Swagelok® Thermoplastic Hose Hand Swager User's Manual

Swagelok

Contents

READ AND UNDERSTAND THIS MANUAL BEFORE USING THE HAND SWAGER.

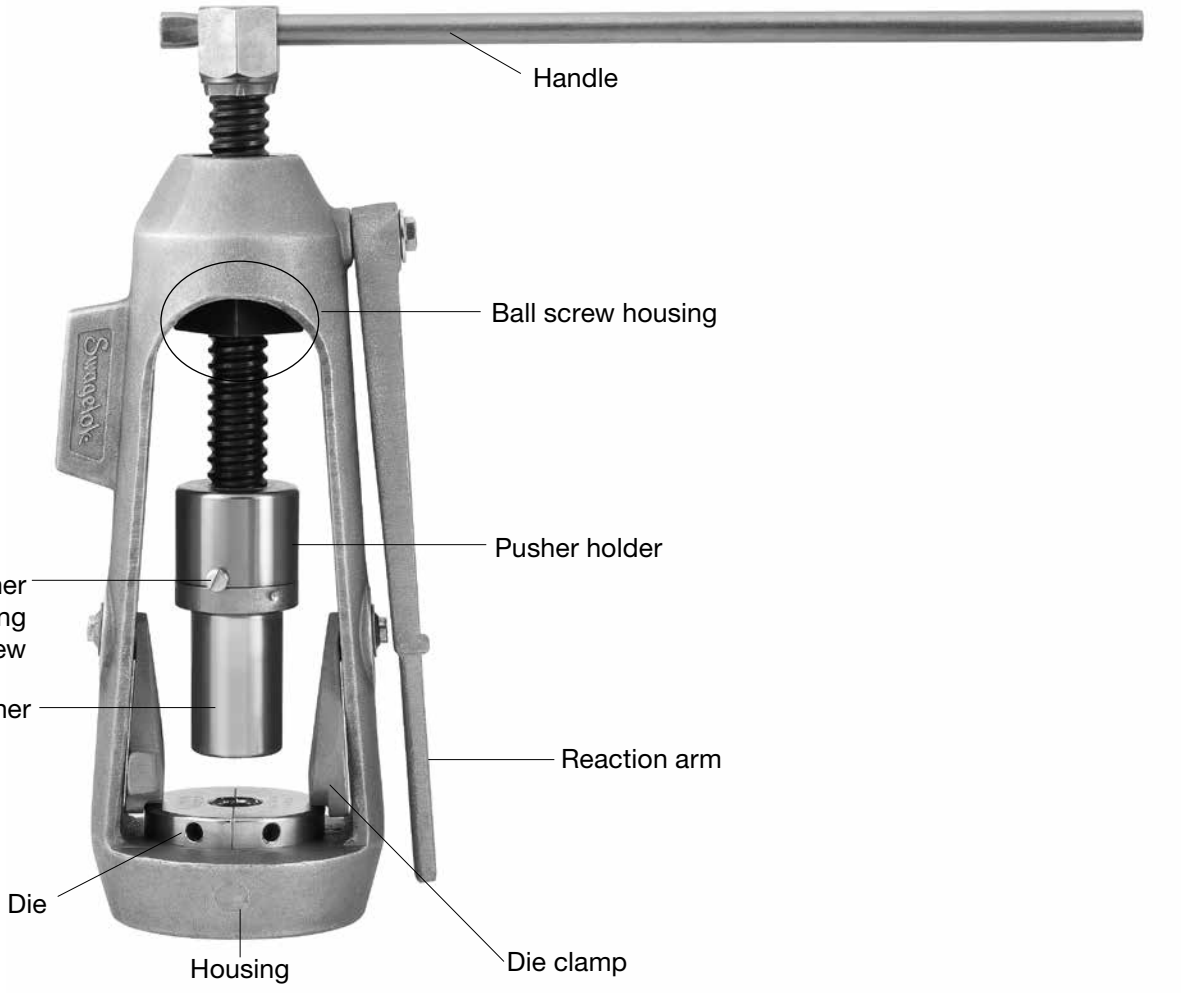
WARNING Pinch Points

Keep hands, loose clothing, and long hair away from rotating or moving parts. Serious injury can occur.

⚠ WARNING

Use the Swagelok hand swager only for swaging Swagelok end connections and hose using the appropriate Swagelok dies and pushers. Do not mix or interchange parts with those of other manufacturers.

Thermoplastic Hose Hand Swager Components



Setup

Swager

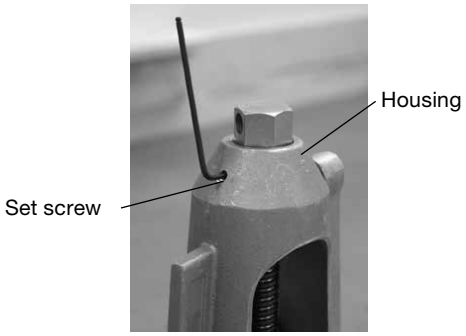
⚠ CAUTION
Do not lift or move the swager by its handle or reaction arm. Damage to the swager could result.

