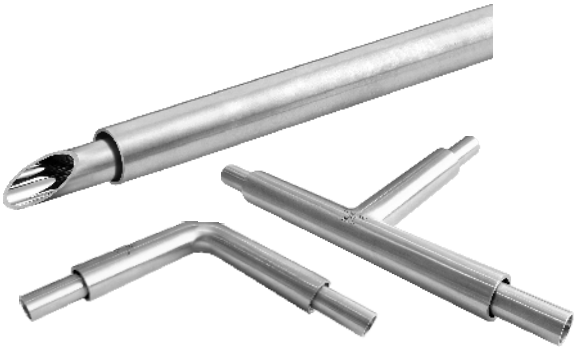
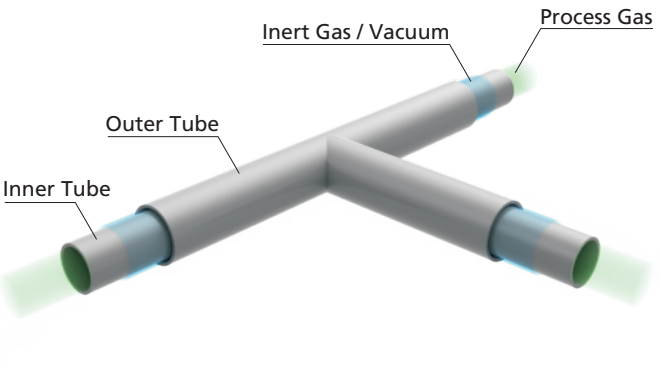
TCA Series Coaxial Tubing and Fittings

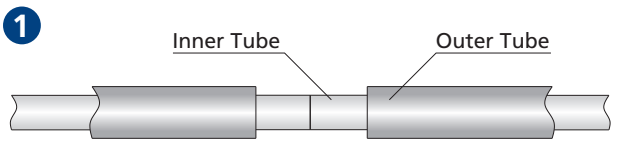
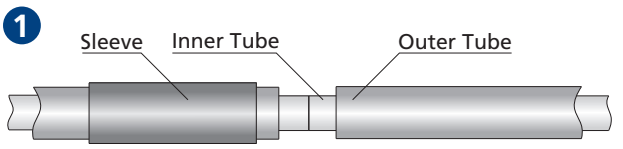
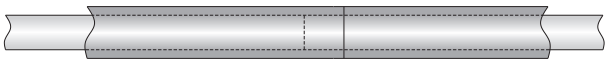
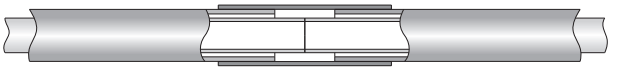
Introduction

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.



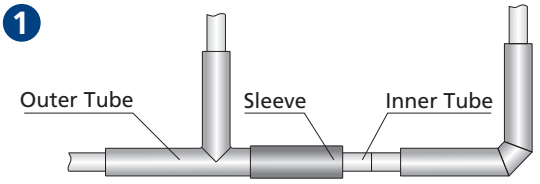


Connection Method

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.

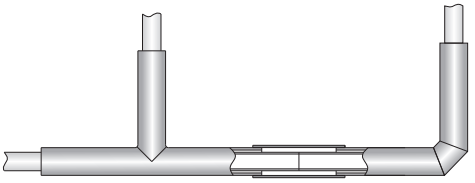
Fitting to fitting connection

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.

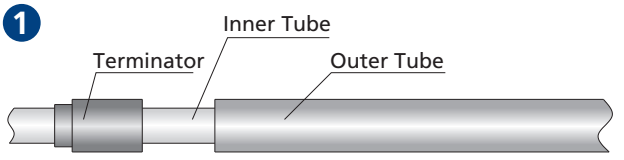
2



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

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 6 cleanroom

◎ Packaging: assembled in ISO 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

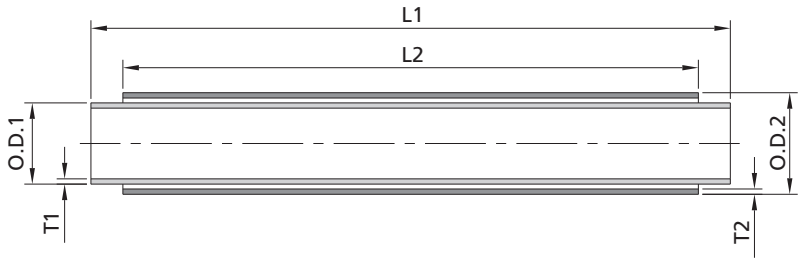
◎ Standard length: 20 ft and 6 m

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				

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

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)

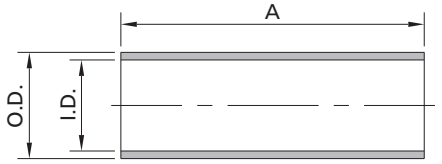
Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combination are available.

