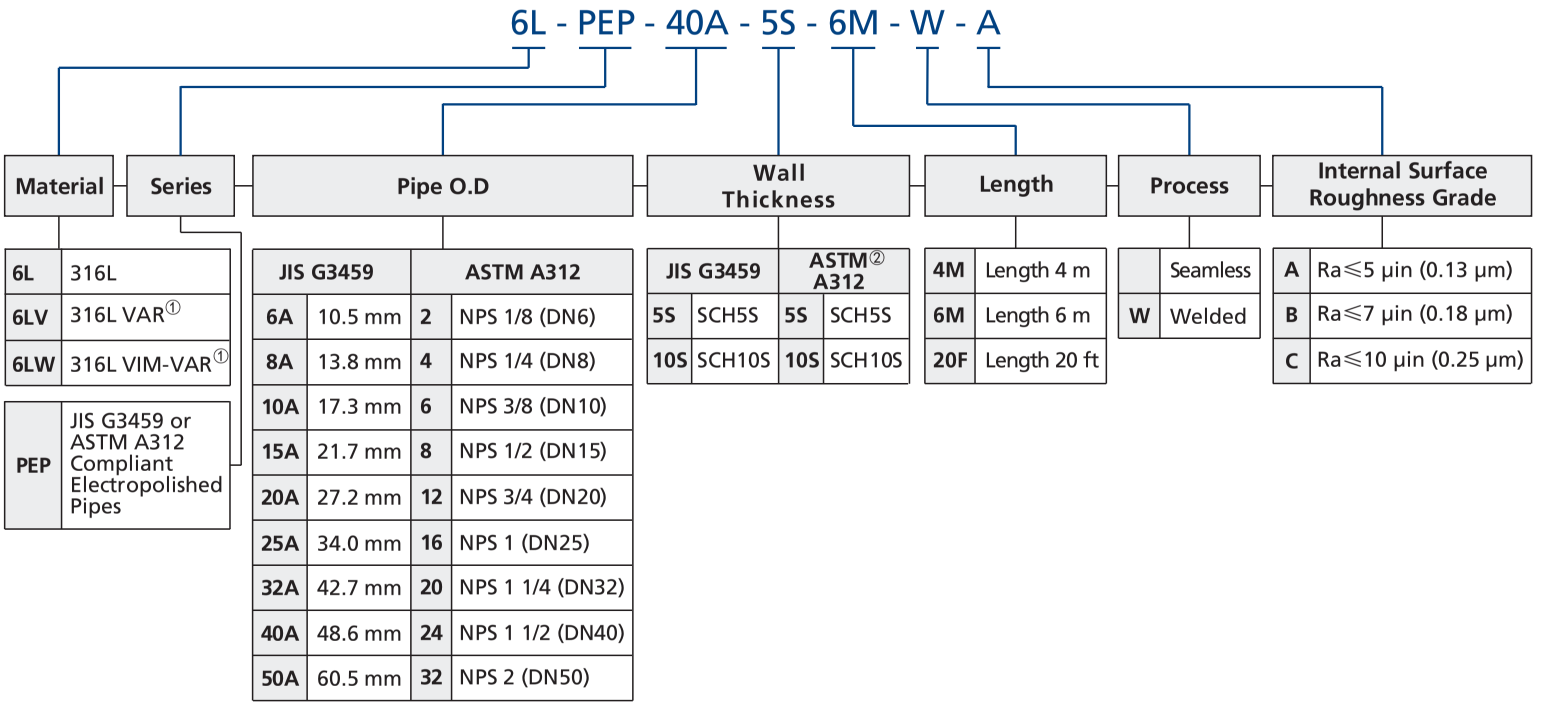
Nominal Diameter NPS	Wall Thickness			
	B36.19M		B36.10M	
	SCH5S	SCH10S	SCH5	SCH10
	Working Pressure psig			
1/8	-	4600	-	4600
1/4	-	4600	-	4600
3/8	-	3600	-	3600
1/2	2800	3700	2800	3700
3/4	2300	2900	2300	2900
1	1800	3100	1800	3100
1 1/4	1400	2400	1400	2400
1 1/2	1200	2100	1200	2100
2	970	1700	970	1700

Elevated Temperature Factors

Temperature		Factor
°F	°C	316L
200	93	1.00
400	204	0.96
600	315	0.85
800	426	0.79
1000	537	0.76

Example:
10A O.D. × SCH55 wall thickness EP pipes at 600 °F (315 °C):
1. Working pressure is 2400 psig at -20 °F to 100 °F (-28 °C to 37 °C);
2. Elevated temperature factor is 0.85 at 600 °F (315 °C);
2400 psig × 0.85 = 2040 psig
conclude the working pressure of 10A O.D. × SCH55 wall thickness EP pipes at 600 °F (315 °C) is 2040 psig.

Ordering Number Description



Material	
6L	316L
6LV	316L VAR①
6LW	316L VIM-VAR①

Series	
PEP	JIS G3459 or ASTM A312 Compliant Electropolished Pipes

Pipe O.D			
JIS G3459		ASTM A312	
6A	10.5 mm	2	NPS 1/8 (DN6)
8A	13.8 mm	4	NPS 1/4 (DN8)
10A	17.3 mm	6	NPS 3/8 (DN10)
15A	21.7 mm	8	NPS 1/2 (DN15)
20A	27.2 mm	12	NPS 3/4 (DN20)
25A	34.0 mm	16	NPS 1 (DN25)
32A	42.7 mm	20	NPS 1 1/4 (DN32)
40A	48.6 mm	24	NPS 1 1/2 (DN40)
50A	60.5 mm	32	NPS 2 (DN50)

Wall Thickness			
JIS G3459		ASTM② A312	
5S	SCH5S	5S	SCH5S
10S	SCH10S	10S	SCH10S

Length	
4M	Length 4 m
6M	Length 6 m
20F	Length 20 ft

Process	
	Seamless
W	Welded

Internal Surface Roughness Grade	
A	Ra≤5 μin (0.13 μm)
B	Ra≤7 μin (0.18 μm)
C	Ra≤10 μin (0.25 μm)

① Not available for JIS G3459 compliant pipes.
② Wall thickness complies with ASME B36.19M. For ASME B36.10M compliant wall thickness, please contact FITOK Group.

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
2. Purity test reports are available. Please contact FITOK Group for more information.

Ordering Information

To order, add material designator, series, length, process, internal surface roughness grade and report to get a complete ordering number.

Examples:

1. Seamless tubing, 316L stainless steel, ASTM A269 compliant, TBA series, 1/4" O.D. x 0.035" wall thickness, 6 m length, standard report, the ordering number is 6L-TBA-4-035-6M.

1. Seamless tubing, 316L stainless steel, ASTM A269 compliant, TEP series, 1/4" O.D. x 0.035" wall thickness, 6 m length, internal surface roughness of Ra≤0.25 μm, standard report, the ordering number is 6L-TEP-4-035-6M-C.

2. Seamless pipe, 316L stainless steel, JIS G3459 compliant, PEP series, 8A O.D. x SCH105 wall thickness, 6 m length, internal surface roughness of Ra≤0.13 μm, the ordering number is 6L-PEP-8A-10S-6M-A.

ASTM A269/A632 Compliant TBA/TEP Series

Tube O.D. in.	Wall Thickness in.	Basic Ordering Number	
1/4	0.035	□□-TBA-4-035-□□-□	□□-TEP-4-035-□□-□-□
	0.039	□□-TBA-4-039-□□-□	□□-TEP-4-039-□□-□-□
3/8	0.035	□□-TBA-6-035-□□-□	□□-TEP-6-035-□□-□-□
	0.039	□□-TBA-6-039-□□-□	□□-TEP-6-039-□□-□-□
	0.049	□□-TBA-6-049-□□-□	□□-TEP-6-049-□□-□-□
1/2	0.035	□□-TBA-8-035-□□-□	□□-TEP-8-035-□□-□-□
	0.039	□□-TBA-8-039-□□-□	□□-TEP-8-039-□□-□-□
	0.049	□□-TBA-8-049-□□-□	□□-TEP-8-049-□□-□-□
3/4	0.049	□□-TBA-12-049-□□-□	□□-TEP-12-049-□□-□-□
	0.065	□□-TBA-12-065-□□-□	□□-TEP-12-065-□□-□-□
1	0.049	□□-TBA-16-049-□□-□	□□-TEP-16-049-□□-□-□
	0.065	□□-TBA-16-065-□□-□	□□-TEP-16-065-□□-□-□
1 1/2	0.065	□□-TBA-24-065-□□-□	□□-TEP-24-065-□□-□-□
2	0.065	□□-TBA-32-065-□□-□	□□-TEP-32-065-□□-□-□
2 1/2	0.065	□□-TBA-40-065-□□-□	□□-TEP-40-065-□□-□-□

JIS G3459 Compliant PEP Series

Nominal Diameter A Size	Nominal Wall Thickness	
	SCH5S	SCH10S
	Basic Ordering Number	
6A	□□-PEP-6A-5S-□□-□-□	□□-PEP-6A-10S-□□-□-□
8A	□□-PEP-8A-5S-□□-□-□	□□-PEP-8A-10S-□□-□-□
10A	□□-PEP-10A-5S-□□-□-□	□□-PEP-10A-10S-□□-□-□
15A	□□-PEP-15A-5S-□□-□-□	□□-PEP-15A-10S-□□-□-□
20A	□□-PEP-20A-5S-□□-□-□	□□-PEP-20A-10S-□□-□-□
25A	□□-PEP-25A-5S-□□-□-□	□□-PEP-25A-10S-□□-□-□
32A	□□-PEP-32A-5S-□□-□-□	□□-PEP-32A-10S-□□-□-□
40A	□□-PEP-40A-5S-□□-□-□	□□-PEP-40A-10S-□□-□-□
50A	□□-PEP-50A-5S-□□-□-□	□□-PEP-50A-10S-□□-□-□

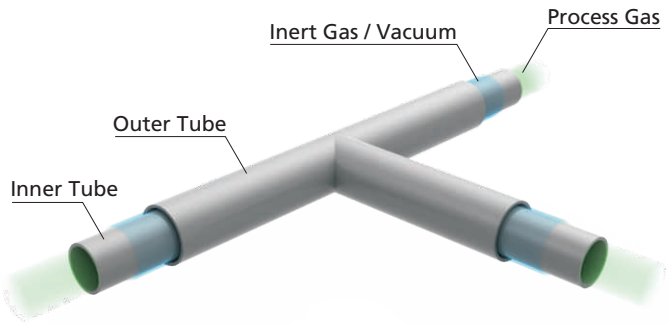
ASTM A312 Compliant PEP Series

Nominal Diameter NPS	Nominal Wall Thickness	
	SCH5S	SCH10S
	Basic Ordering Number	
1/8	-	□□-PEP-2-10S-□□-□-□
1/4	-	□□-PEP-4-10S-□□-□-□
3/8	-	□□-PEP-6-10S-□□-□-□
1/2	□□-PEP-8-5S-□□-□-□	□□-PEP-8-10S-□□-□-□
3/4	□□-PEP-12-5S-□□-□-□	□□-PEP-12-10S-□□-□-□
1	□□-PEP-16-5S-□□-□-□	□□-PEP-16-10S-□□-□-□
1 1/4	□□-PEP-20-5S-□□-□-□	□□-PEP-20-10S-□□-□-□
1 1/2	□□-PEP-24-5S-□□-□-□	□□-PEP-24-10S-□□-□-□
2	□□-PEP-32-5S-□□-□-□	□□-PEP-32-10S-□□-□-□

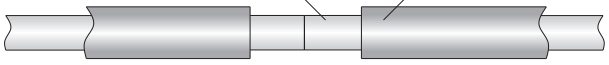
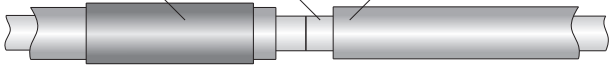
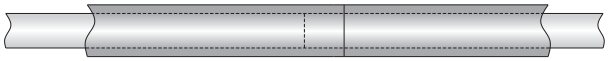
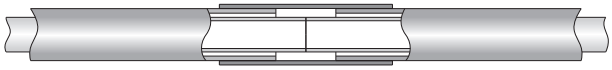
TCA Series Coaxial Tubing and Fittings

Introduction

The inner process tube meets the high cleanliness and high performance requirements of ultra high purity fluid systems through strict specifications for raw materials, electropolishing, cleaning and packaging. The outer safety tube provides safe distribution of the overflow fluid in the unlikely event of a leak in the process tube. The double tube system is simple and easy to install with only orbital welding and can be integrated into existing systems and facilities.

