Instructions

Tube Fitting

Installation

For Tube Fittings up to 1 in.(25 mm)

1. Insert the tube into the tube fitting. Make sure the tubing rests firmly on the shoulder of the fitting body. Finger tight the nut. (Fig. 1)

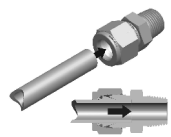


Fig. 1

For High-Pressure Applications and High Safety-Factor Systems:
Further tighten the nut with a wrench until the tubing could not be turned by hand or moved axially in the fitting before Step 2 and Step 3.

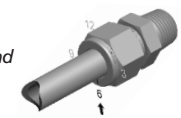


Fig. 2

2. Scribe mark the nut at 6 o'clock position. (Fig. 2)
3. For tube fittings below or equal to 3/16'' (4mm) O.D., tighten the nut 3/4 turn to 3 o'clock position with a wrench, while holding the fitting body steady. For tube fittings above 3/16''(4mm) O.D., tighten the nut 1-1/4 turns to 9 o'clock position. (Fig.3)

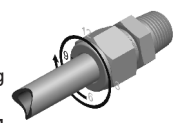


Fig. 3

For Tube Fittings Over 1 in.(25 mm)

1. Preset the ferrules onto the tubing using the FITOK Hydraulic Presetting Tool (HPT) with refer to the HPT Instructions.
2. Apply the enclosed lubricant sparingly to the FITOK tube fitting body threads and to the rear surface of the back ferrule.
3. Install the presetted assembly (tubing, nut, front and back ferrules) into the fitting body finger-tight. Finally, tighten the nut 1/2 turn further with a wrench, while holding the fitting body steady.

Gaugeability

For initial installation, the FITOK Gap Inspection Gauge helps to judge whether the fitting has been sufficiently tightened by trying to enter the FITOK Gap Inspection Gauge into the gap between the nut and body. (Fig. 4)

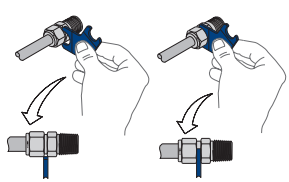


Fig. 4

◎ If the gauge could not enter the gap, the fitting is sufficiently tightened.
◎ If the gauge enters into the gap, additional tightening is required.

Reassembly

The FITOK tube fittings can be disassembled and reassembled for multiple times. Prior to disassembly, make sure to mark a straight line along the tubing, the nut and the fitting body to ensure the reassembled fittings are properly tightened. (Fig. 5)

1. Insert tubing with the presetted ferrules into the fitting body until the front ferrule seats.
2. While holding the fitting body steady, rotate the nut with a wrench back to the original position as indicated by the marks on the tubing and the fitting body. At this point, there shall be a significant increase in resistance. (Fig. 6)
3. Tighten the nut slightly further with a wrench so as to complete the reassembly.

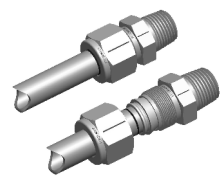


Fig. 5

Fig. 6

▲ ***The FITOK Gap Inspection Gauge is not applicable to reassembled fittings.***

Plugs and Port Connectors

Installation

1. While holding the fitting body steady, tighten the plug and the machined ferrule end of port connector one-quarter turn from the finger-tight position. Fig. 7 & Fig. 8
For 1/16, 1/8, and 3/16 in.; 2, 3, and 4 mm tube fittings, tighten the plug and the machined ferrule end of port connector one-eighth turn.
For over 1 in. and over 25 mm tube fittings, tighten the plug and the machined ferrule end of port connector one-quarter turn.

2. For the tube adapter end of port connector, assemble as per Tube Fitting Installation on page 5. Fig. 9

Fig. 7

Fig. 8

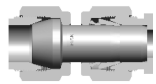


Fig. 9

Reassembly

1. Make subsequent connections by slightly tightening with a wrench after snugging the nut by hand.
2. For the tube adapter end of port connector, reassemble as stated in the tube fitting reassembly instructions on page 6.

Presetting Tool

1. Install the nut and ferrules onto the presetting tool.
2. Insert tubing into the presetting tool, make sure the tube rests firmly on the shoulder of the presetting tool, then rotate the nut finger-tight.
3. Assemble the fitting as per Tube Fitting Installation on page 5. Fig. 10
4. Loosen the nut and insert the tubing with preset ferrules into the fitting body. Fig. 11
5. Reassemble as stated in the reassembly instructions. Fig. 12

Fig. 10

Fig. 11

Fig. 12

Over 1 in. (25 mm) sizes require use of a Hydraulic Presetting Tool to preset the ferrules onto the tubing.