Coaxial Sleeve

Features

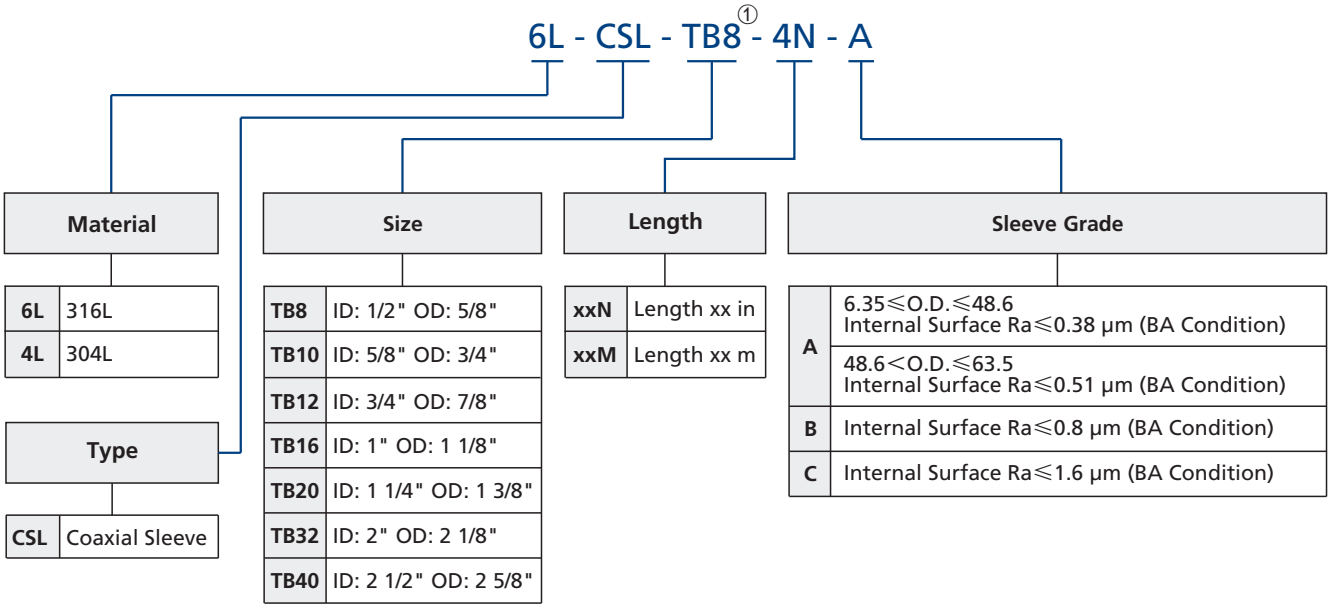
- Materials: 316L, 304L
- Inside diameter: 1/2" ~ 2 1/2"
- Process: internal surface bright annealed or bright annealed after precision cold working to roughness of 15 μin (0.38 μm), Ra≤20 μin (0.51 μm), Ra≤32 μin (0.8 μm), Ra≤63 μin (1.6 μm); external surface mechine finished to roughness of Ra≤63 μin (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.

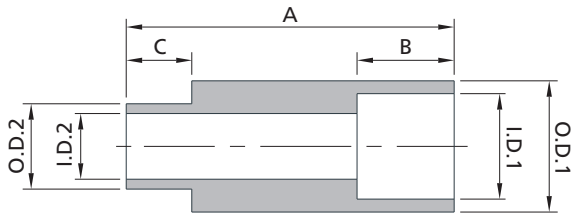
Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

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
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)

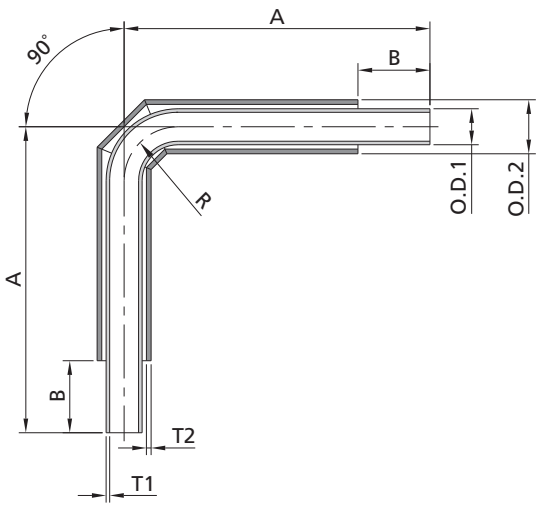
◎ Cleaning: ultrasonically cleaned, washed, rinsed, and purged and dried with high purity hot nitrogen in ISO 6 cleanroom