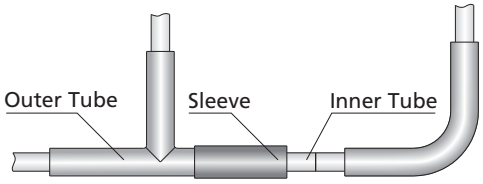


Connection Method

Tube to tube or tube to fitting connection method 1	Tube to tube or tube to fitting connection method 2
1  Orbital weld the inner tubes together, then conduct helium leak test.	1  Install the sleeve on the outer tubes and orbital weld the inner tubes together, then conduct helium leak test.
2  Move the outer tubes to cover the inner tubes completely and connect them by orbital welding, then conduct helium leak test.	2  Move the sleeve to cover the gap between the two outer tubes completely and weld the sleeve to the outer tubes, then conduct helium leak test.

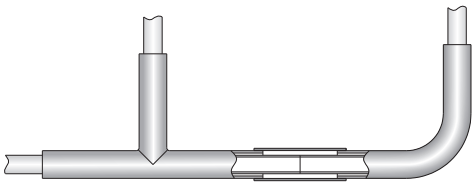
Fitting to fitting connection

1



Install the sleeve on the outer tube of one fitting and connect the inner tubes together by orbital welding, then conduct helium leak test.

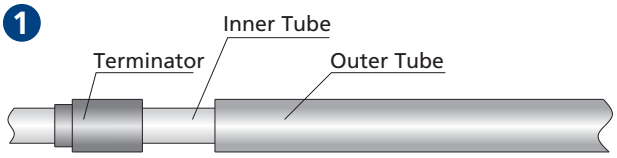
2



Move the sleeve to cover the gap between the two outer tubes completely and weld the sleeve to the outer tubes, then conduct helium leak test.

Seal the outer tubes

1



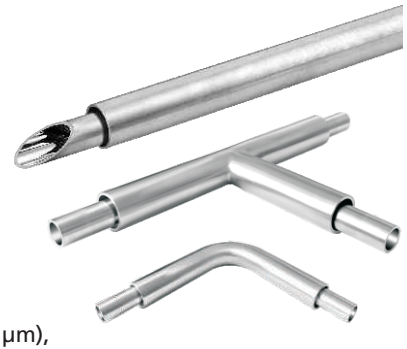
Install the terminator to the inner tubes.

2

Weld one end of the terminator to the outer tube and the other end to the outer wall of the inner tube, then conduct helium leak test.

Coaxial Tubing

Features



◎ Materials:

Inner tube：316L, 316L VAR, 316L VIM-VAR

Outer tube: 316L, 304L

◎ Outside diameters:

Inner tube: 1/4" ~ 2"

Outer tube: 1/2" ~ 2 1/2"

◎ Process:

Inner tube: internal surface electropolished to roughness of Ra≤5 μin (0.13 μm), Ra≤7 μin (0.18 μm), Ra≤10 μin (0.25 μm)

Outer tube: internal surface bright annealed or bright annealed after precision cold working to roughness of 15 μin (0.38 μm), Ra≤20 μin (0.51 μm), Ra≤32 μin (0.8 μm), Ra≤63 μin (1.6 μm); external surface machine finished to roughness of Ra≤63 μin (1.6 μm)

◎ Cleaning: ultrasonically cleaned, washed, rinsed, and purged and dried with high purity hot nitrogen in ISO Class 6 cleanroom

◎ Packaging: assembled in ISO Class 4 cleanroom, tubing ends are capped and tubing is packed in double polyethylene bags with inner bag filled with 99.999% nitrogen

◎ Marked with brand, inner tube grade, specification, heat number

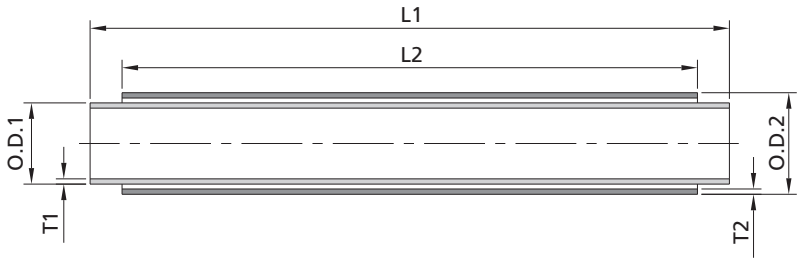
◎ Standard length: 20 ft and 6 m

Materials

Grade	Standard	FITOK Designator	Composition/%							
			C	Mn	P	S	Si	Ni	Cr	Mo
316L	ASTM	6L	≤0. 035①	≤2. 00	≤0. 045	≤0.03	≤1.00	10.0~15.0	16.0~18.0	2.0~3.0
316L VAR		6LV	≤0. 03	≤1. 50		≤0.01				
316L VIM-VAR		6LW								

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%

Ordering Information



Basic Ordering Number	Inner Tube O.D.1	Inner Tube Wall Thickness T1	Outer Tube O.D.2	Outer Tube Wall Thickness T2	Metric/m (recommended)		Fractional/ft		Inner Tube Working Pressure (-18~99 °F) psig
					Inner Tube Length L1	Outer Tube Length L2	Inner Tube Length L1	Outer Tube Length L2	
□□-CEP-TB4-TB8-□□-□□	1/4"	0.035"	1/2"	0.049"	6	5.95	20	19.83	5100
□□-CEP-TB6-TB10-□□-□□	3/8"	0.035"	5/8"	0.049"	6	5.95	20	19.83	3300
□□-CEP-TB8-TB12-□□-□□	1/2"	0.049"	3/4"	0.065"	6	5.95	20	19.83	3700
□□-CEP-TB12-TB16-□□-□□	3/4"	0.065"	1"	0.065"	6	5.91	20	19.71	3300
□□-CEP-TB16-TB20-□□-□□	1"	0.065"	1 1/4"	0.065"	6	5.91	20	19.71	2400
□□-CEP-TB24-TB32-□□-□□	1 1/2"	0.065"	2"	0.065"	6	5.9	20	19.67	1600
□□-CEP-TB32-TB40-□□-□□	2"	0.065"	2 1/2"	0.065"	6	5.9	20	19.67	1200

Ordering Number Description

6L - CEP - TB4 - 4L - TB8 - 6M - A A

Inner Tube Material	
6L	316L
6LV	316L VAR
6LW	316L VIM-VAR

Type	
CEP	Coaxial Tubing

Inner Tube Size	
TB4	1/4" x 0.035"
TB6	3/8" x 0.035"
TB8	1/2" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB24	1 1/2" x 0.065"
TB32	2" x 0.065"

Outer Tube Material	
None	316L
4L	304L

Outer Tube Size	
TB8	1/2" x 0.049"
TB10	5/8" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB20	1 1/4" x 0.065"
TB32	2" x 0.065"
TB40	2 1/2" x 0.065"

Length	
6M	6 m
20F	20 ft

Inner Tube Grade	
A	Internal Surface Ra≤0.13 μm (EP Condition)
B	Internal Surface Ra≤0.18 μm (EP Condition)
C	Internal Surface Ra≤0.25 μm (EP Condition)

Outer Tube Grade	
A	6.35≤O.D.≤48.6 Internal Surface Ra≤0.38 μm (BA Condition)
	48.6<O. D. ≤63.5 Internal Surface Ra≤0.51 μm (BA Condition)
B	Internal Surface Ra≤0.8 μm (BA Condition)
C	Internal Surface Ra≤1.6 μm (BA Condition)

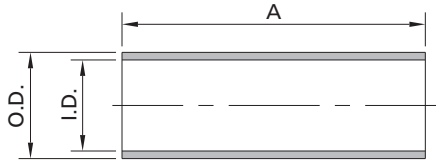
Note:"Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.
Not all combination are available.

Coaxial Sleeve

Features

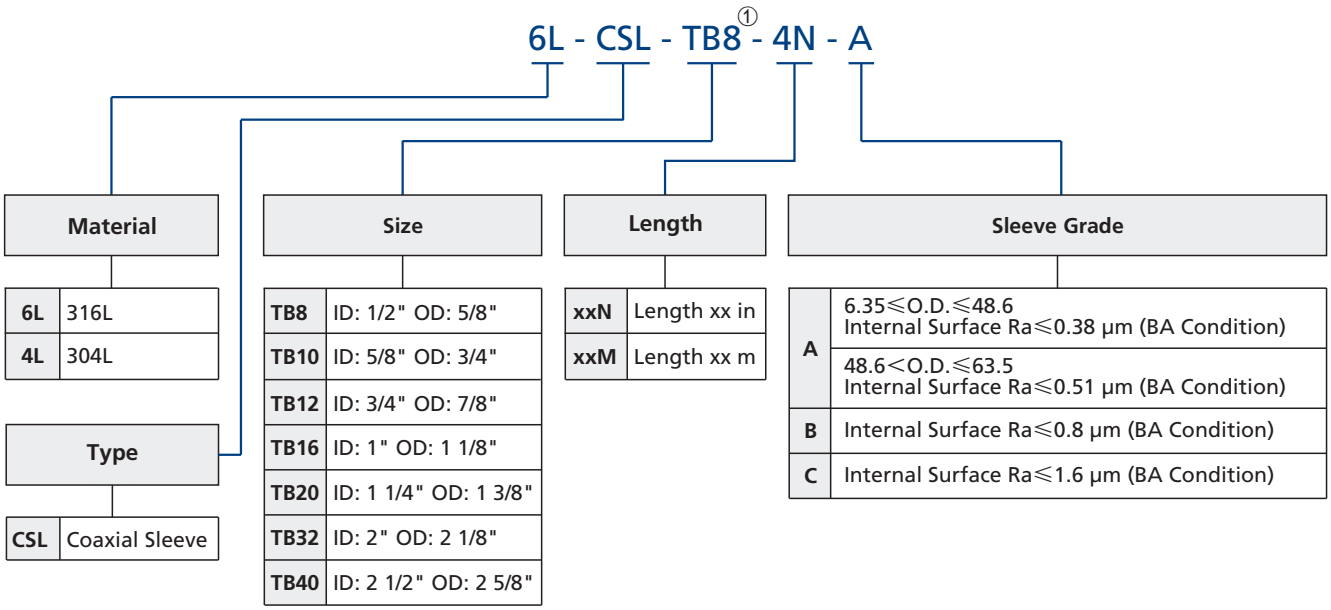
- Materials: 316L, 304L
- Inside diameter: 1/2" ~ 2 1/2"
- Process: internal surface bright annealed or bright annealed after precision cold working to roughness of 15 μin (0.38 μm), Ra≤20 μin (0.51 μm), Ra≤32 μin (0.8 μm), Ra≤63 μin (1.6 μm); external surface mechine finished to roughness of Ra≤63 μin (1.6 μm)
- Cleaning: ultrasonically cleaned, purged and dried
- Packaging: tubing ends are capped and tubing is packed in individual polyethylene bag
- Marked with brand, material grade and trace number
- Standard length: 2.5 in, 4 in, 4.5 in, customized lengths are available upon request

Ordering Information



Part Number	I.D.	O.D.	Length A
6L-CSL-TB8-□□-□	1/2"	5/8"	2.5"
6L-CSL-TB10-□□-□	5/8"	3/4"	2.5"
6L-CSL-TB12-□□-□	3/4"	7/8"	2.5"
6L-CSL-TB16-□□-□	1"	1 1/8"	4"
6L-CSL-TB20-□□-□	1 1/4"	1 3/8"	4"
6L-CSL-TB32-□□-□	2"	2 1/8"	4.5"
6L-CSL-TB40-□□-□	2 1/2"	2 5/8"	4.5"

Ordering Number Description



① Refer to outer tube outside diameter for sleeve part number selection.

