



Instructions for Swagelok® Medium-Pressure Tube Fittings

Installation Instructions

These instructions apply to Swagelok FK series medium-pressure tube fittings as follows:

- Materials: 316 stainless steel, alloy 2507, and alloy 625
- Arbor colors: Red for fractional 316 SS; Yellow for metric 316 SS, Orange for alloy 2507 and alloy 625
- 316 SS sizes: 1/4 to 3/4 in. and 6 to 12 mm
- Alloy 2507 and alloy 625 sizes: 1/4, 3/8, 1/2, and 3/4 in.
- Proper tube preparation is critical for tube fitting function. Tube preparation is essential to ensure bottoming into the fitting body and consistent assembly. Tubing for the FK fitting must be cut squarely, deburred, and chamfered.
- Refer to the Swagelok *Tube Fitter's Manual*, [MS-13-03](#), Chapter 3 (Tubing and Tube Fitting Handling and Installation), sections *Tube Preparation* and *Tube Facing Tool*.

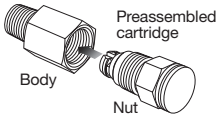
To install 1/2 in. and 3/4 in. medium-pressure tube fittings that have been preswaged with the MHSU, refer to **316 SS (1/2 in. size) and 316 SS, Alloy 2507, and Alloy 625 (3/4 in. size) Connections Preswaged with the MHSU**.

Tools Required

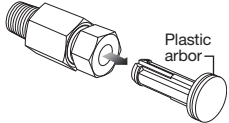
- Swagelok FK medium-pressure gap inspection gauge
- Wrench
- Non-chloride permanent marker
- Optional: Silver Goop™ high-temperature lubricant. For temperatures above 400°F (204°C), apply to fitting nut threads.

All Sizes—316 SS, Alloy 2507, and Alloy 625

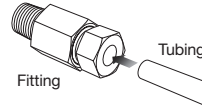
1. Thread the **preassembled cartridge** into the fitting **body** until finger-tight.



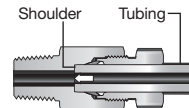
2. Remove the **plastic arbor**.



3. Insert **tubing** into the **fitting**.



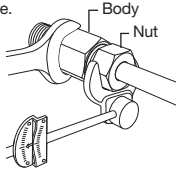
4. Make sure the **tubing** rests firmly on the **shoulder** of the body.



5. Refer to appropriate material and size.

■ 316 SS and Alloy 2507—All Sizes except 3/4 in.

Hold the **body** steady and tighten the **nut** to the specified torque.



Tube OD	316 SS Fitting Required Torque		Alloy 2507 Fitting Required Torque	
	ft-lb	N-m	ft-lb	N-m
6 mm	25	34	-	-
1/4 in.			30	41
3/8 in.	45	61	50	68
10 mm	100	135	-	-
12 mm	110	150	-	-
1/2 in.			140	190
9/16 in.	170	230	-	-

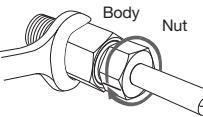
Alternately, mark the nut, then tighten the nut one full turn.

■ 316 SS and Alloy 2507—3/4 in.

Mark the nut, then hold the **body** steady and tighten the **nut** one full turn.

■ Alloy 625—All Sizes

Mark the nut, then hold the **body** steady and tighten the **nut** one full turn.



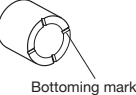
6. Use the Swagelok medium-pressure gap inspection gauge to ensure that the fitting has been tightened sufficiently. See **Gaugeability** section for details.

316 SS (1/2 in. Size) and 316 SS, Alloy 2507, and Alloy 625 (3/4 in. Size) Connections Preswaged with the MHSU

1. Preswage the ferrules onto the tube using a Swagelok multihead hydraulic swaging unit (MHSU) and the appropriate medium-pressure tooling.

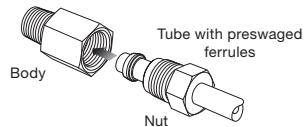
See the *Multihead Hydraulic Swaging Unit (MHSU) Setup and Operating Instructions*, [MS-12-37](#).

2. Inspect the tube end for **bottoming marks**. These radial indentations indicate the tubing was properly bottomed in the MHSU. If there are **not four** visible indentations, the preswaged assembly should not be used.

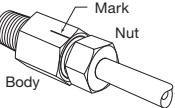


The MHSU should be used to preswage a set of ferrules only one time. If the ferrules were insufficiently preswaged, they should be discarded and the process started again with a new set of ferrules.

3. Insert the **tube with preswaged ferrules** into the fitting **body** until the front ferrule seats against the fitting body; rotate the nut finger-tight.

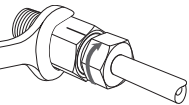


4. Place a mark on the fitting **body** in line with one of the hex points of the **nut**.



5. Hold the fitting body steady and tighten the nut one-third turn. This is equivalent to advancing the nut two hex points from the scribed mark.

