Swagelok® Medium-Pressure, Gaugeable Tube Fittings and Adapter Fittings

For Pressures up to 15 000 psig (1034 bar)

- Easy installation, by specified turns or torque
- Leak-tight gas seal with initial installation and with each reassembly
- Consistent gaugeability upon initial installation
- Simple two-piece construction, body and cartridge
- Leak-tight performance on a variety of tubing types and materials

Swagelok®

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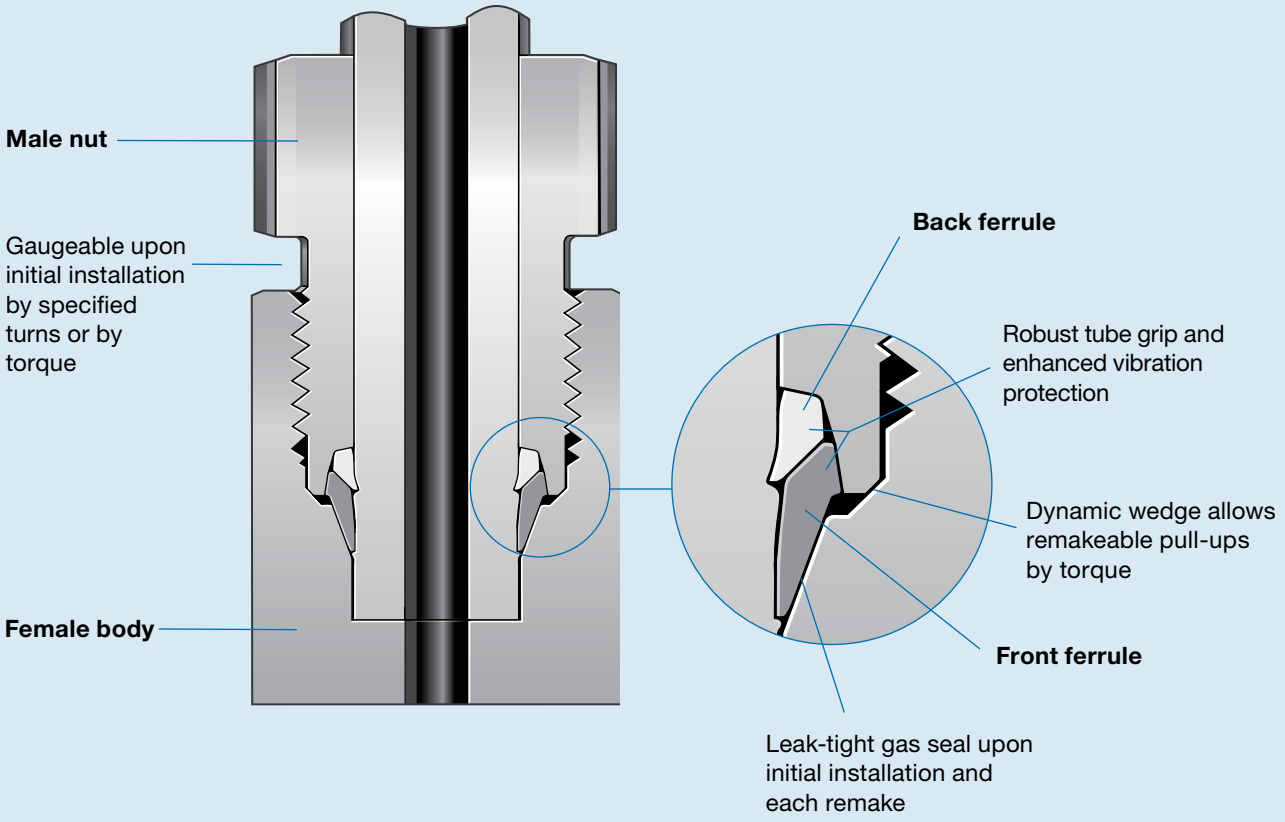
Swagelok Medium-Pressure Tube Fittings



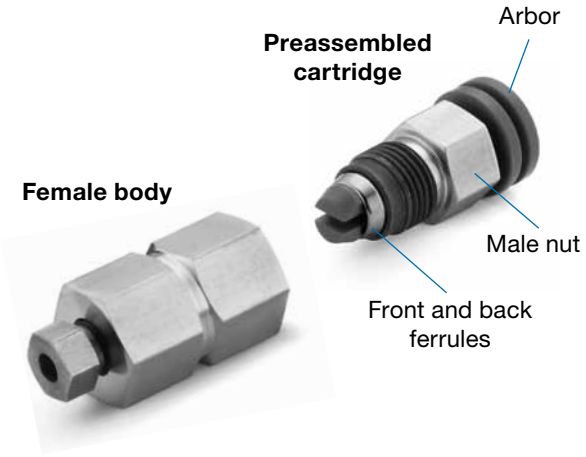
Features

The simple two-piece design of the Swagelok medium-pressure tube fittings and adapters consists of a female fitting body and preassembled cartridge containing the male nut and color-coded front and back ferrules on a disposable plastic arbor. The preassembled cartridge ensures installers correct ferrule orientation, visual confirmation of ferrule presence, and proper installation into the female body. Components are released only after the nut is threaded finger-tight on the fitting body.

The Swagelok medium-pressure tube fitting offers a leak-tight gas seal and vibration resistance in applications up to 15 000 psig (1034 bar).

Additional features of this novel tube fitting technology include:

- Patented low-temperature case hardening processing of the ferrules and nut, plus the specially designed ferrule geometry, promotes a patent-pending hinging colleting action
  - Robust tube grip for a variety of installation practices
  - Enhanced vibration protection
- Strain-hardened stainless steel bodies offer lightweight, space-saving designs
- Extensive Swagelok product test reports and third-party test reports
- 4:1 design factor.



Materials of Construction

Component	Material/ASTM Specification
Body	*316 SS/A276, A479*
Front ferrule	*316 SS/A276*
Nut①	316 SS/A276, A479
Back ferrule	316 SS/A276

Wetted components listed in *italics*.

① Molybdenum disulfide-based lubricant.

Pressure Ratings

Pressure ratings are dependent on the end connection or system component with the lowest pressure rating. Ratings for the end connections used in this catalog are identified below.

Swagelok Medium-Pressure Tube Fittings

Swagelok medium-pressure ends are rated to the working pressure of the tubing as listed below. Calculations are based on maximum outside diameter and minimum wall thickness.

*Heavy-Wall Annealed 316 Stainless Steel Tubing*①

Allowable working pressures are calculated from an *S* value of 20 000 psi (137.8 MPa) for ASTM A269 tubing at –20 to 100°F (–28 to 37°C), as listed in ASME B31.3. See **Elevated Temperature Factors,** page 5, for tubing use above 100°F (37°C).

Tube OD in.	Wall Thickness in.	Working Pressure psig (bar)
1/4	0.095	15 000 (1034)
3/8	0.134	15 000 (1034)②
1/2	0.188	15 000 (1034)

Tube OD mm	Wall Thickness mm	Working Pressure bar (psig)
6	2.2	1034 (15 000)②
10	3.5	1034 (15 000)②
12	4.5	1034 (15 000)

① No allowance is made for corrosion, erosion, or elevated temperatures.