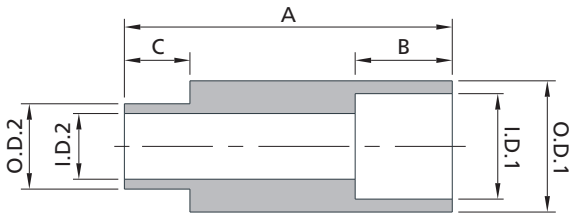
Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

Coaxial Terminator

Features

- Materials: 316L, 304L
- Big end: O.D. 1/2" ~ 2 1/2"
- Small end: I.D. 1/4" ~ 2"
- Marked with brand, material grade and trace number
- Standard length: 1.25 in, 2 in, 2.25 in

Ordering Information



Part Number	O.D.1	I.D.1	O.D.2	I.D.2	A	B	C
6L-CTE-TB8-TB4	1/2"	0.402"	0.325"	1/4"	1.25"	0.37"	0.25"
6L-CTE-TB10-TB6	5/8"	0.527"	0.450"	3/8"	1.25"	0.37"	0.25"
6L-CTE-TB12-TB8	3/4"	0.620"	0.603"	1/2"	1.25"	0.37"	0.25"
6L-CTE-TB16-TB12	1"	0.870"	0.885"	3/4"	2"	0.5"	0.25"
6L-CTE-TB20-TB16	1 1/4"	1.120"	1.135"	1"	2"	0.5"	0.25"
6L-CTE-TB32-TB24	2"	1.870"	1.635"	1 1/2"	2.25"	0.75"	0.25"
6L-CTE-TB40-TB32	2 1/2"	2.360"	2.135"	2"	2.25"	0.75"	0.25"

Ordering Number Description

6L - CTE - TB8 - TB4

Material	
6L	316L
4L	304L

Type	
CTE	Coaxial Terminator

Big End Size	
TB8	1/2" x 0.049"
TB10	5/8" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB20	1 1/4" x 0.065"
TB32	2" x 0.065"
TB40	2 1/2" x 0.065"

Small End Size	
TB4	ID: 1/4"
TB6	ID: 3/8"
TB8	ID: 1/2"
TB12	ID: 3/4"
TB16	ID: 1"
TB24	ID: 1 1/2"
TB32	ID: 2"

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

Coaxial Elbow

Features

◎ Materials:
Inner tube: 316L, 316L VAR, 316L VIM-VAR
Outer tube: 316L, 304L

◎ Outside diameter:
Inner tube: 1/4" ~ 2"
Outer tube: 1/2" ~ 2 1/2"

◎ Inner tube process: internal surface electropolished to roughness of Ra≤5 μin (0.13 μm), Ra≤7 μin (0.18 μm), Ra≤10 μin (0.25 μm)

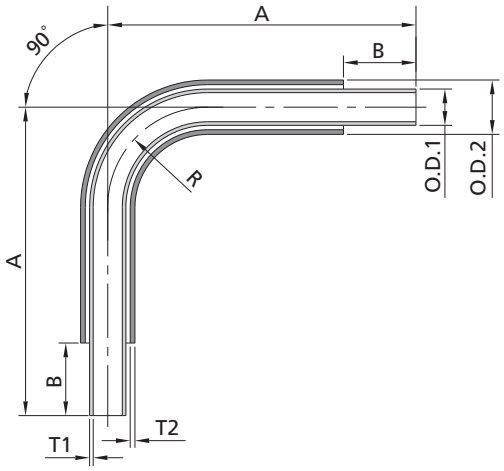
◎ Cleaning: ultrasonically cleaned, washed, rinsed, and purged and dried with high purity hot nitrogen in ISO Class 6 cleanroom

◎ Packaging: packaged in ISO Class 4 cleanroom, tubing ends are capped and tubing is packed in double polyethylene bags with inner bag filled with 99.999% nitrogen

◎ Marked with brand, material grade and trace number

Ordering Information

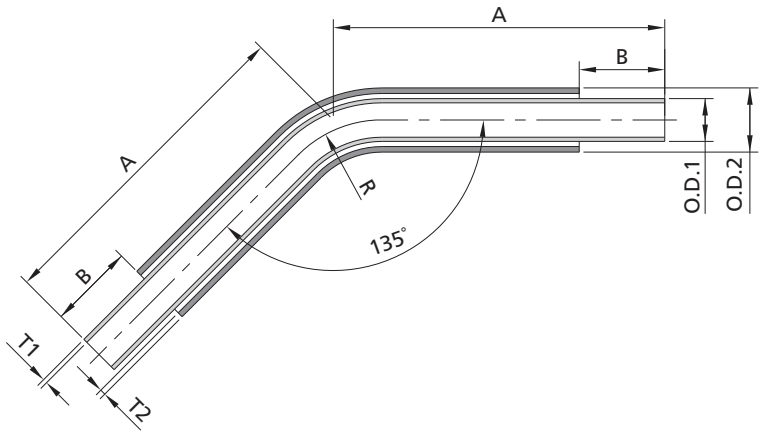
Coaxial 90° Elbow



Part Number	Inner Tube O.D.1	Inner Tube Wall Thickness T1	Outer Tube O.D.2	Outer Tube Wall Thickness T2	Bending Radius R	A	B
6L-CEL-TB4-TB8	0.25"	0.035"	0.5"	0.049"	0.98"	4.375"	1"
6L-CEL-TB6-TB10	0.375"	0.035"	0.625"	0.049"	1.10"	4.125"	1"
6L-CEL-TB8-TB12	0.5"	0.049"	0.75"	0.065"	1.38"	4.25"	1"
6L-CEL-TB12-TB16	0.75"	0.065"	1"	0.065"	1.12"	6.75"	1.75"
6L-CEL-TB16-TB20	1"	0.065"	1.25"	0.065"	1.50"	7.125"	1.75"
6L-CEL-TB24-TB32	1.5"	0.065"	2"	0.065"	2.25"	8.375"	2"
6L-CEL-TB32-TB40	2"	0.065"	2.5"	0.065"	3.00"	9"	2"

Ordering Information

Coaxial 45° Elbow



Part Number	Inner Tube O.D.1	Inner Tube Wall Thickness T1	Outer Tube O.D.2	Outer Tube Wall Thickness T2	Bending Radius R	A	B
6L-CEV-TB4-TB8	0.25"	0.035"	0.5"	0.049"	0.98"	4"	1"
6L-CEV-TB6-TB10	0.375"	0.035"	0.625"	0.049"	1.10"	3.875"	1"
6L-CEV-TB8-TB12	0.5"	0.049"	0.75"	0.065"	1.38"	3.875"	1"
6L-CEV-TB12-TB16	0.75"	0.065"	1"	0.065"	1.12"	6.125"	1.75"
6L-CEV-TB16-TB20	1"	0.065"	1.25"	0.065"	1.50"	6.25"	1.75"
6L-CEV-TB24-TB32	1.5"	0.065"	2"	0.065"	2.25"	7.12"	2"
6L-CEV-TB32-TB40	2"	0.065"	2.5"	0.065"	3.00"	8"	2"

Ordering Number Description

6L - CEL - TB4 - 4L - TB8 - A A

Inner Tube Material

6L	316L
6LV	316L VAR
6LW	316L VIM-VAR

Type

CEL	Coaxial 90° Elbow
CEV	Coaxial 45° Elbow

Inner Tube Size

TB4	1/4" x 0.035"
TB6	3/8" x 0.035"
TB8	1/2" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB24	1 1/2" x 0.065"
TB32	2" x 0.065"

Outer Tube Material

None	316L
4L	304L

Outer Tube Size

TB8	1/2" x 0.049"
TB10	5/8" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB20	1 1/4" x 0.065"
TB32	2" x 0.065"
TB40	2 1/2" x 0.065"

Inner Tube Grade ①

A	Internal Surface Ra≤0.13 μm (EP Condition)
B	Internal Surface Ra≤0.18 μm (EP Condition)
C	Internal Surface Ra≤0.25 μm (EP Condition)

Outer Tube Grade ①

A	6.35≤O.D.≤48.6 Internal Surface Ra≤0.38 μm (BA Condition)
	48.6<O.D.≤63.5 Internal Surface Ra≤0.51 μm (BA Condition)
B	Internal Surface Ra≤0.8 μm (BA Condition)
C	Internal Surface Ra≤1.6 μm (BA Condition)

① Ra values for the internal and external surfaces of the cold working area of the fittings are not defined.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

Coaxial Equal Tee

Features

◎ Materials:
Inner tube: 316L, 316L VAR, 316L VIM-VAR
Outer tube: 316L, 304L

◎ Outside diameter:
Inner tube: 1/4" ~ 2"
Outer tube: 1/2" ~ 2 1/2"

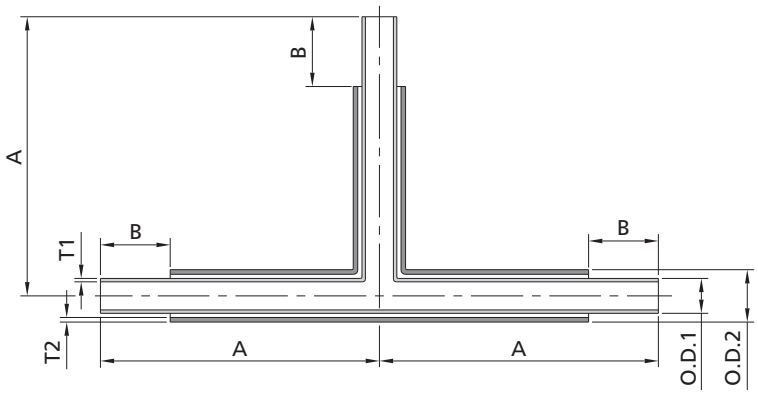
◎ Inner tube process: internal surface electropolished to roughness of Ra≤5 μin (0.13 μm), Ra≤7 μin (0.18 μm), Ra≤10 μin (0.25 μm)

◎ Cleaning: ultrasonically cleaned, washed, rinsed, and purged and dried with high purity hot nitrogen in ISO Class 6 cleanroom

◎ Packaging: packaged in ISO Class 4 cleanroom, tubing ends are capped and tubing is packed in double polyethylene bags with inner bag filled with 99.999% nitrogen

◎ Marked with brand, material grade and trace number

Ordering Information



Part Number	Inner Tube O.D.1	Inner Tube Wall Thickness T1	Outer Tube O.D.2	Outer Tube Wall Thickness T2	A	B
6L-CET-TB4-TB8	0.25"	0.035"	0.5"	0.049"	3.875"	1"
6L-CET-TB6-TB10	0.375"	0.035"	0.625"	0.049"	4"	1"
6L-CET-TB8-TB12	0.5"	0.049"	0.75"	0.065"	4"	1"
6L-CET-TB12-TB16	0.75"	0.065"	1"	0.065"	6.375"	1.75"
6L-CET-TB16-TB20	1"	0.065"	1.25"	0.065"	6.5"	1.75"
6L-CET-TB24-TB32	1.5"	0.065"	2"	0.065"	7.625"	2"
6L-CET-TB32-TB40	2"	0.065"	2.5"	0.065"	8"	2"

Ordering Number Description

6L - CET - TB4 - 4L - TB8 - A A

Inner Tube Material

6L	316L
6LV	316L VAR
6LW	316L VIM-VAR

Type

CET	Coaxial Equal Tee

Inner Tube Size

TB4	1/4" x 0.035"
TB6	3/8" x 0.035"
TB8	1/2" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB24	1 1/2" x 0.065"
TB32	2" x 0.065"

Outer Tube Material

None	316L
4L	304L

Outer Tube Size

TB8	1/2" x 0.049"
TB10	5/8" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB20	1 1/4" x 0.065"
TB32	2" x 0.065"
TB40	2 1/2" x 0.065"

Inner Tube Grade ①

A	Internal Surface Ra≤0.13 μm (EP Condition)
B	Internal Surface Ra≤0.18 μm (EP Condition)
C	Internal Surface Ra≤0.25 μm (EP Condition)

Outer Tube Grade ①

A	6.35≤O.D.≤48.6 Internal Surface Ra≤0.38 μm (BA Condition)
	48.6<O.D.≤63.5 Internal Surface Ra≤0.51 μm (BA Condition)
B	Internal Surface Ra≤0.8 μm (BA Condition)
C	Internal Surface Ra≤1.6 μm (BA Condition)