◎ Packaging: packaged in ISO 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

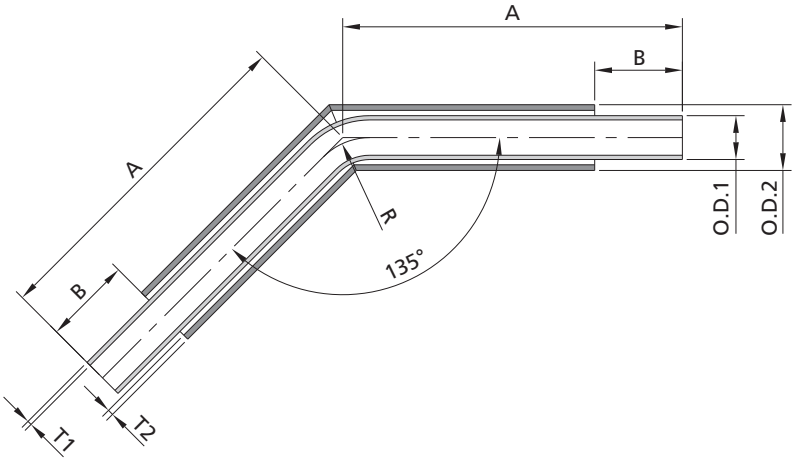
Coaxial 90° Elbow



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"	0.56"	4.375"	1"
6L-CEL-TB6-TB10	0.375"	0.035"	0.625"	0.049"	0.56"	4.125"	1"
6L-CEL-TB8-TB12	0.5"	0.049"	0.75"	0.065"	0.75"	4.25"	1"
6L-CEL-TB12-TB16	0.75"	0.065"	1"	0.065"	1"	6.75"	1.75"
6L-CEL-TB16-TB20	1"	0.065"	1.25"	0.065"	1.18"	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"	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"	0.56"	4"	1"
6L-CEV-TB6-TB10	0.375"	0.035"	0.625"	0.049"	0.56"	3.875"	1"
6L-CEV-TB8-TB12	0.5"	0.049"	0.75"	0.065"	0.75"	3.875"	1"
6L-CEV-TB12-TB16	0.75"	0.065"	1"	0.065"	1"	6.125"	1.75"
6L-CEV-TB16-TB20	1"	0.065"	1.25"	0.065"	1.18"	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"	8"	2"

Ordering Number Description

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

Inner Tube Material

6L	316L

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
Outer tube: 316L, 304L

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

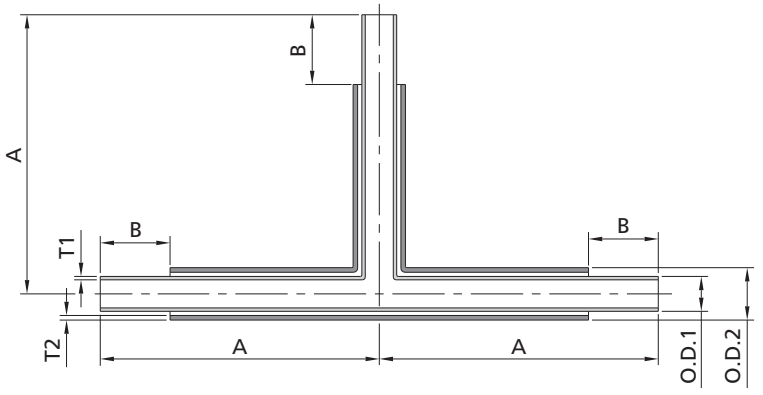
◎ Inner tube process: internal surface electropolished to roughness of Ra≤5 μin (0.13 μm), Ra≤7 μin (0.18 μm), Ra≤10 μin (0.25 μm)

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

◎ Packaging: packaged in ISO 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

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
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"

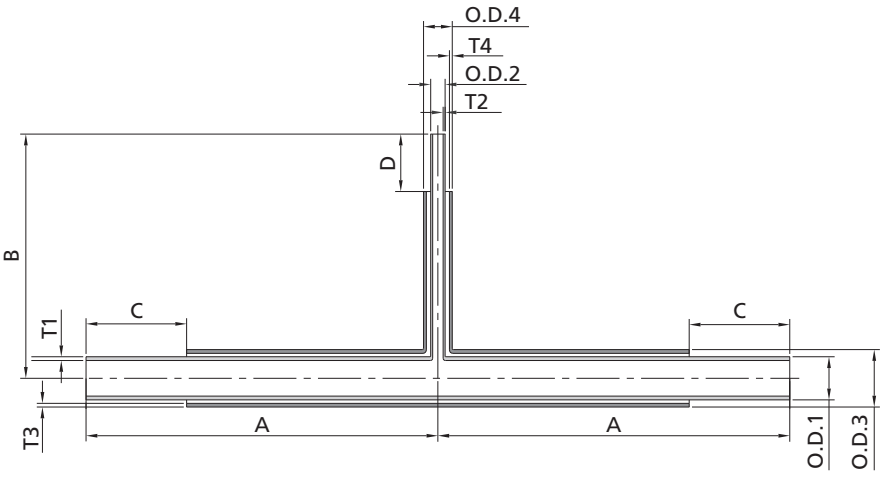
◎ Inner tube process: internal surface electropolished to roughness of Ra≤5 μin (0.13 μm), Ra≤7 μin (0.18 μm), Ra≤10 μin (0.25 μm)