② Pressure rating based on special wall thickness tolerance ± 10 % for heavy-wall annealed 316 stainless steel tubing.

Suggested Ordering Information

Fully annealed, high-quality type 316 stainless steel tubing ASTM A269 or A213, or equivalent. Hardness not to exceed 90 HRB. Tubing to be free of scratches, suitable for bending and flaring.

*Cold-Drawn 1/8-Hard 316 Stainless Steel Tubing*①

Allowable working pressures are calculated from an *S* value of 35 000 psi (241 MPa) at –20 to 100°F (–28 to 37°C). See **Elevated Temperature Factors,** page 5, for tubing use above 100°F (37°C).

Tube OD in.	Wall Thickness in.	Working Pressure psig (bar)
1/4	0.065	15 000 (1034)
3/8	0.083	
1/2	0.109	
3/4	0.165	

Tube OD mm	Wall Thickness mm	Working Pressure bar (psig)
6	1.5	1034 (15 000)
10	2.2	
12	2.8	

① No allowance is made for corrosion, erosion, or elevated temperatures.

Suggested Ordering Information

Cold-drawn 1/8-hard high-quality type 316 stainless steel tubing. OD tolerance ± 0.005 in. / ± 0.127 mm and wall thickness tolerance of ± 10 %. Minimum tensile strength 105 000 psi (723 MPa), yield strength 75 000 psi (517 MPa), minimum elongation 20 %, hardness not to exceed 26 HRC. Tubing to be free of scratches, suitable for bending and flaring.

*Fractional Cone and Thread (C&T) Tubing*①

Cone and thread tubing is 1/8-hard 316 seamless stainless steel tubing that has an undersized outside diameter to assist in coning and threading operations when the tube is used with cone and thread fittings.

Nominal Tube OD in.	Nominal Tube ID in. (mm)	Working Pressure psig (bar)
9/16	0.359 (9.12)	10 000 (689)
	0.312 (7.92)	15 000 (1034)
3/4	0.438 (11.1)	12 500 (861)

① No allowance is made for corrosion, erosion, or elevated temperatures.

Pressure Ratings

*SAF 2507™ Super Duplex Tubing*①

Allowable working pressures are calculated from an S value of 38 700 psi (266 MPa), in accordance with ASME B31.3. Pressure ratings are for metal temperatures from –20 to 100°F (–28 to 37°C). See **Elevated Temperature Factors,** below, for tubing use above 100°F (37°C).

Tube OD in.	Tube Wall Thickness, in.②							
	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134
	Working Pressure, psig (bar)							
1/4	10 000 (689)	15 000③ (1034)						
3/8		10 100 (700)③	12 700 (875)	15 000 (1034)				
1/2			10 100 (700)③	12 900 (888)	15 000 (1034)			
3/4					10 000 (689)③	11 100 (764)	12 400 (854)	15 000 (1034)③

① No allowance is made for corrosion, erosion, or elevated temperatures.

② For gas service, select a tube wall thickness *outside* of the shaded areas.

③ Pressure rating based on special wall thickness tolerance for Swagelok SAF 2507 tubing.

Suggested Ordering Information

High-quality, fully annealed SAF 2507 super duplex tubing, ASTM A789 or equivalent. Hardness not to exceed 32 HRC. Tubing to be free of scratches, suitable for bending and flaring.

Elevated Temperature Factors

To determine allowable working pressure at elevated temperatures, multiply allowable working pressures from the tables above by a factor shown in the table below.

Temperature		316 SS Tubing	2507 Super Duplex Tubing
°F	°C		
200	93	1.00	0.90
300	148	1.00	0.85
400	204	0.96	0.82
600	315	0.85	0.80
800	426	0.79	—
1000	537	0.76	—

Example: heavy-wall annealed 316 stainless steel tubing 1/4 in. OD × 0.095 in. wall at 1000°F (537°C):

1. The allowable working pressure at –20 to 100°F (–28 to 37°C) is 15 000 psig (1034 bar).
2. The elevated temperature factor for 1000°F (537°C) is 0.76:

   15 000 psig (1034 bar) × 0.76 = 11 400 psig (785 bar)

The allowable working pressure for heavy-wall annealed 316 stainless steel tubing 1/4 in. OD × 0.095 in. wall at 1000°F (537°C) is 11 400 psig (785 bar).

Heavy-Duty SAE/MS End Connections

Heavy-duty SAE/MS end connections listed in this catalog (1/4 and 3/8 in. sizes) are rated to 63 MPa (9137 psig), in accordance with SAE J1926/2.

Medium-Pressure Cone and Thread End Connections

Cone and thread end connections listed in this catalog are manufactured to medium-pressure cone and thread design standards and are rated to 15 000 psig (1034 bar).

NPT End Connections①

Male and Female NPT Size in.	Pressure Rating psig (bar)
1/16, 1/8, 1/4, 3/8, 1/2	15 000 (1034)
3/4, 1	10 000 (689)

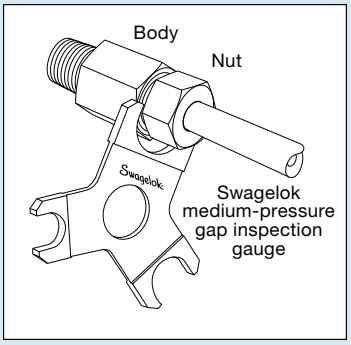
① No allowance is made for corrosion, erosion, or elevated temperatures.

Cleaning and Packaging

All medium-pressure fittings are cleaned in accordance with Swagelok *Standard Cleaning and Packaging (SC-10),* MS-06-62.

All medium-pressure fittings are provided with a preassembled cartridge containing the male nut and front and back ferrules on a disposable plastic arbor, one cartridge per medium-pressure end connection.

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.

- If the gauge will not enter the gap, the fitting is sufficiently tightened.
- If the gauge will enter the gap, additional tightening is required.

Ordering Information and Dimensions

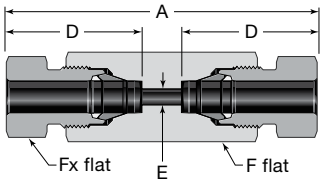
Dimensions are for reference only and are subject to change. Dimensions shown with Swagelok nuts finger-tight .

The pressure ratings of configurations with SAE and NPT end connections are limited to the rating of the SAE or NPT end connection; see page 5.

Additional configurations and adapters are available on request. Contact your authorized Swagelok sales and service representative.