① Ra values of the internal and external surfaces at tube circumferential weld area is undefined.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

Coaxial Reducing Tee

Features

◎ Materials:

Inner tube: 316L, 316L VAR, 316L VIM-VAR

Outer tube: 316L, 304L

◎ Outside diameter:

Inner tube: main inner tube O.D. 3/8" ~ 2", branch inner tube O.D. 1/4" ~ 1"

Outer tube: main outer tube O.D. 5/8" ~ 2 1/2", branch outer tube O.D. 1/2" ~ 1 1/4"

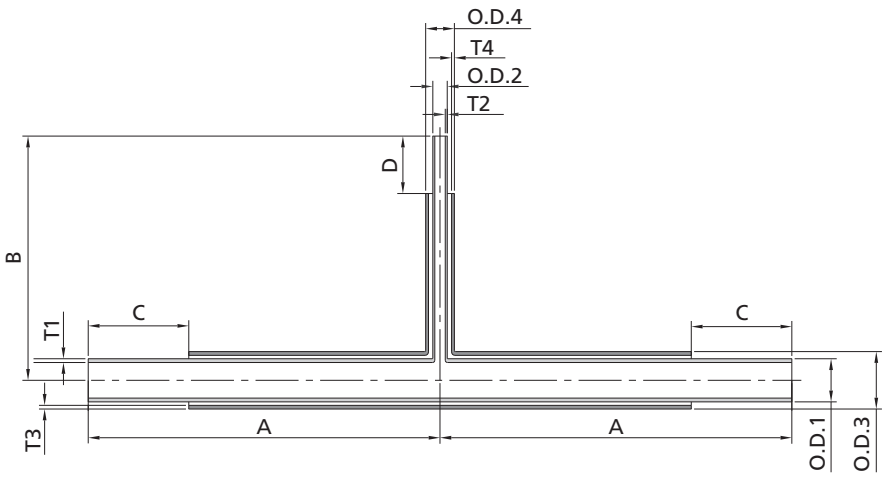
◎ Inner tube process: internal surface electropolished to roughness of Ra≤5 μin (0.13 μm), Ra≤7 μin (0.18 μm), Ra≤10 μin (0.25 μm)

◎ Cleaning: ultrasonically cleaned, washed, rinsed, and purged and dried with high purity hot nitrogen in ISO Class 6 cleanroom

◎ Packaging: packaged in ISO Class 4 cleanroom, tubing ends are capped and tubing is packed in double polyethylene bags with inner bag filled with 99.999% nitrogen

◎ Marked with brand, material grade and trace number

Ordering Information



Part Number	Inner Tube O.D.1	Inner Tube Wall Thickness T1	Inner Tube O.D.2	Inner Tube Wall Thickness T2	Outer Tube O.D.3	Outer Tube Wall Thickness T3	Outer Tube O.D.4	Outer Tube Wall Thickness T4	A	B	C	D
6L-CRT-TB6-TB4-TB10-TB8	0.375"	0.035"	0.25"	0.035"	0.625"	0.049"	0.5"	0.049"	3.875"	4.125"	1"	1"
6L-CRT-TB8-TB4-TB12-TB8	0.5"	0.049"	0.25"	0.035"	0.75"	0.065"	0.5"	0.049"	3.875"	4.125"	1"	1"
6L-CRT-TB8-TB6-TB12-TB10	0.5"	0.049"	0.375"	0.035"	0.75"	0.065"	0.625"	0.049"	4"	4.125"	1"	1"
6L-CRT-TB12-TB4-TB16-TB8	0.75"	0.065"	0.25"	0.035"	1"	0.065"	0.5"	0.049"	6.125"	4.25"	1.75"	1"
6L-CRT-TB12-TB6-TB16-TB10	0.75"	0.065"	0.375"	0.035"	1"	0.065"	0.625"	0.049"	6.25"	4.25"	1.75"	1"
6L-CRT-TB12-TB8-TB16-TB12	0.75"	0.065"	0.5"	0.049"	1"	0.065"	0.75"	0.065"	6.25"	4.25"	1.75"	1"
6L-CRT-TB16-TB4-TB20-TB8	1"	0.065"	0.25"	0.035"	1.25"	0.065"	0.5"	0.049"	6.125"	4.375"	1.75"	1"
6L-CRT-TB16-TB6-TB20-TB10	1"	0.065"	0.375"	0.035"	1.25"	0.065"	0.625"	0.049"	6.25"	4.375"	1.75"	1"
6L-CRT-TB16-TB8-TB20-TB12	1"	0.065"	0.5"	0.049"	1.25"	0.065"	0.75"	0.065"	6.25"	4.375"	1.75"	1"
6L-CRT-TB16-TB12-TB20-TB16	1"	0.065"	0.75"	0.065"	1.25"	0.065"	1"	0.065"	6.375"	6.625"	1.75"	1.75"
6L-CRT-TB24-TB8-TB32-TB12	1.5"	0.065"	0.5"	0.049"	2"	0.065"	0.75"	0.065"	7"	7"	2"	1.75"
6L-CRT-TB24-TB12-TB32-TB16	1.5"	0.065"	0.75"	0.065"	2"	0.065"	1"	0.065"	7.125"	7"	2"	1.75"
6L-CRT-TB24-TB16-TB32-TB20	1.5"	0.065"	1"	0.065"	2"	0.065"	1.25"	0.065"	7.25"	7"	2"	1.75"
6L-CRT-TB32-TB8-TB40-TB12	2"	0.065"	0.5"	0.049"	2.5"	0.065"	0.75"	0.065"	7.75"	9"	2"	1.75"
6L-CRT-TB32-TB16-TB40-TB20	2"	0.065"	1"	0.065"	2.5"	0.065"	1.25"	0.065"	8"	7.25"	2"	1.75"

Ordering Number Description

6L - CRT - TB6 - TB4 - 4L - TB10 - TB8 - A A

Inner Tube Material

6L	316L
6LV	316L VAR
6LW	316L VIM-VAR

Type

CRT	Coaxial Reducing Tee

Main Inner Tube Size

TB6	3/8" x 0.035"
TB8	1/2" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB24	1 1/2" x 0.065"
TB32	2" x 0.065"

Branch Inner Tube Size

TB4	1/4" x 0.035"
TB6	3/8" x 0.035"
TB8	1/2" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"

Outer Tube Material

None	316L
4L	304L

Main Outer Tube Size

TB10	5/8" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB20	1 1/4" x 0.065"
TB32	2" x 0.065"
TB40	2 1/2" x 0.065"

Branch Outer Tube Size

TB8	1/2" x 0.049"
TB10	5/8" x 0.049"
TB12	3/4" x 0.065"
TB16	1" x 0.065"
TB20	1 1/4" x 0.065"

Inner Tube Grade ①

A	Internal Surface Ra≤0.13 μm (EP Condition)
B	Internal Surface Ra≤0.18 μm (EP Condition)
C	Internal Surface Ra≤0.25 μm (EP Condition)

Outer Tube Grade ①

A	6.35≤O.D.≤48.6 Internal Surface Ra≤0.38 μm (BA Condition)
	48.6<O.D.≤63.5 Internal Surface Ra≤0.51 μm (BA Condition)
B	Internal Surface Ra≤0.8 μm (BA Condition)
C	Internal Surface Ra≤1.6 μm (BA Condition)

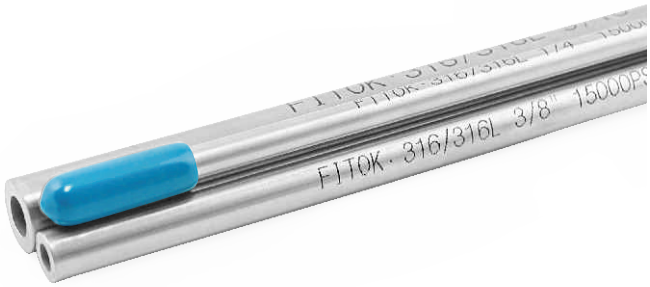
① Ra values of the internal and external surfaces at tube circumferential weld area is undefined.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

Medium and High Pressure Tubing

T15A Series

Features



- ◎ Materials: 316/316L, enhanced-316/316L
- ◎ Working pressures: up to 15,000 psig (1034 bar)
- ◎ Working temperature: -325°F to 800°F (-198°C to 427°C)
- ◎ Supply conditions: annealed seamless tubing
- ◎ For use with FITOK 20D series tube fittings
- ◎ Marked with brand, material grade, specification, pressure, annealing designator 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	FITOK Designator	Composition %							
			C	Mn	P	S	Si	Cr	Ni	Mo
S31600/S31603	316/316L	SS	≤0.035	≤2.00	≤0.045	≤0.03	≤1.00	16-18	10-14	2.0-3.0
Enhanced-S31600/S31603	Enhanced-316/316L ①	SH	≤0.03					17-18	12-14	2.6-3.0

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.

Mechanical Properties

Annealed Seamless Tubing

UNS	Grade	Yield Strength ksi	Tensile Strength ksi	Elongation %	Hardness
S31600/S31603	316/316L	≥30	≥75	≥30	≤90 HRB
Enhanced-S31600/S31603	Enhanced-316/316L				

Dimensional Tolerance

Tube O.D. in.	O.D. Tolerance in.	Wall Thickness Tolerance %
1/8	+/-0.003	+/-10
1/4	+/-0.005	
3/8		
1/2		
3/4		
1		

Working Pressure at Ambient Temperature

Annealed Seamless Tubing

Tube O.D. in.	Wall Thickness in.	Working Pressure① psig (bar)
1/8	0.037	15,000 (1034)
1/4	0.083	15,000 (1034)
	0.065	10,300 (710)
3/8	0.118	15,000 (1034)
	0.095	10,000 (690)
1/2	0.156	15,000 (1034)
	0.134	11,200 (772)
3/4	0.240	15,000 (1034)
	0.188	10,000 (690)
1	0.220	10,000 (690)

① Working pressures are calculated from an S value of 20,000 psi (138 MPa) at -20 to 100°F (-28 to 38°C) for ASME B31.3.

Elevated Temperature Factors

Temperature		Factor
°F	°C	
100	38	1.00
200	93	
300	149	
400	204	0.96
500	260	0.89
600	316	0.85
700	371	0.81
800	427	0.79
1000	537	0.76

Ordering Information

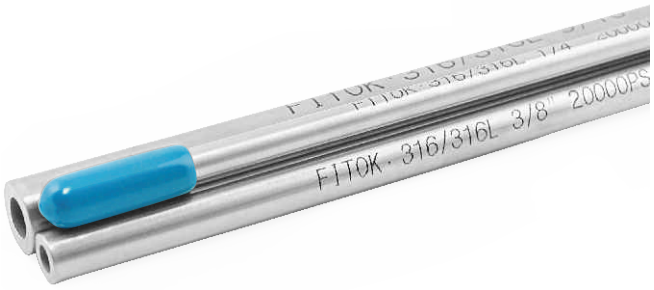
Annealed Seamless Tubing

Tube O.D. in.	Wall Thickness in.	Ordering Number ①②	
1/8	0.037	□□-T15A-2-037-6M	□□-T15A-2-037-20F
1/4	0.083	□□-T15A-4-083-6M	□□-T15A-4-083-20F
	0.065	□□-T15A-4-065-6M	□□-T15A-4-065-20F
3/8	0.118	□□-T15A-6-118-6M	□□-T15A-6-118-20F
	0.095	□□-T15A-6-095-6M	□□-T15A-6-095-20F
1/2	0.156	□□-T15A-8-156-6M	□□-T15A-8-156-20F
	0.134	□□-T15A-8-134-6M	□□-T15A-8-134-20F
3/4	0.240	□□-T15A-12-240-6M	□□-T15A-12-240-20F
	0.188	□□-T15A-12-188-6M	□□-T15A-12-188-20F
1	0.220	□□-T15A-16-220-6M	□□-T15A-16-220-20F

① In the ordering number, "6M"designator refers to 6 m tubing length and "20F" designator refers to 20 ft tubing length.
② To order, add the material designator as prefix: SS for 316/316L and SH for enhanced-316/316L.