Pipe Fittings and Weld Fittings

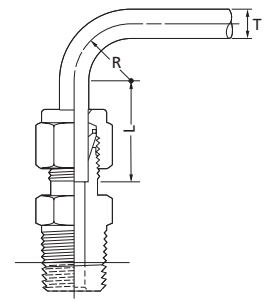
Please refer to the 6 Series Pipe Fittings catalog, FK-IC-GF-02, and 6 Series Weld Fittings catalog, FK-IC-GF-03, for the installation of thread ends and weld ends.

Tubing Installation

Tubing properly selected and handled, combined with properly installed FITOK tube fittings, will give you a leaktight system and provide reliable service in a wide variety of applications. For maximum assurance of reliable performance, use:

- Properly selected and handled high-quality tubing—such as provided by FITOK.
- FITOK tube fittings assembled in accordance with catalog instructions.
- An appropriate tube support system to limit the movement of tubing and fluid system components.

When installing fittings near tube bends, there must be a sufficient straight length of tubing to allow the tube to be bottomed in the FITOK fitting (see tables).



T Tube O.D.
L Required straight tube length (see tables)
R Radius of tubing bend

Fractional, in.	
T Tube O.D.	L
1/16	1/2
1/8	23/32
3/16	3/4
1/4	13/16
5/16	7/8
3/8	15/16
1/2	1 3/16
5/8	1 1/4
3/4	1 1/4
7/8	1 5/16
1	1 1/2
1 1/4	2
1 1/2	2 13/32
2	3 1/4

Metric, mm	
T Tube O.D.	L
3	19
6	21
8	23
10	25
12	31
14	32
15	32
16	32
18	32
20	34
22	34
25	40
28	46
30	50
32	54
38	63
50	80

Tubing Selection

Proper selection, handling, and installation of tubing, when combined with proper selection of FITOK tube fittings, are essential for reliable tubing systems. The following variables should be considered when ordering tubing for use with FITOK tube fittings:

◎ Surface finish
◎ Material
◎ Wall thickness

Surface Finish

Surface finish is very important for proper sealing. Tubing with any kind of depression, scratch, raised portion, or other surface defect will be difficult to seal, particularly in gas service.

Material

Metal tubing material should be softer than fitting material. For example, stainless steel tubing should not be used with brass fittings. When tubing and fittings are made of the same material, tubing must be fully annealed.

Wall Thickness

The accompanying tables show working pressure ratings of tubing in a wide range of wall thicknesses. Except as noted, allowable pressure ratings are calculated from S values as specified by ASME B31.3, Process Piping. FITOK tube fittings have been repeatedly tested in both the minimum and maximum wall thicknesses shown. FITOK tube fittings are not recommended for tube wall thicknesses outside the ranges shown in the accompanying tables for each size.

Tubing Handling

It is important to properly handle the tubing in order to reduce the scratches and protect the surface finish.

◎ Tubing should never be dragged out of a tubing rack or across a rough surface.
◎ Tube cutters or hacksaws should be sharp. Do not take deep cuts with each turn of the cutter or stroke of the saw. The tubing will go all the way through the ferrules without damaging the ferrule sealing edge.

Gas Service

Gases (air, hydrogen, helium, nitrogen, etc.) have very small molecules that can escape through even the most minute leak path. Some surface defects on the tubing can provide such a leak path. As tube outside diameter (O.D.) increases, so does the likelihood of a scratch or other surface defect interfering with proper sealing. The most successful connection for gas service will occur if all installation instructions are carefully followed and the heavier wall thicknesses of tubing on the accompanying tables are selected.

Suggested Allowable Pressure Tables

Figures and tables are for reference only. No implication is made that these values can be used for design work. Applicable codes and practices in industry should be considered.

◎ All pressures are calculated from formulas in ASME B31.3, Process Piping. See factors for calculating working pressures in accordance with ASME B31.1, Power Piping.
◎ Calculations are based on maximum O.D. and mimimum wall thickness, except as noted in individual tables.
Example: 1/2 in. O.D.×0.049 in. wall thickness stainless steel tubing purchased to ASTM A269:
O.D. Tolerance ±0.005 in. / Wall Thickness Tolerance ±10%
Calculations are based on 0.505 in.O.D.×0.0441 in. wall thickness tubing.
◎ No allowance is made for corrosion or erosion.