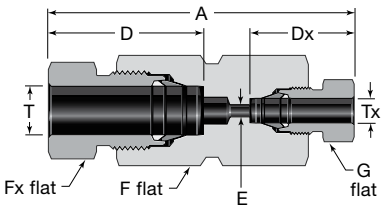
Straight Fittings

Unions



Union

Tube OD	Ordering Number	Dimensions				
		A	D	E	F	Fx
Dimensions, in.						
1/4	SS-4FK0-6	2.25	1.08	0.13	5/8	9/16
3/8	SS-6FK0-6	2.81	1.34	0.21	3/4	11/16
1/2	SS-8FK0-6	3.36	1.59	0.28	1	7/8
9/16	SS-9FK0-6	3.69	1.75	0.41	1 1/8	1 1/16
3/4	SS-12FK0-6	4.84	2.29	0.56	1 1/2	1 3/8
Dimensions, mm						
6	SS-6MFK0-6	57.2	27.4	3.2	16	15
10	SS-10MFK0-6	85.3	40.4	5.6	24	22
12	SS-12MFK0-6	85.3	40.4	6.4	27	22

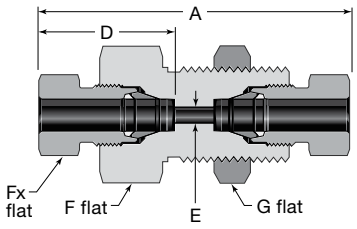


Reducing Union

Tube OD		Ordering Number	Dimensions						
T	Tx		A	D	Dx	E	F	Fx	G
Dimensions, in.									
3/8	1/4	SS-6FK0-6-4	2.64	1.34	1.08	0.13	3/4	11/16	9/16
1/2	1/4	SS-8FK0-6-4	2.90	1.59	1.34	0.13	1	7/8	9/16
	3/8	SS-8FK0-6-6	3.19	1.59	1.34	0.21	1	7/8	11/16
9/16	1/2	SS-9FK0-6-8	3.63	1.75	1.59	0.28	1 1/8	1 1/16	7/8
3/4	1/2	SS-12FK0-6-8	4.26	2.29	1.59	0.28	1 1/2	1 3/8	7/8
Dimensions, mm									
10	6	SS-10MFK0-6-6M	74.0	40.4	27.4	3.2	24	22	15
12	6	SS-12MFK0-6-6M	74.0	40.4	27.4	3.2	27	22	15
	10	SS-12MFK0-6-10M	86.4	40.4	40.4	5.6	27	22	22

Straight Fittings

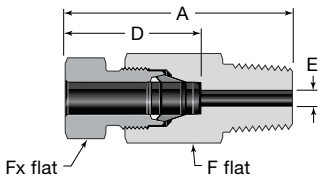
Unions



Bulkhead Union

Tube OD	Ordering Number	Dimensions							
		A	D	E	F	Fx	G	Panel Hole Size	Maximum Panel Thickness
Dimensions, in.									
1/4	SS-4FK0-61	2.25	1.08	0.13	15/16	9/16	15/16	49/64	0.50
3/8	SS-6FK0-61	2.81	1.34	0.21	1 1/16	11/16	1 1/16	57/64	0.66
1/2	SS-8FK0-61	3.38	1.59	0.28	1 5/16	7/8	1 5/16	1 9/64	0.75
9/16	SS-9FK0-61	3.69	1.75	0.41	1 5/8	1 1/16	1 5/8	1 21/64	0.75
3/4	SS-12FK0-61	4.84	2.29	0.56	1 7/8	1 3/8	1 7/8	1 41/64	1.00
Dimensions, mm									
6	SS-6MFK0-61	57.2	27.4	3.2	24	15	24	19.5	12.7
10	SS-10MFK0-61	85.8	40.4	5.6	30	22	30	26.0	20.0
12	SS-12MFK0-61	85.8	40.4	6.4	35	22	35	29.0	19.0

Male Connectors

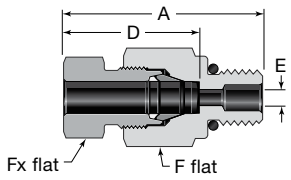


NPT

Tube OD	NPT Size in.	Ordering Number	Dimensions				
			A	D	E	F	Fx
Dimensions, in.							
1/4	1/8	SS-4FK0-1-2	1.60	1.08	0.13	5/8	9/16
	1/4	SS-4FK0-1-4	1.74	1.08	0.25	5/8	9/16
	3/8	SS-4FK0-1-6	1.74	1.08	0.13	11/16	9/16
	1/2	SS-4FK0-1-8	1.93	1.08	0.13	7/8	9/16
3/8	1/4	SS-6FK0-1-4	2.03	1.34	0.21	3/4	11/16
	3/8	SS-6FK0-1-6	2.03	1.34	0.21	3/4	11/16
	1/2	SS-6FK0-1-8	2.22	1.34	0.21	7/8	11/16
1/2	1/4	SS-8FK0-1-4	2.33	1.59	0.25	1	7/8
	3/8	SS-8FK0-1-6	2.33	1.59	0.28	1	7/8
	1/2	SS-8FK0-1-8	2.52	1.59	0.28	1	7/8
	3/4	SS-8FK0-1-12	2.52	1.59	0.28	1 1/16	7/8
9/16	1/4	SS-9FK0-1-4	2.64	1.75	0.25	1 1/8	1 1/16
	1/2	SS-9FK0-1-8	2.68	1.75	0.41	1 1/8	1 1/16
3/4	1/2	SS-12FK0-1-8	3.37	2.29	0.41	1 1/2	1 3/8
	3/4	SS-12FK0-1-12	3.37	2.29	0.56	1 1/2	1 3/8
	1	SS-12FK0-1-16	3.46	2.29	0.56	1 1/2	1 3/8
Dimensions, mm							
6	1/4	SS-6MFK0-1-4	44.1	27.4	3.2	16	15
10	1/4	SS-10MFK0-1-4	59.1	40.4	5.6	24	22
12	1/4	SS-12MFK0-1-4	59.1	40.4	6.4	27	22

Straight Fittings

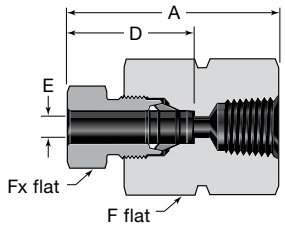
Male Connectors



Heavy-Duty Male SAE/MS (STH)

Tube OD	SAE/MS Thread Size	Ordering Number	Dimensions				
			A	D	E	F	Fx
Dimensions, in.							
1/4	7/16-20	SS-4FK0-1-4STH	1.61	1.08	0.13	5/8	9/16
	9/16-18	SS-4FK0-1-6STH	1.65	1.08	0.13	3/4	9/16
3/8	7/16-20	SS-6FK0-1-4STH	1.91	1.34	0.20	3/4	11/16
	9/16-18	SS-6FK0-1-6STH	1.95	1.34	0.21	3/4	11/16
1/2	7/16-20	SS-8FK0-1-4STH	2.29	1.59	0.20	1	7/8
	9/16-18	SS-8FK0-1-6STH	2.29	1.59	0.28	1	7/8
Dimensions, mm							
6	7/16-20	SS-6MFK0-1-4STH	40.8	27.4	3.2	16	15
	9/16-18	SS-6MFK0-1-6STH	41.8	27.4	3.2	19	15
10	7/16-20	SS-10MFK0-1-4STH	58.2	40.4	5.2	24	22
	9/16-18	SS-10MFK0-1-6STH	58.2	40.4	5.6	24	22
12	7/16-20	SS-12MFK0-1-4STH	58.2	40.4	5.2	27	22
	9/16-18	SS-12MFK0-1-6STH	58.2	40.4	6.4	27	22