T20D Series

Features



- ◎ Materials: 316/316L, enhanced-316/316L
- ◎ Working pressures: up to 20,000 psig (1379 bar)
- ◎ Working temperature: -325°F to 800°F (-198°C to 427°C)
- ◎ Supply conditions: cold-drawn 1/8-hard seamless tubing
- ◎ For use with FITOK 20D series tube fittings
- ◎ Marked with brand, material grade, specification, pressure, annealing designator 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	FITOK Designator	Composition %							
			C	Mn	P	S	Si	Cr	Ni	Mo
S31600/S31603	316/316L	SS	≤0.035	≤2.00	≤0.045	≤0.03	≤1.00	16-18	10-14	2.0-3.0
Enhanced-S31600/S31603	Enhanced-316/316L ①	SH	≤0.03					17-18	12-14	2.6-3.0

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.

Mechanical Properties

Cold-Drawn 1/8-Hard Seamless Tubing

UNS	Grade	Yield Strength ksi	Tensile Strength ksi	Elongation %	Hardness
S31600/S31603	316/316L	75 to 110	105 to 140	≥25	≤26 HRC
Enhanced-S31600/S31603	Enhanced-316/316L				

Dimensional Tolerance

Tube O.D. in.	O.D. Tolerance in.	Wall Thickness Tolerance %
1/4	+/-0.005	+/-10
3/8		
1/2		
3/4		
1		

Working Pressure at Ambient Temperature

Cold-Drawn 1/8-Hard Seamless Tubing

Tube O.D. in.	Wall Thickness in.	ASME B31.3① psig (bar)	ASME B31.3① psig (bar)
1/4	0.065	15,000 (1034)	20,000 (1034)
3/8	0.083		
1/2	0.109		
3/4	0.165		
1	0.172	12500 (862)	17,800 (1220)

① Working pressures are calculated from an S value of 35,000 psi (241 MPa) at -20 to 100°F (-28 to 38°C) for ASME B31.3.
② Working pressures are calculated from an S value of 49,900 psi (344 MPa) at -20 to 100°F (-28 to 38°C) for ASME B31.3 Chapter IX High Pressure Piping.

Elevated Temperature Factors

Temperature		Factor
°F	°C	
100	38	1.00
200	93	
300	149	
400	204	0.96
500	260	0.89
600	316	0.85
700	371	0.81
800	427	0.79

Ordering Information

Cold-Drawn 1/8-Hard Seamless Tubing

Tube O.D. in.	Wall Thickness in.	Ordering Number①②③	
1/4	0.065	□□-T20D-4-065-6M	□□-T20D-4-065-20F
3/8	0.083	□□-T20D-6-083-6M	□□-T20D-6-083-20F
1/2	0.109	□□-T20D-8-109-6M	□□-T20D-8-109-20F
3/4	0.165	□□-T20D-12-165-6M	□□-T20D-12-165-20F
1	0.172	□□-T20D-16-172-6M	□□-T20D-16-172-20F

① In the ordering number, "6M"designator refers to 6 m tubing length and "20F" designator refers to 20 ft tubing length.
② To order, add the material designator as prefix: SS for 316/316L and SH for enhanced-316/316L.
③ Cold-drawn 1/8-hard seamless tubing is not used with 15S series single-ferrule tube fittings.

T20M Series

Features

- ◎ Materials: 316/316L, enhanced-316/316L
- ◎ Working pressure up to 20,000 psig (1379 bar)
- ◎ Working temperature: -325°F to 800°F (-198°C to 427°C)
- ◎ Cold-drawn seamless tubing
- ◎ For use with FITOK 20M series medium pressure fittings
- ◎ Marked with brand, material grade, specification, pressure, and heat number
- ◎ Standard length: 40 in, 80 in, 10 ft, 20 ft, 1 m, 2 m, 3 m and 6 m, straight-length tubing and coned and threaded nipples in custom length are also available.

Materials

UNS	Grade	FITOK Designator	Composition %							
			C	Mn	P	S	Si	Cr	Ni	Mo
S31600/S31603	316/316L	SS	≤0.035	≤2.00	≤0.045	≤0.03	≤1.00	16-18	10-14	2.0-3.0
Enhanced-S31600/S31603	Enhanced-316/316L ①	SH	≤0.03					17-18	12-14	2.6-3.0

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.

Dimensional Tolerance

Tube O.D. in.	O.D. Tolerance in.	Tube I.D. in.	I.D. Tolerance in.
1/4	-0.002/-0.007	0.109	0/-0.005
3/8	-0.005/-0.01	0.203	
9/16		0.312	
3/4		0.438	+/-0.005
1		0.562	

Pressure-Temperature Ratings

Working Pressure psig (bar)				
-423 to 100°F (-252 to 37.8°C)	200°F (93°C)	400°F (204°C)	600°F (316°C)	800°F (427°C)
20,000 (1379)	20,000 (1379)	19,250 (1327)	18,050 (1244)	16,800 (1158)

Ordering Information

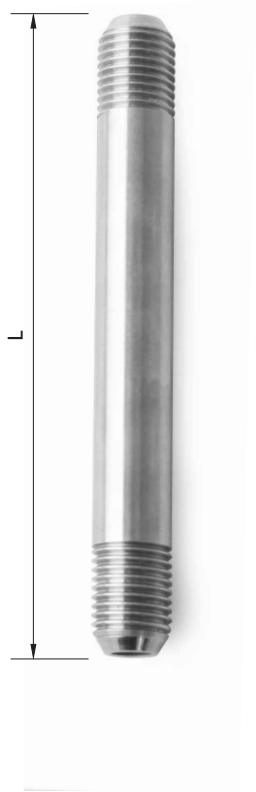
Cold-Drawn Seamless Tubing

Tube O.D. in.	Tube I.D. in.	Ordering Number①②	
1/4	0.109	□□-T20M-4-6M	□□-T20M-4-20F
3/8	0.203	□□-T20M-6-6M	□□-T20M-6-20F
9/16	0.312	□□-T20M-9-6M	□□-T20M-9-20F
3/4	0.438	□□-T20M-12-6M	□□-T20M-12-20F
1	0.562	□□-T20M-16-6M	□□-T20M-16-20F

① In the ordering number, "6M"designator refers to 6 m tubing length and "20F" designator refers to 20 ft tubing length. Nipples in custom length available upon request.

② To order, add the material designator as prefix: SS for 316/316L and SH for enhanced-316/316L.

Coned and Threaded Nipples



Tube O.D. in.	Tube I.D. in.	Length L ① in. (mm)	Ordering Number ②
1/4	0.109	3.00 (76.2)	☐☐-T20M-4CT-3N
		4.00 (101.6)	☐☐-T20M-4CT-4N
		6.00 (152.4)	☐☐-T20M-4CT-6N
		8.00 (203.2)	☐☐-T20M-4CT-8N
		10.0 (254.0)	☐☐-T20M-4CT-10N
		12.0 (304.8)	☐☐-T20M-4CT-12N
3/8	0.203	3.00 (76.2)	☐☐-T20M-6CT-3N
		4.00 (101.6)	☐☐-T20M-6CT-4N
		6.00 (152.4)	☐☐-T20M-6CT-6N
		8.00 (203.2)	☐☐-T20M-6CT-8N
		10.0 (254.0)	☐☐-T20M-6CT-10N
		12.0 (304.8)	☐☐-T20M-6CT-12N
9/16	0.312	4.00 (101.6)	☐☐-T20M-9CT-4N
		6.00 (152.4)	☐☐-T20M-9CT-6N
		8.00 (203.2)	☐☐-T20M-9CT-8N
		10.0 (254.0)	☐☐-T20M-9CT-10N
		12.00 (304.8)	☐☐-T20M-9CT-12N
3/4	0.438	4.00 (101.6)	☐☐-T20M-12CT-4N
		6.00 (152.4)	☐☐-T20M-12CT-6N
		8.00 (203.2)	☐☐-T20M-12CT-8N
		10.0 (254.0)	☐☐-T20M-12CT-10N
		12.0 (304.8)	☐☐-T20M-12CT-12N
1	0.562	6.00 (152.4)	☐☐-T20M-16CT-6N
		8.00 (203.2)	☐☐-T20M-16CT-8N
		10.0 (254.0)	☐☐-T20M-16CT-10N
		12.0 (304.8)	☐☐-T20M-16CT-12N

① Nipples in customized length available upon request.
② To order, add the material designator as prefix: SS for 316/316L and SH for enhanced-316/316L.

T60H Series

Features

- Materials: 316/316L, enhanced-316/316L
- Working pressure up to 60,000 psig (4137 bar)
- Working temperature: -423°F to 1200°F (-252°C to 649°C)
- Cold-drawn seamless tubing
- For use with FITOK 60 series high pressure fittings
- Marked with brand, material grade, specification, pressure, and heat number
- Standard length: 40 in, 80 in, 10 ft, 20 ft, 1 m, 2 m, 3 m and 6 m, straight-length tubing and coned and threaded nipples in custom length are also available.

Materials

UNS	Grade	FITOK Designator	Composition %							
			C	Mn	P	S	Si	Cr	Ni	Mo
S31600/S31603	316/316L	SS	≤0.035	≤2.00	≤0.045	≤0.03	≤1.00	16-18	10-14	2.0-3.0
Enhanced-S31600/S31603	Enhanced-316/316L	SH	≤0.03					17-18	12-14	2.6-3.0

Dimensional Tolerance

Tube O.D. in.	O.D. Tolerance in.	Tube I.D. in.	I.D. Tolerance in.
1/4	-0.002/-0.007	0.083	0/-0.005
3/8	-0.005/-0.01	0.125	
9/16		0.188	

Pressure-Temperature Ratings

Working Pressure psig (bar)				
-423 to 100°F (-252 to 37.8°C)	200°F (93°C)	400°F (204°C)	600°F (316°C)	800°F (427°C)
60,000 (4137)	60,000 (4137)	57,750 (3982)	54,250 (3740)	50,700 (3496)

If tubing is used at temperatures above 800°F (427°C) or reused thereafter, working pressures for tubing in the following table shall apply.

Working Pressure psig (bar)					
-423 to 200°F (-252 to 93°C)	400°F (204°C)	600°F (316°C)	800°F (427°C)	1000°F (538°C)	1200°F (649°C)
24,200 (1669)	22,200 (1531)	20,500 (1413)	18,850 (1300)	18,600 (1282)	8,750 (603)

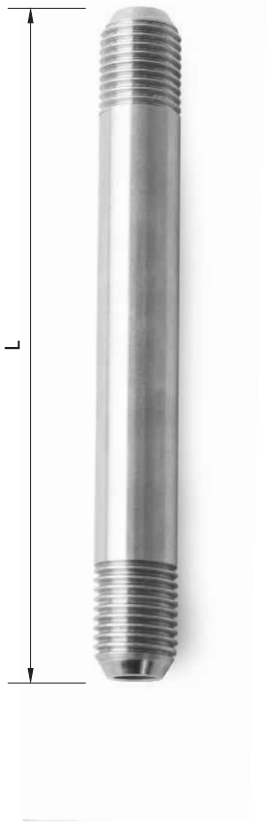
Ordering Information

Cold-Drawn Seamless Tubing

Tube O.D. in.	Tube I.D. in.	Ordering Number ①②	
1/4	0.083	□□-T60H-4-6M	□□-T60H-4-20F
3/8	0.125	□□-T60H-6-6M	□□-T60H-6-20F
9/16	0.188	□□-T60H-9-6M	□□-T60H-9-20F

① In the ordering number, "6M"designator refers to 6 m tubing length and "20F" designator refers to 20 ft tubing length. Nipples in custom length available upon request.
② To order, add the material designator as prefix: SS for 316/316L and SH for enhanced-316/316L.

