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: 1/8"-2 1/2"

◎ Process: internal surface cold worked followed by bright annealing to roughness of Ra≤20 μin (0.51 μm)

◎ Inspection:

FC-01: visual inspection, surface roughness measurement

FC-02: visual inspection, surface roughness measurement, particle testing, dew point testing, oil content testing

◎ Cleaning:

FC-01: immersion rinsing, air purging

FC-02: ultrasonic cleaning and rinsing, then purging and drying with high purity nitrogen in ISO 4 cleanroom

◎ Packaging: in ISO 4 cleanroom, after cleaning with 99.999% nitrogen, both tubing ends are capped and tubing is packed in individual polyethylene bag

◎ Marking: tubing is marked with brand, material grade, specification and heat number

◎ Standard length: 20 ft, 2 m, 3 m, 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)
3.18≤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
1/8	0.028	0/+0.003 (0.08)	+/-10	2 or 3	-	√	-
1/4	0.035	+/-0.004 (0.10)		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 in accordance with ASME B31.3: for single butt weld tubing, multiply the pressure rating by 0.8.

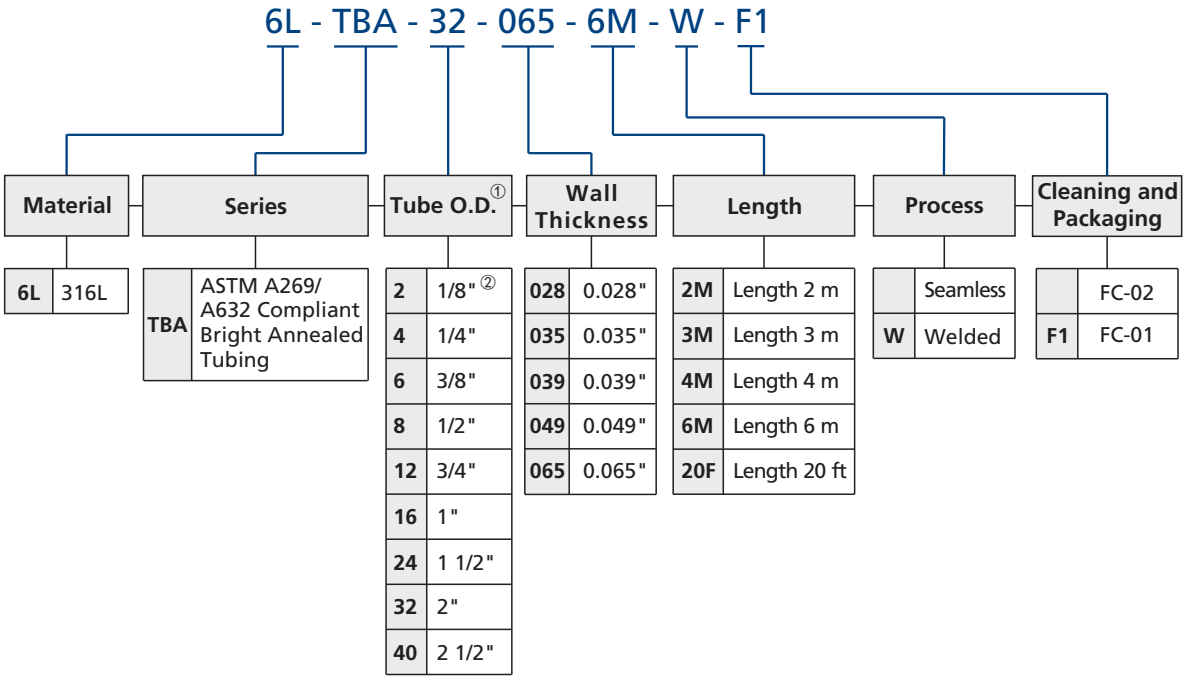
Tube O.D. in.	Wall Thickness in.				
	0.028	0.035	0.039	0.049	0.065
	Working Pressure psig				
1/8	8500	-	-	-	-
1/4	-	5100	5700	-	-
3/8	-	3300	3700	4800	-
1/2	-	2600	3000	3700	-
3/4	-	-	-	2400	3300
1	-	-	-	1800	2400
1 1/2	-	-	-	-	1600
2	-	-	-	-	1200
2 1/2	-	-	-	-	950

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.
② Maximum length: 3 meters.
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.