Female Connectors

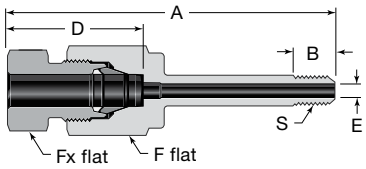


NPT

Tube OD in.	NPT Size in.	Ordering Number	Dimensions, in. (mm)				
			A	D	E	F	Fx
1/4	1/4	SS-4FK0-7-4	1.85	1.08	0.13	1	9/16
3/8	1/4	SS-6FK0-7-4	2.10	1.34	0.21	1	11/16
1/2	1/4	SS-8FK0-7-4	2.42	1.59	0.28	1	7/8
	1/2	SS-8FK0-7-8	2.66	1.59	0.28	1 1/2	7/8
3/4	1/2	SS-12FK0-7-8	3.40	2.29	0.56	1 1/2	1 3/8

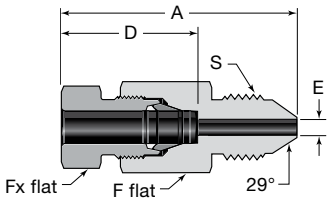
Straight Fittings

Medium-Pressure Cone and Thread Adapters



Collar-Style

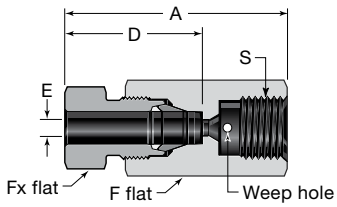
Tube OD	Cone and Thread Tube Size in.	Ordering Number	S Thread Size	Dimensions					
				A	B	D	E	F	Fx
Dimensions, in.									
1/4	1/4	SS-4FK0-1-4CW	1/4-28 LH	2.70	0.31	1.08	0.11	5/8	9/16
3/8	3/8	SS-6FK0-1-6CW	3/8-24 LH	3.22	0.39	1.34	0.21	3/4	11/16
1/2	9/16	SS-8FK0-1-9CW	9/16-18 LH	4.04	0.47	1.59	0.28	1	7/8
3/4	9/16	SS-12FK0-1-9CW	9/16-18 LH	4.83	0.47	2.29	0.31	1 1/2	1 3/8
Dimensions, mm									
6	1/4	SS-6MFK0-1-4CW	1/4-28 LH	68.5	7.9	27.4	2.7	16	15
10	3/8	SS-10MFK0-1-6CW	3/8-24 LH	90.3	9.9	40.4	5.3	24	22
12	9/16	SS-12MFK0-1-9CW	9/16-18 LH	103	11.9	40.4	6.4	27	22



To protect surfaces from galling at installation, apply a system-compatible lubricant to the nose and threads of the coned end.

One-Piece

Tube OD	Cone and Thread Tube Size in.	Ordering Number	S Thread Size	Dimensions				
				A	D	E	F	Fx
Dimensions, in.								
1/4	1/4	SS-4FK0-1-4MP	7/16-20 UN	1.94	1.08	0.11	5/8	9/16
	3/8	SS-4FK0-1-6MP	9/16-18 UN	2.17	1.08	0.13	5/8	9/16
3/8	3/8	SS-6FK0-1-6MP	9/16-18 UN	2.42	1.34	0.21	3/4	11/16
	9/16	SS-6FK0-1-9MP	13/16-16 UN	2.48	1.34	0.21	7/8	11/16
1/2	9/16	SS-8FK0-1-9MP	13/16-16 UN	2.87	1.59	0.28	1	7/8
9/16	9/16	SS-9FK0-1-9MP	13/16-16 UN	3.06	1.75	0.31	1 1/8	1 1/16
3/4	9/16	SS-12FK0-1-9MP	13/16-16 UN	3.73	2.29	0.31	1 1/2	1 3/8
	3/4	SS-12FK0-1-12MP	3/4-14 NPSM	3.82	2.29	0.45	1 1/2	1 3/8
Dimensions, mm								
6	1/4	SS-6MFK0-1-4MP	7/16-20 UN	49.3	27.4	2.7	16	15
10	3/8	SS-10MFK0-1-6MP	9/16-20 UN	70.1	40.4	5.3	24	22
12	9/16	SS-12MFK0-1-9MP	13/16-16 UN	72.9	40.4	6.4	27	22

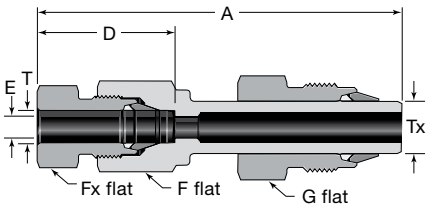


Female

Tube OD	Cone and Thread Tube Size in.	Ordering Number	S Thread Size	Dimensions				
				A	D	E	F	Fx
Dimensions, in.								
1/4	1/4	SS-4FK0-7-4MP	7/16-20 UN	1.89	1.08	0.11	11/16	9/16
3/8	3/8	SS-6FK0-7-6MP	9/16-18 UN	2.21	1.34	0.20	7/8	11/16
1/2	9/16	SS-8FK0-7-9MP	13/16-16 UN	2.72	1.59	0.28	1 1/16	7/8
9/16	9/16	SS-9FK0-7-9MP	13/16-16 UN	2.86	1.75	0.36	1 1/8	1 1/16
3/4	3/4	SS-12FK0-7-12MP	3/4-14 NPSM	3.80	2.29	0.44	1 1/2	1 3/8
Dimensions, mm								
6	1/4	SS-6MFK0-7-4MP	7/16-20 UN	48.0	27.4	2.7	18	15
10	3/8	SS-10MFK0-7-6MP	9/16-18 UN	64.8	40.4	5.1	24	22
12	9/16	SS-12MFK0-7-9MP	13/16-16 UN	69.1	40.4	6.4	27	22

Straight Fittings

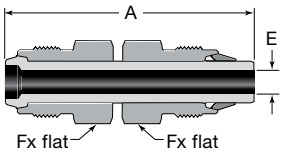
Reducers



Tube OD, in.		Ordering Number	Dimensions, in.					
T	Tx		A	D	E	F	Fx	G
1/4	3/8	SS-4FK0-R-6FK	2.97	1.08	0.13	5/8	9/16	11/16
	1/2	SS-4FK0-R-8FK	3.31	1.08	0.13	5/8	9/16	7/8
3/8	1/2	SS-6FK0-R-8FK	3.52	1.34	0.21	3/4	11/16	7/8
1/2	3/8	SS-8FK0-R-6FK	3.65	1.59	0.21	1	7/8	11/16
	3/4	SS-8FK0-R-12FK	4.66	1.59	0.28	1	7/8	1 3/8
9/16	3/4	SS-9FK0-R-12FK	4.79	1.75	0.41	1 1/8	1 1/16	1 3/8
3/4	9/16	SS-12FK0-R-9FK	4.93	2.29	0.31	1 1/2	1 3/8	1 1/16

Reducers are furnished with nuts and preswaged ferrules. See page 15 for installation information.

Port Connectors

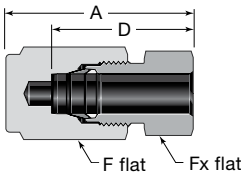


Tube OD	Ordering Number	Dimensions		
		A	E	Fx
Dimensions, in.				
1/4	SS-4FK0-PC	2.06	0.12	9/16
3/8	SS-6FK0-PC	2.54	0.21	11/16
1/2	SS-8FK0-PC	2.99	0.28	7/8
9/16	SS-9FK0-PC	3.22	0.31	1 1/16
3/4	SS-12FK0-PC	4.22	0.42	1 3/8
Dimensions, mm				
6	SS-6MFK0-PC	52.3	3.0	15
10	SS-10MFK0-PC	75.9	5.6	22
12	SS-12MFK0-PC	75.9	6.4	22

Port connectors are furnished with nuts and preswaged ferrules.
See page 15 for installation information.