Coned and Threaded Nipples



Tube O.D. in.	Tube I.D. in.	Length L ① in. (mm)	Ordering Number②
1/4	0.083	2.75 (69.9)	□□-T60H-4CT-2.75N
		3.00 (76.2)	□□-T60H-4CT-3N
		4.00 (101.6)	□□-T60H-4CT-4N
		6.00 (152.4)	□□-T60H-4CT-6N
		8.00 (203.2)	□□-T60H-4CT-8N
		10.0 (254.0)	□□-T60H-4CT-10N
		12.0 (304.8)	□□-T60H-4CT-12N
3/8	0.125	3.00 (76.2)	□□-T60H-6CT-3N
		4.00 (101.6)	□□-T60H-6CT-4N
		6.00 (152.4)	□□-T60H-6CT-6N
		8.00 (203.2)	□□-T60H-6CT-8N
		10.0 (254.0)	□□-T60H-6CT-10N
		12.0 (304.8)	□□-T60H-6CT-12N
9/16	0.188	4.00 (101.6)	□□-T60H-9CT-4N
		6.00 (152.4)	□□-T60H-9CT-6N
		8.00 (203.2)	□□-T60H-9CT-8N
		10.0 (254.0)	□□-T60H-9CT-10N
		12.0 (304.8)	□□-T60H-9CT-12N

① Nipples in custom length available upon request.
② To order, add the material designator as prefix: SS for 316/316L and SH for enhanced-316/316L.

Jacketed Tubing

TJT Series

Features

- ◎ Materials: stainless steel or copper tubing, PVC or TPU jacket
- ◎ Sizes: 1/4" to 1 1/4", 6 mm to 32 mm
- ◎ Working temperature: -31°F to 194°F (-35°C to 90°C)
- ◎ Stainless steel tubing 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, tubing material grade, standard, specification, heat number

Materials

Tubing

UNS	Grade	ASTM Standard	FITOK Designator	Composition %					Mechanical Properties			
				C	Cr	Ni	Mo	Cu	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
C12200	-	B75	CU	-	-	-	-	99.9	≥62	≥205	-	-

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%.

PVC Jacket

Min. Tensile Strength	1530 psig (105 bar)
Min. Elongation	300%
Shore Hardness	80 HA
Max. Working Temperature	194°F (90°C)
Min. Installation Temperature	-31°F (-35°C)
Min. Working Temperature	-31°F (-35°C)
Resistance to Chloride	Yes
Max. Water Absorption	0.06%

Technical Data

Fractional

Material Designator	UNS	Tube O.D. in.	Wall ① Thickness in.	Max. Working Temperature °F (°C)	Min. Working Temperature °F (°C)	Working Pressure psig	Min. Bend Radius in.	Jacket O.D. in. ±0.016 in.	Max. Coil Length ft	Straight-Length Tubing ft
SS	S31600/ S31603	1/4	0.028	194 (90)	-31 (-35)	4000	8	0.407	6560	20
		5/16	0.035			4000		0.471	4170	
		3/8	0.049			4800		0.533	2530	
		1/2	0.065			5100		0.657	1430	
		5/8	0.083			5200		0.783	900	
		3/4	0.095			4900	/	0.907	/	
		7/8	0.095			4200		1.033		
		1	0.109			4200		1.157		
		1 1/4	0.120			3600		1.407		
CU	C12200	1/4	0.035			800	8	0.407	4800	
		3/8	0.035			500		0.533	3050	
		1/2	0.035 ②			400		0.657	2200	
			0.049			550		0.657	1650	

Metric

Material Designator	UNS	Tube O.D. mm	Wall ① Thickness mm	Max. Working Temperature °C (°F)	Min. Working Temperature °C (°F)	Working Pressure bar	Min. Bend Radius cm	Jacket O.D. mm ±0.4 mm	Max. Coil Length m	Straight-Length Tubing m
SS	S31600/ S31603	6	1.0	90 (194)	-35 (-31)	420	20.3	10	1600	6
		8	1.0			310		12	1140	
		10	1.2			300		14	750	
		12	1.5			330		16	500	
		14	2.0			380		18	330	
		15	2.0			360		19	300	
		16	2.0			330		20	280	
		18	2.0			290	/	22	/	
		20	2.0			260		24		
		22	2.0			230		26		
		25	3.0			320		29		
		28	3.0			280		32		
		30	3.0			260		34		
		32	3.0			240		36		
CU	C12200	6	1.0			70	20.3	10	1400	
		10	1.0			40		14	750	
		12	1.0②			30		16	650	
			1.5			50		16	450	

① Refer to TMP series tubing for other wall thicknesses of S31600/S31603.
② Not recommended for use with 6D series tube fittings in gas service.

Ordering Information
1. Standard length: 20 ft and 6 m
2. S31600/S31603 material jacketed tubing is ordered in the same way as TCT series coiled tubing, for different lengths see Ordering information of TCT series.

Ordering Number Description

SS - TJT - 6 - 035 - U - W - 6M

Material	
SS	316/316L
CU	12200

Series
TJT

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

Wall Thickness			
Fractional		Metric	
028	0.028"	0.8	0.8 mm
035	0.035"	1.0	1.0 mm
049	0.049"	1.2	1.2 mm
065	0.065"	1.5	1.5 mm
083	0.083"	1.8	1.8 mm
095	0.095"	2.0	2.0 mm
109	0.109"	2.2	2.2 mm
120	0.120"	2.5	2.5 mm
134	0.134"	2.8	2.8 mm
156	0.156"	3.0	3.0 mm
		3.5	3.5 mm
		4.0	4.0 mm

Jacket Material	
	PVC
U	TPU

Jacket Color	
	Black
W	White

Length	
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)

Note: "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.

Insulated Tubing

TIT Series

Features

- ◎ Materials: stainless steel or copper tubing, fibrous glass insulation, PVC or TPU jacket
- ◎ Sizes: 1/4" to 1 1/4", 6 mm to 32 mm
- ◎ Maintains temperature from -20°F to 400°F (-29°C to 204°C)
- ◎ Stainless steel tubing 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, tubing material grade, standard, specification, heat number

Materials

Tubing

UNS	Grade	ASTM Standard	FITOK Designator	Composition %					Mechanical Properties			
				C	Cr	Ni	Mo	Cu	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
C12200	-	B75	CU	-	-	-	-	99.9	≥62	≥205	-	-

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%.

PVC Jacket

Min. Tensile Strength	1530 psig (105 bar)
Min. Elongation	300%
Shore Hardness	80 HA
Max. Working Temperature	194°F (90°C)
Min. Installation Temperature	-31°F (-35°C)
Min. Working Temperature	-31°F (-35°C)
Resistance to Chloride	Yes
Max. Water Absorption	0.06%

Technical Data

Fractional

Material Designator	UNS	Tube O.D. in.	Wall Thickness in.	Max. Working Temperature °F (°C)	Min. Working Temperature °F (°C)	Working Pressure psig	Min. Bend Radius in.	Jacket O.D. in. ±0.157 in.	Max. Coil Length ft	Straight-Length Tubing ft
SS	S31600/ S31603	1/4	0.028	194 (90)	-31 (-35)	4000	13.8	1.27	1640	20
		5/16	0.035			4000		1.34		
		3/8	0.049			4800		1.40		
		1/2	0.065			5100		1.68		
		5/8	0.083			5200		1.80	984	
		3/4	0.095			4900	/	1.93	/	
		7/8	0.095			4200		2.06		
		1	0.109			4200		2.18		
		1 1/4	0.120			3600		2.43		
CU	C12200	1/4	0.035			800	9.84	1.27	1640	
		3/8	0.035			500		1.40		
		1/2	0.035②			400		1.68		
			0.049			550		1.68		

Metric

Material Designator	UNS	Tube O.D. mm	Wall Thickness mm ①	Max. Working Temperature °C (°F)	Min. Working Temperature °C (°F)	Working Pressure bar	Min. Bend Radius mm	Jacket O.D. mm ±4 mm	Max. Coil Length m	Straight-Length Tubing m
SS	S31600/ S31603	6	1.0	204 (400)	-29 (-20)	420	350	32	500	6
		8	1.0			310		34		
		10	1.2			300		36		
		12	1.5			330		42		
		14	2.0			380		44	400	
		15	2.0 ③			360		45	300	
		16	2.0			330		46		
		18	2.0			290	/	48	/	
		20	2.0			260		50		
		22	2.0			230		52		
		25	3.0			320		55		
		28	3.0			280		58		
		30	3.0			260		60		
		32	3.0			240		62		
CU	C12200	6	1.0			70	250	32	500	
		10	1.0			40		36		
		12	1.0 ②			30		42		
			1.5			50		42		

① Refer to TMP series tubing for other wall thicknesses of S31600/S31603.
② Not recommended for use with 6D series tube fittings in gas service.

Ordering Information
1. Standard length: 20 ft and 6 m
2. S31600/S31603 material jacketed tubing is ordered in the same way as TCT series coiled tubing, for different lengths see Ordering Information of TCT series.

Ordering Number Description

SS - TIT - 6 - 035 - U - W - 6M

Material		Series	Tube O.D.				Wall Thickness				Jacket Material		Jacket Color		Length	
SS	316/316L	TIT	Fractional		Metric		Fractional		Metric			PVC		Black	xxM	Length xx m (Except For Random Length Coiled Tubing)
CU	12200		4	1/4"	6MM	6 mm	028	0.028"	0.8	0.8 mm	U	TPU	W	White	xxF	Length xx ft (Except For Random Length Coiled Tubing)
			5	5/16"	8MM	8 mm	035	0.035"	1.0	1.0 mm					CL11F	Random Length Grade CL11F (For Coiled Tubing Only)
			6	3/8"	10MM	10 mm	049	0.049"	1.2	1.2 mm					CL11M	Random Length Grade CL11M (For Coiled Tubing Only)
			8	1/2"	12MM	12 mm	065	0.065"	1.5	1.5 mm					CL21F	Random Length Grade CL21F (For Coiled Tubing Only)
			10	5/8"	14MM	14 mm	083	0.083"	1.8	1.8 mm					CL21M	Random Length Grade CL21M (For Coiled Tubing Only)
			12	3/4"	16MM	16 mm	095	0.095"	2.0	2.0 mm					CL31F	Random Length Grade CL31F (For Coiled Tubing Only)
			14	7/8"	18MM	18 mm	109	0.109"	2.2	2.2 mm					CL31M	Random Length Grade CL31M (For Coiled Tubing Only)
			16	1"	20MM	20 mm	120	0.120"	2.5	2.5 mm					CL41F	Random Length Grade CL41F (For Coiled Tubing Only)
			20	1 1/4"	22MM	22 mm	134	0.134"	2.8	2.8 mm					CL41M	Random Length Grade CL41M (For Coiled Tubing Only)
					25MM	25 mm	156	0.156"	3.0	3.0 mm						
					28MM	28 mm			3.5	3.5 mm						
					30MM	30 mm			4.0	4.0 mm						
					32MM	32 mm										

Note: "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.

Heat Trace Tubing

TST Series

Features

- ◎ Steam trace
- ◎ Materials: stainless steel or copper process tube and tracer tube, fibrous glass insulation, PVC or TPU jacket
- ◎ Sizes: process and tracer tube: 1/4" to 1/2", 6 to 14 mm
- ◎ Maintains process temperature from 50°F to 355°F (10°C to 179°C)
- ◎ For use with FITOK 6D series tube fittings, 4:1 safety factor for tubing and connection part of fitting and tubing
- ◎ Marked with brand, and ordering number

Materials of Process Tube and Tracer Tube

UNS	Grade	ASTM Standard	FITOK Designator	Composition %					Mechanical Properties			
				C	Cr	Ni	Mo	Cu	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	≤80HRB
C12200	-	B75	CU	-	-	-	-	99.9	≥62	≥205	-	-

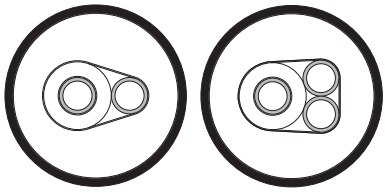
① The carbon content of tubing with outside diameter smaller than 1/2" or wall thickness smaller than 0.049" is allowed up to 0.04%.

