

# 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, 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  $\geq$  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  $\mu$ m. (0.51  $\mu$ m) 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  $\mu$ m. (0.25  $\mu$ m) 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  $\mu$ m. (0.25  $\mu$ m) max; ultrasonically cleaning, purged with filtered hot nitrogen, dried and assembled in clean room.

Materials: TBA, PEP Series: 316L. TEP Series: 316L, 316L VAR

TCA Series: inner tube: 316L, 316L VAR, outer tube: 316L, 304L

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

Materials	Series	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 (JIS standard)					✓									
	316L VAR				✓		✓								
	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

Hardness Connection	Heat Treatment	Series	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			✓	✓	○	○	×	×	□	×	×	×	✓	✓	✓
6S Series Single-Ferrule Tube Fittings			✓	✓	○	○	×	×	□	×	×	×	✓	✓	✓
37° Flared Fittings			○	○	○	○	×	×	×	×	×	×	○	○	○
Orbital Welding			○	○	✓	✓	✓	✓	□	×	×	×	○	○	○
15S Series Single-Ferrule Tube Fittings			□	□	□	□	×	×	✓	×	×	×	□	□	□
20D Series Tube Fittings			□	□	□	□	×	×	✓	✓	○ <sup>①</sup>	×	□	□	□
20M Series Medium Pressure Fittings			×	×	×	×	×	×	×	×	✓	□	×	×	×
60H Series High Pressure Fittings			×	×	×	×	×	×	×	×	×	✓	×	×	×

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

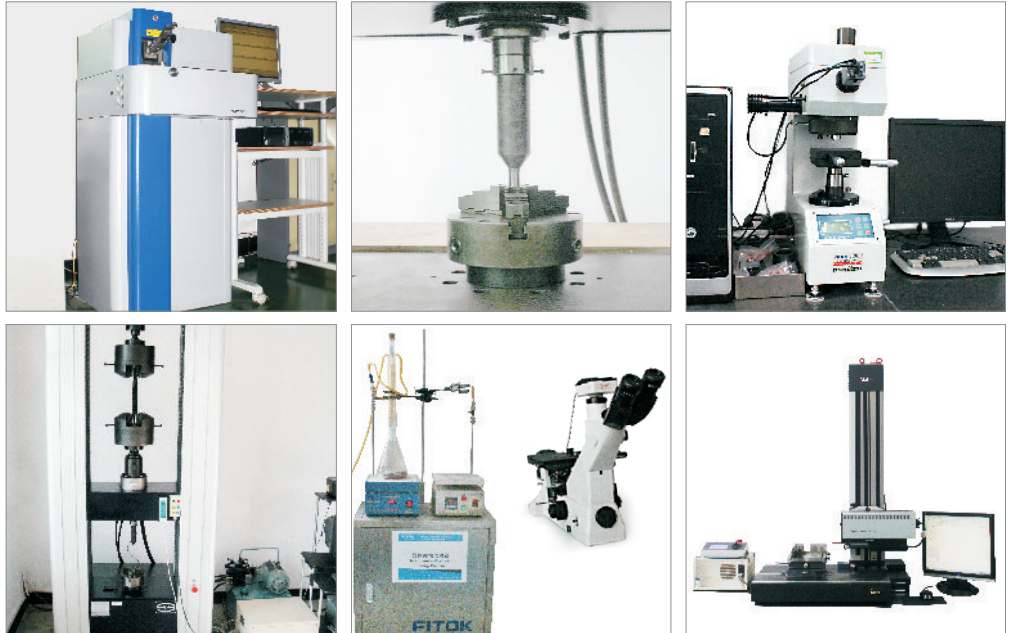
## Working Pressure

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.