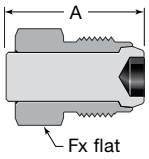
Caps and Plugs

Cap



Tube OD	Ordering Number	Dimensions			
		A	D	F	Fx
Dimensions, in.					
1/4	SS-4FK0-C	1.33	1.08	5/8	9/16
3/8	SS-6FK0-C	1.74	1.34	3/4	11/16
1/2	SS-8FK0-C	2.05	1.59	1	7/8
9/16	SS-9FK0-C	2.19	1.75	1 1/8	1 1/16
3/4	SS-12FK0-C	2.86	2.29	1 1/2	1 3/8
Dimensions, mm					
6	SS-6MFK0-C	33.7	27.4	16	15
10	SS-10MFK0-C	52.0	40.4	24	22
12	SS-12MFK0-C	52.0	40.4	27	22

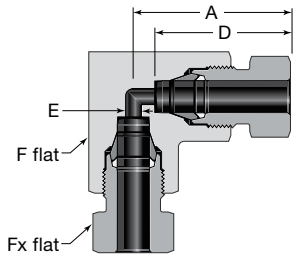
Plug



Tube OD	Ordering Number	Dimensions	
		A	Fx
Dimensions, in.			
1/4	SS-4FK0-P	1.03	9/16
3/8	SS-6FK0-P	1.26	11/16
1/2	SS-8FK0-P	1.45	7/8
9/16	SS-9FK0-P	1.50	1 1/16
3/4	SS-12FK0-P	1.98	1 3/8
Dimensions, mm			
6	SS-6MFK0-P	26.2	15
10	SS-10MFK0-P	36.7	22
12	SS-12MFK0-P	36.7	22

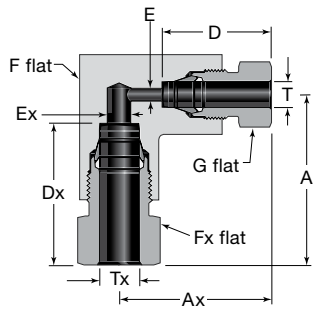
90° Elbows

Unions



Union

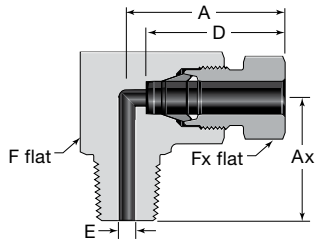
Tube OD	Ordering Number	Dimensions				
		A	D	E	F, in.	Fx
Dimensions, in.						
1/4	SS-4FK0-9	1.26	1.08	0.13	5/8	9/16
3/8	SS-6FK0-9	1.58	1.34	0.21	3/4	11/16
1/2	SS-8FK0-9	1.87	1.59	0.28	1	7/8
9/16	SS-9FK0-9	2.18	1.75	0.41	1 1/2	1 1/16
3/4	SS-12FK0-9	2.83	2.29	0.56	1 1/2	1 3/8
Dimensions, mm						
6	SS-6MFK0-9	31.9	27.4	3.0	5/8	15
10	SS-10MFK0-9	47.5	40.4	5.6	1	22
12	SS-12MFK0-9	47.5	40.4	6.4	1	22



Reducing Union

Tube OD		Ordering Number	Dimensions								
T	Tx		A	Ax	D	Dx	E	Ex	F, in.	Fx	G
Dimensions, in.											
1/4	3/8	SS-6FK0-9-4	1.61	1.48	1.08	1.34	0.13	0.21	3/4	11/16	9/16
	1/2	SS-8FK0-9-4	1.91	1.69	1.08	1.59	0.13	0.28	1	7/8	9/16
3/8	1/2	SS-8FK0-9-6	1.91	1.82	1.34	1.59	0.21	0.28	1	7/8	11/16
1/2	9/16	SS-9FK0-9-8	2.18	2.14	1.59	1.75	0.28	0.41	1 1/2	1 1/16	7/8
	3/4	SS-12FK0-9-8	2.83	2.51	1.59	2.29	0.28	0.56	1 1/2	1 3/8	7/8
Dimensions, mm											
6	10	SS-10MFK0-9-6M	48.5	42.8	27.4	40.4	3.2	5.6	1	22	15
	12	SS-12MFK0-9-6M	48.5	42.8	27.4	40.4	3.2	6.4	1	22	22
10	12	SS-12MFK0-9-10M	48.5	48.5	40.4	40.4	5.6	6.4	1	22	22

Male

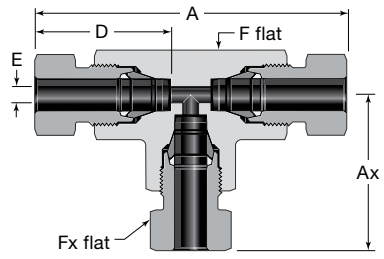


NPT

Tube OD	NPT Size in.	Ordering Number	Dimensions					
			A	Ax	D	E	F, in.	Fx
Dimensions, in.								
1/4	1/4	SS-4FK0-2-4	1.46	0.97	1.08	0.13	3/4	9/16
	3/8	SS-4FK0-2-6	1.46	0.97	1.08	0.13	3/4	9/16
	1/2	SS-4FK0-2-8	1.67	1.37	1.08	0.13	1	9/16
3/8	1/4	SS-6FK0-2-4	1.59	0.97	1.34	0.21	3/4	11/16
	3/8	SS-6FK0-2-6	1.59	0.97	1.34	0.21	3/4	11/16
	1/2	SS-6FK0-2-8	1.80	1.37	1.34	0.21	1	11/16
1/2	1/4	SS-8FK0-2-4	1.88	1.18	1.59	0.25	1	7/8
	3/8	SS-8FK0-2-6	1.88	1.18	1.59	0.28	1	7/8
	1/2	SS-8FK0-2-8	1.88	1.37	1.59	0.28	1	7/8
9/16	1/2	SS-9FK0-2-8	2.18	1.73	1.75	0.41	1 1/2	1 1/16
3/4	1/2	SS-12FK0-2-8	2.83	1.73	2.29	0.41	1 1/2	1 3/8
	3/4	SS-12FK0-2-12	2.83	1.73	2.29	0.56	1 1/2	1 3/8
Dimensions, mm								
6	1/4	SS-6MFK0-2-4	37.0	24.6	27.4	3.2	3/4	15
10	3/8	SS-10MFK0-2-6	47.8	30.0	40.4	5.6	1	22
12	1/2	SS-12MFK0-2-8	47.8	34.8	40.4	6.3	1	22