PVC Jacket

Min. Tensile Strength	1530 psig (105 bar)
Min. Elongation	300%
Shore Hardness	80 HA
Max. Working Temperature	194°F (90°C)
Min. Installation Temperature	-31°F (-35°C)
Min. Working Temperature	-31°F (-35°C)
Resistance to Chloride	Yes
Max. Water Absorption	0.06%

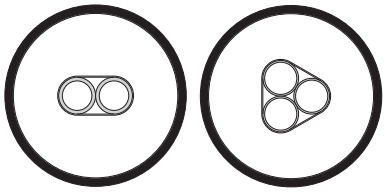
Types

Light Heat Trace



One Process Tube Two Process Tubes

Heavy Heat Trace



One Process Tube Two Process Tubes

Temperature Maintenance Range	
Light Heat Trace	Heavy Heat Trace
50°F to 200°F (10°C to 93°C)	200°F to 355°F (93°C to 179°C)

Technical Data of Light Heat Trace

Fractional

Process Tube Tube O.D. x Wall Thickness, in.	Tracer Tube Tube O.D. x Wall Thickness, in.	Product O.D. in. ±0.157 in.	Min. Bend Radius in.	Max. Coil Length ① ft	Straight-Length Tubing ft
Process Tube and Tracer Tube					
1/4×0.035	1/4×0.035	1.65	13.8	1312	20
3/8×0.049	3/8×0.049	1.89			
1/2×0.065	1/2×0.065	2.32			
Two Process Tubes and Tracer Tube					
1/4×0.035	1/4×0.035	1.65	13.8	984	20
3/8×0.049	3/8×0.049	1.89			
1/2×0.065	1/2×0.065	2.32			

① Contact FITOK Group for more information.

Metric

Process Tube Tube O.D. x Wall Thickness, mm	Tracer Tube Tube O.D. x Wall Thickness, mm	Product O.D. mm ±4 mm	Min. Bend Radius mm	Max. Coil Length ① m	Straight-Length Tubing m
Process Tube and Tracer Tube					
6×1	6×1	41	350	400	6
8×1	8×1	45			
10×1	10×1	49			
12×1	12×1	57			
14×2	14×2	61	/	/	
Two Process Tubes and Tracer Tube					
6×1	6×1	41	350	300	6
8×1	8×1	45			
10×1	10×1	49			
12×1	12×1	57			
14×2	14×2	61	/	/	

① Contact FITOK Group for more information.

Technical Data of Heavy Heat Trace

Fractional

Process Tube Tube O.D. x Wall Thickness, in.	Tracer Tube Tube O.D. x Wall Thickness, in.	Product O.D. in. ±0.157 in.	Min. Bend Radius in.	Max. Coil Length ① ft	Straight-Length Tubing ft
Process Tube and Tracer Tube					
1/4×0.035	1/4×0.035	1.65	13.8	1312	20
3/8×0.049	3/8×0.049	1.89			
1/2×0.065	1/2×0.065	2.32			
Two Process Tubes and Tracer Tube					
1/4×0.035	1/4×0.035	1.65	13.8	984	20
3/8×0.049	3/8×0.049	1.89			
1/2×0.065	1/2×0.065	2.32			

① Contact FITOK Group for more information.

Metric

Process Tube Tube O.D. x Wall Thickness, mm	Tracer Tube Tube O.D. x Wall Thickness, mm	Product O.D. mm ±4 mm	Min. Bend Radius mm	Max. Coil Length ① m	Straight-Length Tubing m
Process Tube and Tracer Tube					
6×1	6×1	41	350	400	6
8×1	8×1	45			
10×1	10×1	49			
12×1	12×1	57			
14×2	14×2	61	/	/	
Two Process Tubes and Tracer Tube					
6×1	6×1	41	350	300	6
8×1	8×1	45			
10×1	10×1	49			
12×1	12×1	57			
14×2	14×2	61	/	/	

① Contact FITOK Group for more information.

Working Pressure

Refer to the working pressure of TMP series tubing.

Ordering Information

Fractional

Refer to Part Number Description to get a complete ordering number.

Process Tube Tube O.D. x Wall Thickness, in.	Process Tube Material	Tracer Tube Tube O.D. x Wall Thickness, in.	Ordering Number	
			Light Heat Trace	Heavy Heat Trace
Process Tube and Tracer Tube				
1/4×0.035	316/316L	1/4×0.035	SS-TST-L2-4035-SS4035-□-□-□□	SS-TST-H2-4035-SS4035-□-□-□□
3/8×0.049	C12200	3/8×0.049	CU-TST-L2-6049-SS6049-□-□-□□	CU-TST-H2-6049-SS6049-□-□-□□
Two Process Tubes and Tracer Tube				
1/4×0.035	316/316L	1/4×0.035	SS-TST-L3-4035-SS4035-□-□-□□	SS-TST-H3-4035-SS4035-□-□-□□
3/8×0.049	C12200	3/8×0.049	CU-TST-L3-6049-SS6049-□-□-□□	CU-TST-H3-6049-SS6049-□-□-□□

Metric

Refer to Part Number Description to get a complete ordering number.

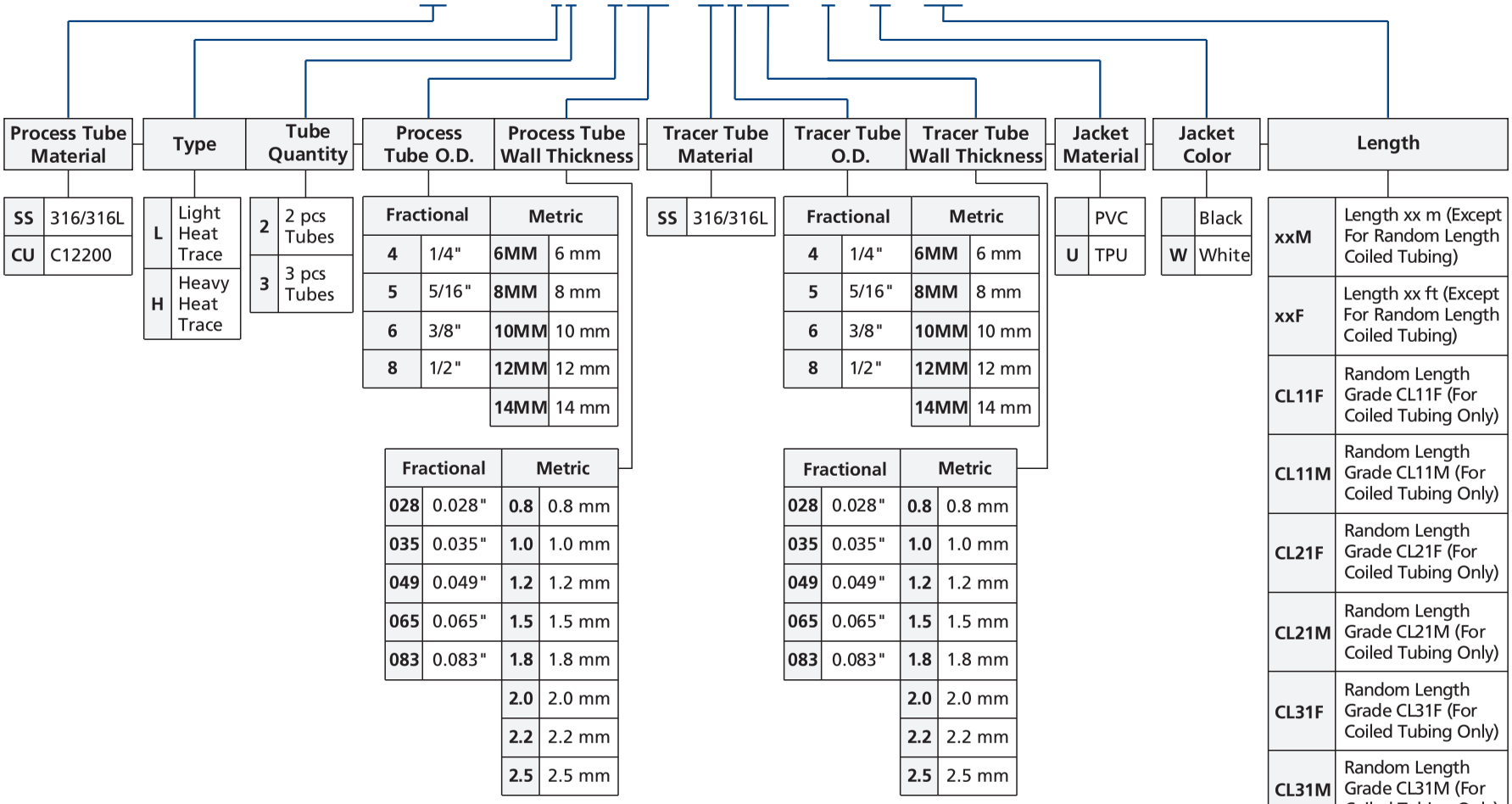
Process Tube Tube O.D. x Wall Thickness mm	Process Tube Material	Tracer Tube Tube O.D. x Wall Thickness mm	Ordering Number	
			Light Heat Trace	Heavy Heat Trace
Process Tube and Tracer Tube				
6×1	316/316L	6×1	SS-TST-L2-6MM1.0-SS6MM1.0-□-□-□□	SS-TST-H2-6MM1.0-SS6MM1.0-□-□-□□
10×1	C12200	10×1	CU-TST-L2-10MM1.0-SS10MM1.0-□-□-□□	CU-TST-H2-10MM1.0-SS10MM1.0-□-□-□□
Two Process Tubes and Tracer Tube				
6×1	316/316L	6×1	SS-TST-L3-6MM1.0-SS6MM1.0-□-□-□□	SS-TST-H3-6MM1.0-SS6MM1.0-□-□-□□
10×1	C12200	10×1	CU-TST-L3-10MM1.0-SS10MM1.0-□-□-□□	CU-TST-H3-10MM1.0-SS10MM1.0-□-□-□□

① Standard length: 20 ft and 6 m

② S31600/S31603 material jacketed tubing is ordered in the same way as TCT series coiled tubing, for different lengths see Ordering Information of TCT series.

Ordering Number Description

SS - TST - L2 - 6035 - SS6035 - U - W - 6M



Process Tube Material	
SS	316/316L
CU	C12200

Type	
L	Light Heat Trace
H	Heavy Heat Trace

Tube Quantity	
2	2 pcs Tubes
3	3 pcs Tubes

Process Tube O.D.			
Fractional		Metric	
4	1/4"	6MM	6 mm
5	5/16"	8MM	8 mm
6	3/8"	10MM	10 mm
8	1/2"	12MM	12 mm
		14MM	14 mm

Process Tube Wall Thickness			
Fractional		Metric	
028	0.028"	0.8	0.8 mm
035	0.035"	1.0	1.0 mm
049	0.049"	1.2	1.2 mm
065	0.065"	1.5	1.5 mm
083	0.083"	1.8	1.8 mm
		2.0	2.0 mm
		2.2	2.2 mm
		2.5	2.5 mm

Tracer Tube Material	
SS	316/316L

Tracer Tube O.D.			
Fractional		Metric	
4	1/4"	6MM	6 mm
5	5/16"	8MM	8 mm
6	3/8"	10MM	10 mm
8	1/2"	12MM	12 mm
		14MM	14 mm

Tracer Tube Wall Thickness			
Fractional		Metric	
028	0.028"	0.8	0.8 mm
035	0.035"	1.0	1.0 mm
049	0.049"	1.2	1.2 mm
065	0.065"	1.5	1.5 mm
083	0.083"	1.8	1.8 mm
		2.0	2.0 mm
		2.2	2.2 mm
		2.5	2.5 mm

Jacket Material	
	PVC
U	TPU

Jacket Color	
	Black
W	White

Length	
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)

Note: "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.

Other Tubing Products

SilcoNert® 2000 (Sulfinert®) Coated Tubing

Features

Natural gas samples often contain varying amounts and types of sulfur compounds, which can interfere with reaction or poison catalysts in many petrochemical processes. Because sulfur compounds quickly react with stainless steel surfaces, to prevent sulfur adsorption, passivation treatment is performed on the surface of the substrate, we also call this passivation technology "silanization", and the passivation layer is also called "SilcoNert® 2000 (Sulfinert®) Coating". SilcoNert® 2000 (Sulfinert®) technique bonds an inert silica layer onto the surface of the stainless steel. This layer acts as a barrier, preventing active compounds from reacting with or adsorbing to the stainless steel.