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

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

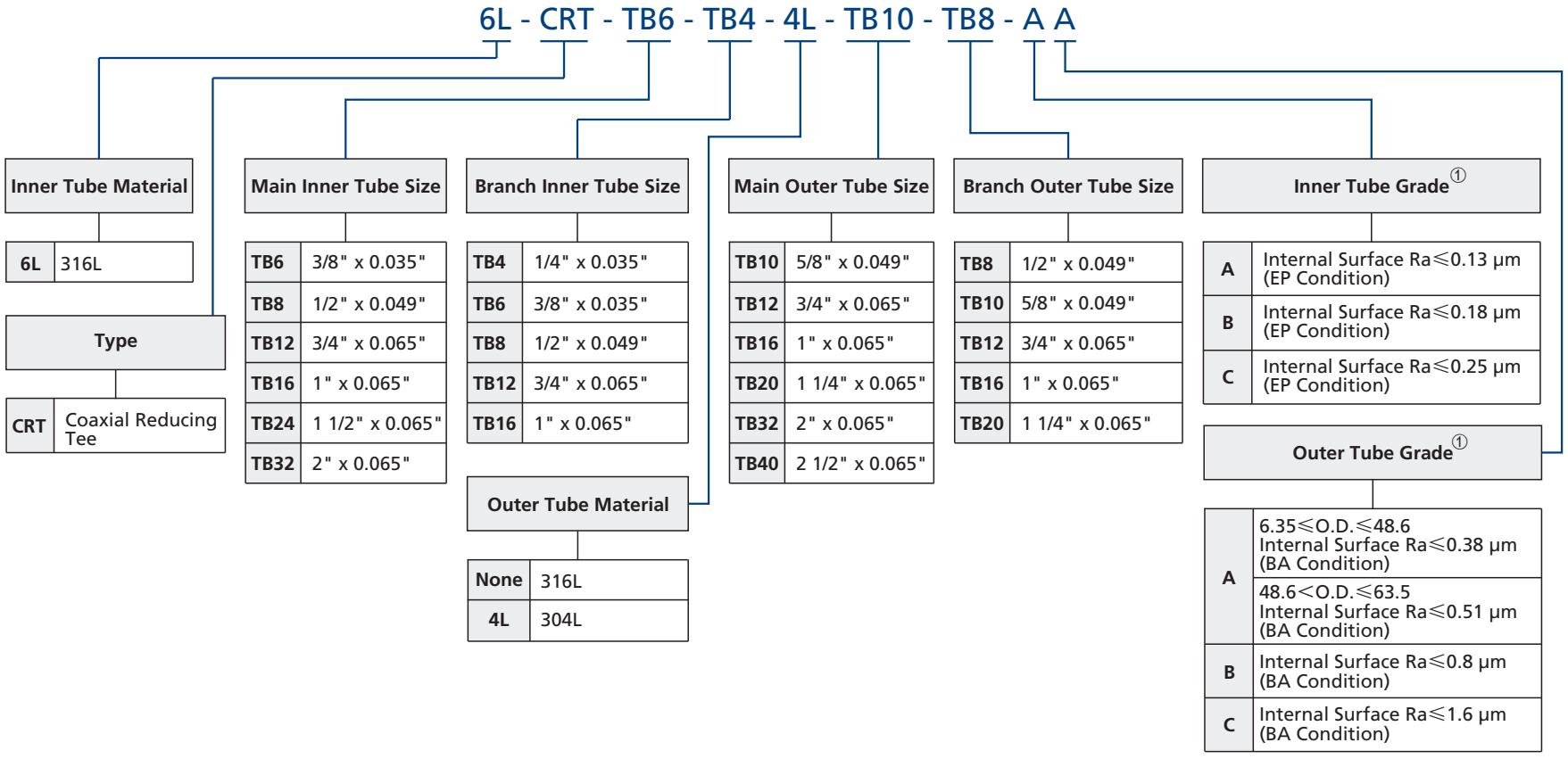
◎ Marked with brand, material grade and trace number

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



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.