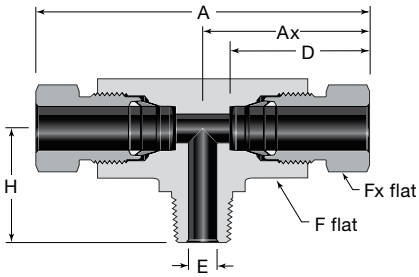
Tees

Unions



Tube OD	Ordering Number	Dimensions					
		A	Ax	D	E	F, in.	Fx
Dimensions, in.							
1/4	SS-4FK0-3	2.51	1.26	1.08	0.13	5/8	9/16
3/8	SS-6FK0-3	3.17	1.58	1.34	0.21	3/4	11/16
1/2	SS-8FK0-3	3.74	1.87	1.59	0.28	1	7/8
9/16	SS-9FK0-3	4.36	2.18	1.75	0.41	1 1/2	1 1/16
3/4	SS-12FK0-3	5.66	2.83	2.29	0.56	1 1/2	1 3/8
Dimensions, mm							
6	SS-6MFK0-3	63.8	31.9	27.4	3.2	5/8	15
10	SS-10MFK0-3	94.9	47.5	40.4	5.6	1	22
12	SS-12MFK0-3	94.9	47.5	40.4	6.4	1	22

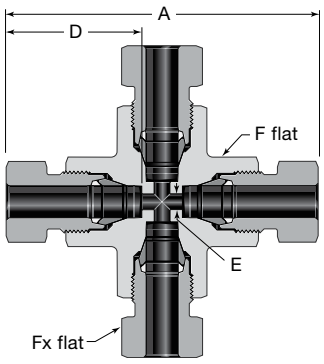
Male Branch, NPT (TTM)



Tube OD	NPT Size in.	Ordering Number	Dimensions						
			A	Ax	D	E	H	F, in.	Fx
Dimensions, in.									
1/4	1/8	SS-4FK0-3TTM	2.51	1.26	1.08	0.13	0.78	5/8	9/16
	1/4	SS-4FK0-3-4TTM	2.92	1.46	1.08	0.13	0.97	3/4	9/16
3/8	1/4	SS-6FK0-3TTM	3.17	1.58	1.34	0.21	0.97	3/4	11/16
1/2	1/4	SS-8FK0-3-4TTM	3.74	1.87	1.59	0.25	1.18	1	7/8
	3/8	SS-8FK0-3TTM	3.74	1.87	1.59	0.28	1.18	1	7/8
3/4	3/4	SS-12FK0-3TTM	5.66	2.83	2.29	0.56	1.81	1 1/2	1 3/8
Dimensions, mm									
6	1/8	SS-6MFK0-3TTM	63.8	31.9	27.4	3.2	19.8	5/8	15
10	1/4	SS-10MFK0-3TTM	94.9	47.5	40.4	5.6	30.0	1	22
12	3/8	SS-12MFK0-3TTM	94.9	47.5	40.4	6.4	30.0	1	22

Crosses

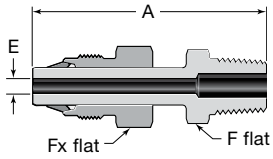
Unions



Tube OD	Ordering Number	Dimensions				
		A	D	E	F, in.	Fx
Dimensions, in.						
1/4	SS-4FK0-4	2.51	1.08	0.13	5/8	9/16
3/8	SS-6FK0-4	3.17	1.34	0.21	3/4	11/16
1/2	SS-8FK0-4	3.74	1.59	0.28	1	7/8
Dimensions, mm						
6	SS-6MFK0-4	63.8	27.4	3.0	5/8	15
10	SS-10MFK0-4	94.9	40.5	5.6	1	22
12	SS-12MFK0-4	94.9	40.5	6.4	1	22

Tube Adapters

Male NPT



Tube OD in.	NPT Size in.	Ordering Number	Dimensions, in. (mm)			
			A	E	F	Fx
1/4	1/4	SS-4FK-TA-1-4	2.18	0.12	9/16	9/16
3/8	1/4	SS-6FK-TA-1-4	2.53	0.21	9/16	11/16
	1/2	SS-6FK-TA-1-8	2.78	0.21	7/8	11/16
1/2	1/4	SS-8FK-TA-1-4	2.87	0.25	9/16	7/8
	1/2	SS-8FK-TA-1-8	3.12	0.28	7/8	7/8
9/16	1/2	SS-9FK-TA-1-8	3.28	0.31	7/8	1 1/16
3/4	3/4	SS-12FK-TA-1-12	3.92	0.42	1 1/16	1 3/8

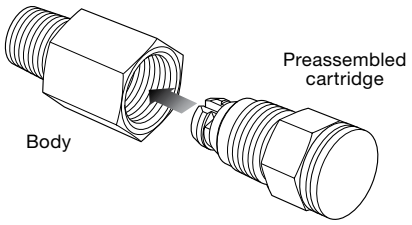
Tube adapters are furnished with nuts and preswaged ferrules. See page 15 for installation information.

Installation Instructions

Medium-Pressure Tube Fitting Assembly

These instructions apply to medium-pressure tube fitting sizes from 1/4 in./6 mm to 3/4 in./12 mm. For 3/4 in. medium-pressure tube fittings *only,* you can use the Swagelok multihead hydraulic swaging unit (MHSU) to preswage the ferrules onto the tube and install in accordance with **Connections Preswaged with the MHSU,** page 15.

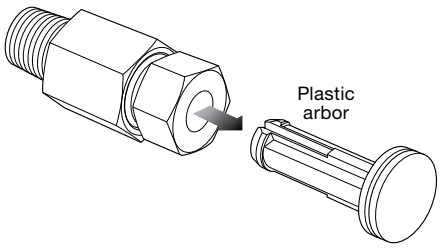
Fig. 1



1. Thread the preassembled cartridge (nut, ferrules, and plastic arbor) into the fitting body until finger-tight (Fig. 1).

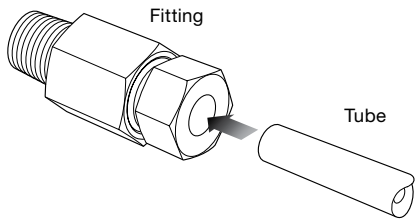
   For temperatures above 400°F (204°C), Silver Goop™ high-temperature thread lubricant is recommended for use on fitting nut threads.

Fig. 2



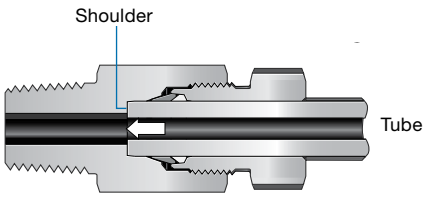
2. Remove the plastic arbor (Fig. 2).

Fig. 3



3. Insert the tube into the fitting (Fig. 3).

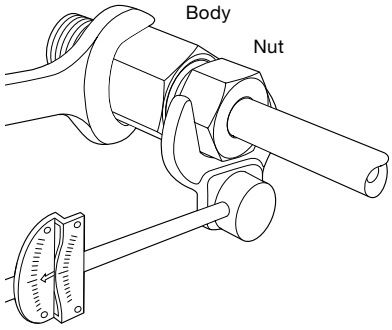
Fig. 4



All Sizes

4. Make sure that the tube rests firmly on the shoulder of the fitting body (Fig. 4).

Fig. 5



9/16 in./12 mm and Smaller Sizes

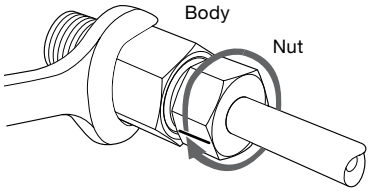
5. Hold the body steady and tighten the nut to the specified torque (Fig. 5).