TMP Series SilcoNert® 2000 (Sulfinert®) Coated Tubing

TCT Series SilcoNert® 2000 (Sulfinert®) Coated Tubing

- SilcoNert® 2000 (Sulfinert®) coating for the internal surface of stainless steel tubing only
- For supply length, please refer to TMP and TCT series tubing

Ordering Information

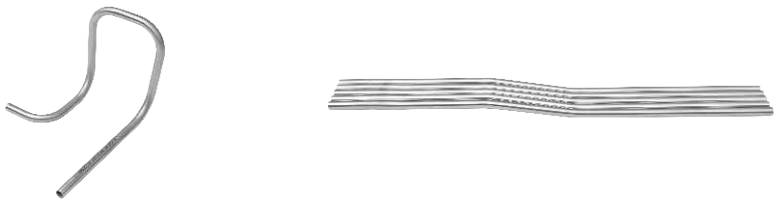
Add "-SI" as a suffix to the standard ordering number.
For example:
1. To order 316 tubing, ASTM A269 compliant, TMP series, 1/4" O.D. x 0.035" wall thickness, 6 m length, SilcoNert® 2000 (Sulfinert®) coated, the ordering number is SS-TMP-4-035-6M-SI.
2. To order 316 tubing, ASTM A269 compliant, TCT series, 1/4" O.D. x 0.035" wall thickness, cut length 100 m, SilcoNert® 2000 (Sulfinert®) coated, the ordering number is SS-TCT-4-035-100M-SI.

Custom Bent Tubing

Features

- Cold forming of stainless steel tubing by CNC tube benders, single plane bending, 3D bending and custom coned and threaded nipple bending available
- Customized following customers' drawings and designed and customized as per customer requirement

TMP Series Bent Tubing



T20D/T20M Series Bent Tubing

Standard Packaging for Seamless Straight-Length Tubing

Table 1 shows the standard packaging comparison for TMP series seamless straight-length tubing
Table 2 shows the standard packaging comparison for TBA series seamless straight-length tubing
Table 3 shows the standard packaging comparison for TEP series seamless straight-length tubing
Table 4 shows the standard packaging comparison for T15A, T20D, T20M and T60H series seamless straight-length tubing (fractional)

Table 1

Tube O.D. in	Wall Thickness in	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)	Tube O.D. in	Wall Thickness in	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
1/16	0.02	300	6000	3000	3/4	0.095	6	120	78
1/8	0.028	140	2660	1540	3/4	0.109	5	110	80
1/8	0.035	120	2280	1440	7/8	0.049	5	100	50
3/16	0.035	50	1500	500	1	0.065	4	80	40
1/4	0.035	40	800	400	1	0.083	4	80	40
1/4	0.049	35	805	385	1	0.095	4	80	40
1/4	0.065	30	660	390	1	0.109	4	76	40
5/16	0.035	30	600	300	1	0.12	4	76	40
3/8	0.035	25	500	250	1 1/4	0.083	2	60	30
3/8	0.049	22	484	242	1 1/4	0.095	2	60	30
3/8	0.065	18	396	252	1 1/4	0.109	2	58	30
1/2	0.035	17	340	170	1 1/4	0.12	2	54	30
1/2	0.049	17	340	170	1 1/4	0.134	2	48	30
1/2	0.065	13	260	169	1 1/4	0.156	2	42	30
1/2	0.083	11	220	165	1 1/2	0.095	1	40	20
5/8	0.049	11	220	110	1 1/2	0.109	1	40	20
5/8	0.065	10	200	120	1 1/2	0.12	1	40	20
3/4	0.049	8	160	80	1 1/2	0.134	1	40	20
3/4	0.065	8	160	80	1 1/2	0.156	1	35	20
3/4	0.083	7	140	77	1 1/2	0.188	1	30	20

Tube O.D. mm	Wall Thickness mm	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
2	0.5	200	①	2000
3	0.5	150	3000	1500
3	0.8	135	2970	1485
6	1	40	800	400
6	1.5	35	770	350
8	1	30	600	300
8	1.5	25	500	300
8	2	20	440	300
10	1	25	500	250
10	1.5	19	399	247
10	2	15	315	240
10	2.5	13	273	234
12	1	17	340	170
12	1.5	15	330	165
12	2	12	264	168
14	1	14	280	140
14	1.5	12	276	132
14	2	10	220	140
14	2.5	8	184	136
14	3	8	160	136
15	1	12	240	120
16	1	10	230	100
16	1.5	10	230	100

Tube O.D. mm	Wall Thickness mm	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
16	2	8	184	96
16	2.5	7	154	98
16	3	7	133	98
18	1	8	160	80
18	1.5	8	160	80
18	2	8	160	80
18	2.5	6	132	78
18	3	5	110	80
18	4	5	90	80
18	5	4	80	72
20	1.5	8	160	80
20	2	7	140	77
20	2.5	5	110	80
22	2	5	100	50
22	2.5	5	100	50
22	3	4	88	48
25	2	4	80	40
25	2.5	4	80	40
28	2.5	4	76	40
30	3	3	60	30
32	3.5	2	40	20
38	4	1	35	20

① Packing in big wooden cases available subject to confirmation from FITOK.

Table 2

Tube O.D. in	Wall Thickness in	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
1/4	0.035	40	800	400
1/4	0.049	35	805	385
1/4	0.065	30	660	390
5/16	0.035	30	600	300
3/8	0.035	25	500	250
3/8	0.049	22	484	242
3/8	0.065	18	396	252
1/2	0.035	17	340	170
1/2	0.049	17	340	170
1/2	0.065	13	260	169
1/2	0.083	11	220	165
5/8	0.049	10	200	100
5/8	0.065	10	200	120
3/4	0.049	8	160	80
3/4	0.065	8	160	80
3/4	0.083	7	140	77
3/4	0.095	6	120	78
3/4	0.109	5	110	80

Tube O.D. in	Wall Thickness in	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
7/8	0.049	5	100	50
1	0.065	4	80	40
1	0.083	4	80	40
1	0.095	4	80	40
1	0.109	4	76	40
1	0.12	4	76	40
1 1/4	0.083	2	60	30
1 1/4	0.095	2	60	30
1 1/4	0.109	2	58	30
1 1/4	0.12	2	54	30
1 1/4	0.134	2	48	30
1 1/4	0.156	2	42	30
1 1/2	0.095	1	40	20
1 1/2	0.109	1	40	20
1 1/2	0.12	1	40	20
1 1/2	0.134	1	40	20
1 1/2	0.156	1	35	20
1 1/2	0.188	1	30	20

Tube O.D. mm	Wall Thickness mm	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
8	1	30	600	300
8	1.5	25	500	300
8	2	20	440	300
10	1	25	500	250
10	1.5	19	399	247
10	2	15	315	240
10	2.5	13	273	234
12	1	17	340	170
12	1.5	15	330	165
12	2	12	264	168
14	1	14	280	140
14	1.5	12	276	132
14	2	10	220	140
14	2.5	8	184	136
14	3	8	160	136
15	1	12	240	120
16	1	10	230	100
16	1.5	10	230	100
16	2	8	184	96
16	2.5	7	154	98

Tube O.D. mm	Wall Thickness mm	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
16	3	7	133	98
18	1	8	160	80
18	1.5	8	160	80
18	2	8	160	80
18	2.5	6	132	78
18	3	5	110	80
18	4	5	90	80
18	5	4	80	72
20	1.5	8	160	80
20	2	7	140	77
20	2.5	5	110	80
22	2	5	100	50
22	2.5	5	100	50
22	3	4	88	48
25	2	4	80	40
25	2.5	4	80	40
28	2.5	4	76	40
30	3	3	60	30
32	3.5	2	40	20
38	4	1	35	20

Contact FITOK Group for more information.

Table 3

Tube O.D. in	Wall Thickness in	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
1/4	0.035	28	560	280
1/4	0.049	24	563	269
1/4	0.065	21	462	273
5/16	0.035	21	420	210
3/8	0.035	17	350	175
3/8	0.049	15	338	169
3/8	0.065	12	277	176
1/2	0.035	11	238	119
1/2	0.049	11	238	119
1/2	0.065	9	182	118
1/2	0.083	7	154	115
5/8	0.049	7	140	70
5/8	0.065	7	140	84
3/4	0.049	5	112	56
3/4	0.065	5	112	56
3/4	0.083	4	98	53
3/4	0.095	4	84	54
3/4	0.109	3	77	56
7/8	0.049	3	70	35
1	0.065	2	56	28
1	0.083	2	56	28
1	0.095	2	56	28
1	0.109	2	53	28
1	0.12	2	53	28
1 1/4	0.083	1	42	21
1 1/4	0.095	1	42	21
1 1/4	0.109	1	40	21
1 1/4	0.12	1	37	21
1 1/4	0.134	1	33	21
1 1/4	0.156	1	29	21
1 1/2	0.095	1	28	14
1 1/2	0.109	1	28	14
1 1/2	0.12	1	28	14
1 1/2	0.134	1	28	14
1 1/2	0.156	1	24	14
1 1/2	0.188	1	21	14

Tube O.D. mm	Wall Thickness mm	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
8	1	21	420	210
8	1.5	17	350	210
8	2	14	308	210
10	1	17	350	175
10	1.5	13	279	172
10	2	10	220	168
10	2.5	9	191	163
12	1	11	238	119
12	1.5	10	231	115
12	2	8	184	117
14	1	9	196	98
14	1.5	8	193	92
14	2	7	154	98
14	2.5	5	128	95
14	3	5	112	95
15	1	8	168	84
16	1	7	161	70
16	1.5	7	161	70
16	2	5	128	67
16	2.5	4	107	68

Tube O.D. mm	Wall Thickness mm	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
16	3	4	93	68
18	1	5	112	56
18	1.5	5	112	56
18	2	5	112	56
18	2.5	4	92	54
18	3	3	77	56
18	4	3	63	56
18	5	2	56	50
20	1.5	5	112	56
20	2	4	98	53
20	2.5	3	77	56
22	2	3	70	35
22	2.5	3	70	35
22	3	2	61	33
25	2	2	56	28
25	2.5	2	56	28
28	2.5	2	53	28
30	3	2	42	21
32	3.5	1	28	14
38	4	1	24	14

Contact FITOK Group for more information.

Table 4

Part Number	Tube O.D. in.	Wall Thickness in.	PCS/ Cardboard Tube	PCS/ Wooden Case (big)	PCS/ Wooden Case (small)
T15A-2-037	1/8	0.037	110	2530	1540
T15A-4-083	1/4	0.083	25	600	400
T15A-4-065	1/4	0.065	30	690	390
T15A-6-118	3/8	0. 118	12	264	240
T15A-6-095	3/8	0.095	14	308	252
T15A-8-156	1/2	0.156	7	154	154
T15A-8-134	1/2	0.134	7	168	168
T15A-12-240	3/4	0.24	3	66	66
T15A-12-188	3/4	0.188	3	78	72
T20D-4-065	1/4	0.065	30	660	390
T20D-6-083	3/8	0.083	14	336	252
T20D-8-109	1/2	0.109	8	192	160
T20D-12-165	3/4	0.165	4	88	80
T20D-16-172	1	0.172	2	48	40
T20M-4	1/4	0.071	30	660	390
T20M-6	3/8	0.086	14	336	252
T20M-9	9/16	0.125	7	154	126
T20M-12	3/4	0.156	4	88	80
T20M-16	1	0.219	2	48	40
T20M-4-S	1/4	0.071	30	660	390
T20M-6-S	3/8	0.086	14	336	252
T20M-9-S	9/16	0.125	7	154	126
T20M-12-S	3/4	0.156	4	88	80
T20M-16-S	1	0.219	2	48	40
T60H-4	1/4	0.083	25	600	400
T60H-6	3/8	0.125	12	264	240
T60H-9	9/16	0.188	5	115	110
T60H-4-S	1/4	0.083	25	600	400
T60H-6-S	3/8	0.125	12	264	240
T60H-9-S	9/16	0.188	5	115	110

Contact FITOK Group for more information.

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Applicable to the stable application analysis of various gases

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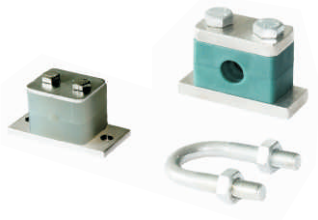

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FK-FC-T-01-EN-23V1