316 SS (1/2 in. Size) and 316 SS and Alloy 2507 (3/4 in. Size) Alternately, hold the fitting body steady and tighten the nut to the specified torque.



Tube OD	316 SS Fitting Required Torque		Alloy 2507 Fitting Required Torque	
	ft-lb	N-m	ft-lb	N-m
1/2 in.	110	150	—	—
3/4 in.	225	305	270	365

6. Use the Swagelok medium-pressure gap inspection gauge to ensure that the fitting has been tightened sufficiently. See **Gaugeability** section for details.



Gaugeability

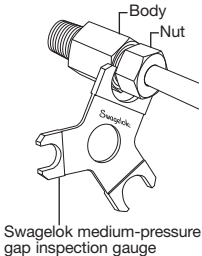
On initial installation, the **Swagelok medium-pressure gap inspection gauge** assures the installer or inspector that a fitting has been sufficiently tightened.

Position the **Swagelok medium-pressure gap inspection gauge** next to the gap between the **nut** and **body**.

For 1/2 in. medium-pressure tube fittings that have been preswaged with the MHSU, use only the Swagelok medium-pressure gap inspection gauge **MS-MHSU-IG-8FK0**, marked **8FK0 SERIES MHSU ONLY**.

- If the gauge **will not** enter the gap, the fitting is sufficiently tightened.
- If the gauge **will** enter the gap, additional tightening is required. Hold the fitting body steady and tighten the nut slightly. Then check the gap with the gap inspection gauge. If the gap inspection gauge **will** still enter the gap, then slightly tighten the nut again. Repeat this additional tightening until the gap inspection gauge **will not** enter the gap.

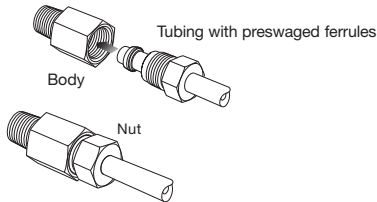
NOTICE: The gap inspection gauge can be used as an important diagnostic tool for reassembled tube fittings. Rechecking the nut-to-body gap upon reassembly can prevent under-tightened conditions.



Reassembly Instructions

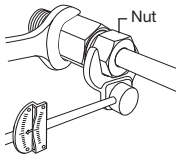
You may disassemble and reassemble Swagelok medium-pressure tube fitting many times.

1. Insert the **tubing with preswaged ferrules** into the fitting **body** until the front ferrule seats; rotate the nut finger-tight.



316 SS and Alloy 2507

2. Rotate the **nut** with a wrench and tighten to the specified torque.



Tube OD	316 SS Fitting Required Torque		Alloy 2507 Fitting Required Torque	
	ft-lb	N·m	ft-lb	N·m
6 mm	25	34	-	-
1/4 in.			30	41
3/8 in.	45	61	50	68
10 mm	100	135	-	-
12 mm	110	150	-	-
1/2 in.			140	190
9/16 in.	170	230	-	-
3/4 in.	225	305	270	365

316 SS and Alloy 2507

Alternately, rotate the nut with a wrench to the previously pulled-up position. At this point, you will feel a significant increase in resistance. Tighten the nut slightly with a wrench.

Alloy 625

2. Rotate the nut with a wrench to the previously pulled-up position. At this point, you will feel a significant increase in resistance. Tighten the nut slightly with a wrench.

Cap Installation Instructions

See instructions for medium-pressure tube fittings on the reverse side of this card.

Plug Installation Instructions

316 SS and Alloy 2507

Hold the **body** steady and tighten the **plug** to the specified torque.

Tube OD	316 SS Plug Required Torque		Alloy 2507 Plug Required Torque	
	ft-lb	N·m	ft-lb	N·m
6 mm	25	34	-	-
1/4 in.			30	41
3/8 in.	45	61	50	68
10 mm	100	135	-	-
12 mm	110	150	-	-
1/2 in.			140	190
9/16 in.	170	230	-	-
3/4 in.	225	305	270	365

Alternately, tighten the plug one-quarter turn from the finger-tight position.

Alloy 625

Tighten the plug one-quarter turn from the finger-tight position.

Port Connectors Installation Instructions

For installation of the machined ferrule end of the port connector, see **Plug Installation**.

For installation of the preswaged ferrule end of the port connector, see **Tube Adapters and Reducers Installation**.

Tube Adapters and Reducers Installation

For initial installation, insert the tube with preswaged ferrules into the body; rotate the nut finger-tight.

- For preswaged 9/16 in./12 mm and smaller fittings, hold the body steady and rotate the nut to the previously pulled-up position. At this point, you will feel a significant increase in resistance. Tighten the nut an additional one-fourth turn.
- For preswaged 3/4 in. fittings, hold the fitting body steady and tighten the nut one-third turn.

*Alternatively, hold the fitting body steady and tighten the nut to the torque specified in **Plugs Installation**.*