Tube OD	Required Torque	
	ft·lb	N·m
1/4 in., 6 mm	25	35
3/8 in.	45	60
10 mm	100	135
1/2 in., 12 mm	110	150
9/16 in.	170	230

   Alternatively, mark the nut, then tighten the nut one full turn (Fig. 6).

6. Use the Swagelok medium-pressure gap inspection gauge to ensure that the fitting has been tightened sufficiently.

Fig. 6



3/4 in. Size

5. Mark the nut, then hold the body steady and tighten the nut one full turn (Fig. 6).
6. Use the Swagelok medium-pressure gap inspection gauge to ensure that the fitting has been tightened sufficiently.

Installation Instructions

Connections Preswaged with the MHSU

These instructions apply to 3/4 in. medium-pressure tube fittings *only.* These fittings can also be assembled in accordance with **Medium-Pressure Tube Assembly,** page 14.

Fig. 1

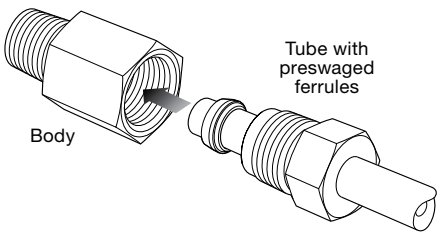


Fig. 2

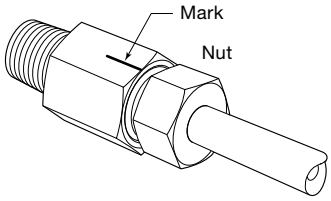
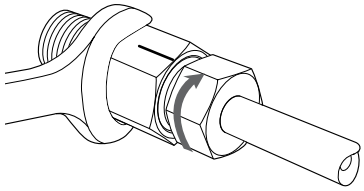


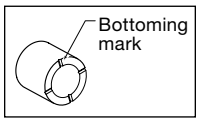
Fig. 3



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 a bottoming mark. This radial indentation indicates the tube was properly bottomed in the MHSU. If there is not a visible indentation, 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 until the front ferrule seats against the fitting body; rotate the nut finger-tight (Fig. 1).

   For temperatures above 400°F (204°C), Silver Goop high-temperature thread lubricant is recommended for use on fitting nut threads.

4. Place a mark on the fitting body in line with one of the hex points of the nut (Fig. 2).

5. Hold the fitting body steady and tighten the nut one-third turn (Fig. 3). This is equivalent to advancing the nut two hex points from the mark.

   Alternatively, hold the fitting body steady and tighten the nut to the specified torque.

Tube OD	Required Torque	
	ft·lb	N·m
3/4 in.	225	305

6. Use the Swagelok medium-pressure gap inspection gauge to ensure that the fitting has been tightened sufficiently.

Caps and Plugs

Caps Installation

See **Medium-Pressure Tube Fitting Assembly,** page 14.

Plugs Installation

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

Tube OD	Required Torque	
	ft·lb	N·m
1/4 in., 6 mm	25	35
3/8 in.	45	60
10 mm	100	135
1/2 in., 12 mm	110	150
9/16 in.	170	230
3/4 in.	225	305

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

Port Connectors Installation

For installation of the machined ferrule end of the port connector, see **Plugs Installation,** this page.

For installation of the pre-swaged ferrule end of the port connector, see **Tube Adapters and Reducers Installation,** this page.

Tube Adapters and Reducers Installation

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

For temperatures above 400°F (204°C), Silver Goop high-temperature thread lubricant is recommended for use on fitting nut threads.

- 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,*** this page.

Installation Instructions

Preswaging Tool

These instructions apply to medium-pressure tube fitting sizes from 1/4 in./6 mm to 9/16 in./12 mm.

Fig. 1

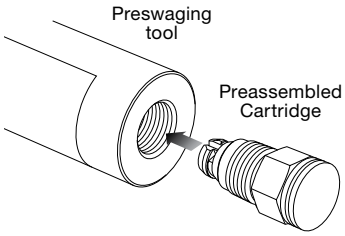


Fig. 2

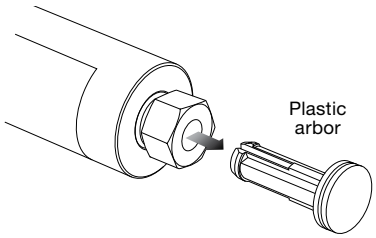


Fig. 3

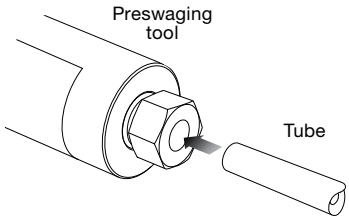


Fig. 4

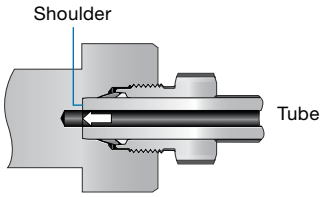


Fig. 5

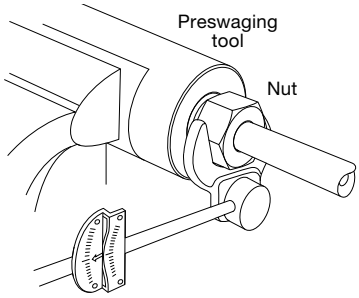


Fig. 6

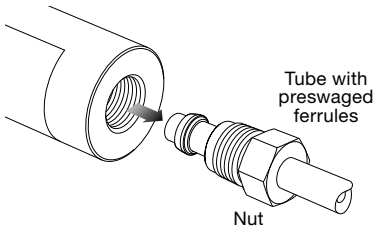


Fig. 7

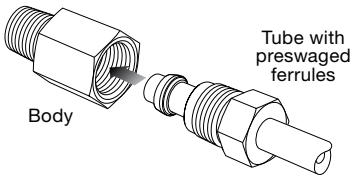
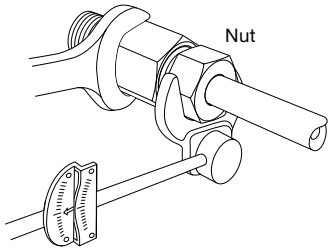


Fig. 8



1. Thread the preassembled cartridge (nut, ferrules, and plastic arbor) into the preswaging tool until finger-tight (Fig. 1).
2. Remove the plastic arbor (Fig. 2).
3. Insert the tube into the preswaging tool (Fig. 3).
4. Make sure that the tube rests firmly on the shoulder of the preswaging tool body; rotate the nut finger-tight (Fig. 4).
5. Hold the preswaging tool steady and tighten the nut to the specified torque (Fig. 5).

Tube OD	Required Torque	
	ft·lb	N·m
1/4 in., 6 mm	25	35
3/8 in.	45	60
10 mm	100	135
1/2 in., 12 mm	110	150
9/16 in.	170	230

   Alternatively, mark the nut and tighten the nut three-quarters turn.
6. Loosen the nut.
7. Remove the tube with preswaged ferrules from the preswaging tool (Fig. 6).

   If the tube sticks in the preswaging tool, remove the tube by gently rocking it back and forth. Do not turn the tube.
8. Insert the tube with preswaged ferrules into the fitting until the front ferrule seats against the fitting body; rotate the nut finger-tight (Fig. 7).

   For temperatures above 400°F (204°C), Silver Goop high-temperature thread lubricant is recommended for use on fitting nut threads.
9. Rotate the nut with a wrench and tighten to the specified torque shown in step 5 (Fig. 8).

   Alternatively, 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 with a wrench.

⚠ **Do not use a gap inspection gauge with fittings that were assembled using the preswaging tool.**

Installation Instructions

Medium-Pressure Tube Fitting Reassembly.

Fig. 1

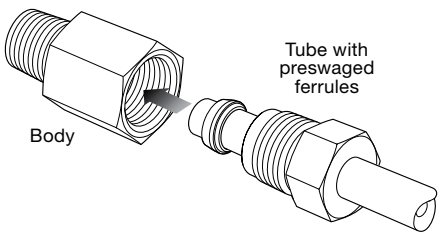


Fig. 2

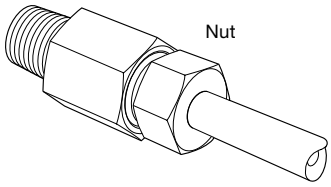
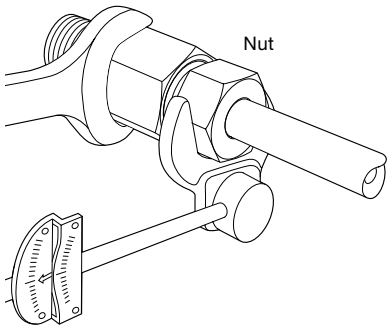


Fig. 3



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

1. Insert tube with preswaged ferrules into the fitting body until the front ferrule seats; rotate the nut finger-tight. (Fig. 1, 2)
2. Rotate the nut with a wrench and tighten to the specified torque (Fig. 3).

Tube OD	Required Torque	
	ft·lb	N·m
1/4 in., 6 mm	25	35
3/8 in.	45	60
10 mm	100	135
1/2 in., 12 mm	110	150
9/16 in.	170	230
3/4 in	225	305

Alternatively, 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.

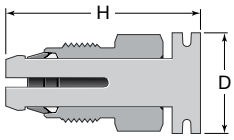
⚠ **Do not use a gap inspection gauge with reassembled fittings.**

Replacement Parts

Nut and Ferrules Cartridge

Each cartridge contains a front ferrule, back ferrule, and male nut. Fractional cartridges are assembled on red arbors; metric cartridges are assembled on yellow arbors.

⚠ **Do not use medium-pressure nut and ferrules with any other Swagelok tube fittings.**



Tube OD	Ordering Number	Dimensions	
		D	H
Dimensions, in.			
1/4	SS-4FK-NFSET	0.69	1.43
3/8	SS-6FK-NFSET	0.81	1.72
1/2	SS-8FK-NFSET	1.00	1.97
9/16	SS-9FK-NFSET	1.10	2.05
3/4	SS-12FK-NFSET	1.60	2.59
Dimensions, mm			
6	SS-6MFK-NFSET	17.5	36.4
10	SS-10MFK-NFSET	25.4	49.9
12	SS-12MFK-NFSET	25.4	49.9

Tools and Accessories

Preswaging Tool

For Swagelok tube fitting installations in close quarters, the Swagelok preswaging tool is a convenient accessory.

Tube OD	Ordering Number
Dimensions, in.	
1/4	MS-ST-4FK0
3/8	MS-ST-6FK0
1/2	MS-ST-8FK0
9/16	MS-ST-9FK0
Dimensions, mm	
6	MS-ST-6MFK0
10	MS-ST-10MFK0
12	MS-ST-12MFK0

Depth Marking Tool

Swagelok depth marking tools help ensure that tubing is bottomed on the shoulder inside the Swagelok tube fitting body.

Tube OD	Ordering Number
Dimensions, in.	
1/4	MS-DMT-4FK0
3/8	MS-DMT-6FK0
1/2	MS-DMT-8FK0
9/16	MS-DMT-9FK0
3/4	MS-DMT-12FK0
Dimensions, mm	
6	MS-DMT-6MFK0
10	MS-DMT-10MFK0
12	MS-DMT-12MFK0

Multihead Hydraulic Swaging Unit (MHSU)

- For preswaging Swagelok 3/4 in. medium-pressure ferrules onto tubing.
- Is standard with a tube marking feature to indicate when tube is properly bottomed.
- Requires the 1 in./25mm and over MHSU unit and medium-pressure tooling.

⚠ **The MHSU cannot be used for preswaging 9/16 in./12 mm and under medium-pressure fittings.**

1 in./25 mm and Over MHSU Unit Components

- Multihead hydraulic swaging unit
- 6 ft (1.8 m) hydraulic hose
- Retaining ring pliers
- Safety glasses
- Operating instructions
- Carrying case.

Medium-Pressure Tooling Kit Components

- Die head set for Swagelok 3/4 in. medium-pressure tube fitting
- Gap inspection gauge.

Description	Ordering Number
MHSU only (1 in./25 mm and over size)	MS-MHSU-O-E
3/4 in. medium-pressure tooling	MS-MHSUT-O-12FK-M

See the Swagelok *Gaugeable Tube Fittings and Adapter Fittings* catalog, MS-01-140, for more information about the MHSU.

See the Swagelok *Multihead Hydraulic Swaging Unit (MHSU) Setup and Operating Instructions,* MS-12-37, for instructions.

Tools and Accessories

Medium-Pressure Gap Inspection Gauge

The Swagelok medium-pressure gap inspection gauge assures the installer or inspector that the fitting has been sufficiently pulled up on initial installation, whether using a torque wrench, standard wrench tightening, or preswaging with the MHSU.

⚠ **The medium-pressure gap inspection gauge is different from the gap gauge for all other Swagelok tube fittings.**

Tube OD	Ordering Number
Dimensions, in.	
1/4, 3/8, 1/2	MS-IG-FK0
9/16	MS-IG-9FK0
3/4	MS-IG-12FK0
Dimensions, mm	
6	MS-IG-6MFK0
10	MS-IG-10MFK0
12	MS-IG-12MFK0

Additional Products

Medium-Pressure Ball Valves

Swagelok offers medium-pressure ball valves rated to 15 000 psig (1034 bar). For more information about FKB series ball valves, see the Swagelok *Medium-Pressure Ball Valves* catalog, MS-02-354.

Tube Benders

For tube benders, see the Swagelok *Tubing Tools and Accessories* catalog, MS-01-179.

Medium-Pressure Tubing Products

Swagelok offers medium-pressure tubing. For more information about heavy-wall annealed and cold-drawn 1/8-hard stainless steel tubing, see the Swagelok *Medium-Pressure Tubing* catalog, MS-02-334.

Pipe Thread Sealants

A thread sealant should always be used when assembling tapered threads. SWAK® anaerobic pipe thread sealant and Swagelok PTFE tape are available. See the Swagelok *Leak Detectors, Lubricants, and Sealants* catalog, MS-01-91.

Safe Product Selection
When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Caution: Do not mix or interchange parts with those of other manufacturers.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

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