1. Select the appropriate **die set** from the table below.

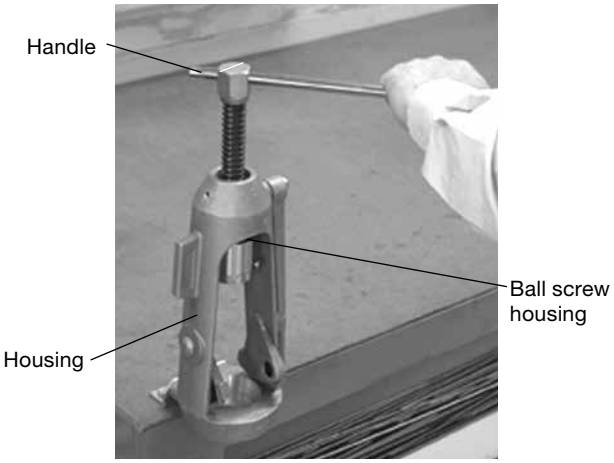
Hose Size in.	Hose Series	Die Set Ordering Number
1/4	7N, 7R, 8R, 7P	MS-7R8R-4
3/8	7N, 7R, 8R, 7P	MS-7R8R-6
1/2	7N, 7R, 8R, 7P	MS-7R8R-8
3/4	8R, 7P	MS-8R-12
1	8R	MS-8R-16
1	7P	MS-7P-16

⚠ CAUTION
Use matching die halves, each of which is stamped with the same identification number. Failure to identify and use matching die halves may result in improper swaging and hose failure.

2. Select the appropriate **pusher** based on the hose end connection type and size. See the **End Connections and Pushers** table, page 8.
3. Using a 1/8 in. hex key, loosen the **set screw** at the top of the **housing**.



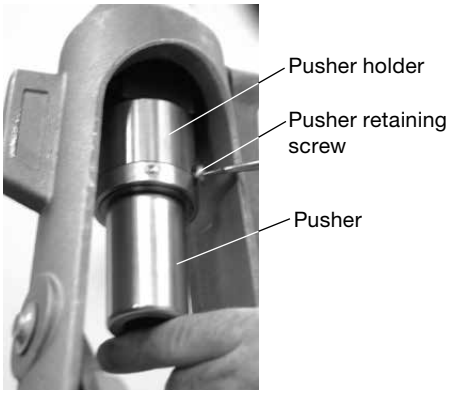
4. Insert the **handle** and turn counterclockwise until hand-tight. This seats the **ball screw housing** firmly against the **housing**.



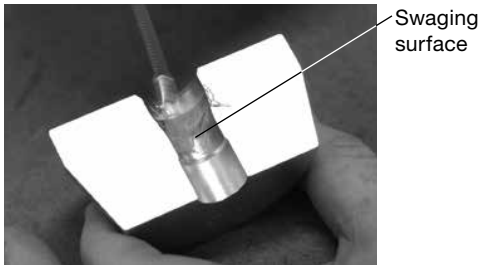
5. Tighten the **set screw** finger-tight.

Note: Perform steps 2 through 5 at least once a month.

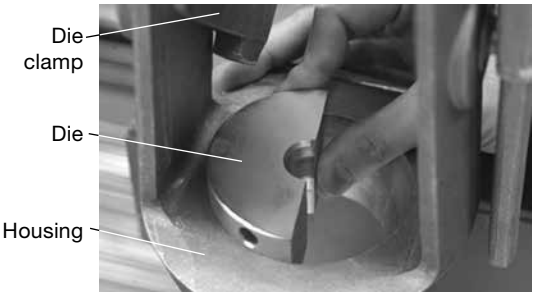
6. Insert the **pusher** into the **pusher holder**. Tighten the **pusher retaining screw** until finger-tight. The pusher should rotate freely in the pusher holder.



7. Lubricate the entire **swaging surface** of both die halves with a light coating of MS-SWAGE-LUBE226 (must be ordered separately).



8. Insert one **die** into the taper at the base of the **housing**. Do not secure the **die clamp** at this time.



Hose

1. Determine the length of bulk hose needed using this formula:

   Overall length of completed hose assembly
   – cutoff length of first end connection
   – cutoff length of second end connection
   = length of bulk hose

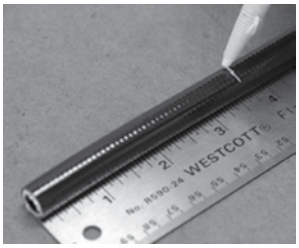
   Cutoff length can be found in the End Connection and Pushers table on page 8, and as dimension B in the Swagelok *Hose and Flexible Tubing* catalog, *MS-01-180*.

   Example:

   Determine the bulk hose length required for the following assembly: SS-7R8TA8TA8-60

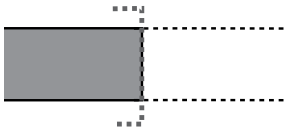
   60.00 in.
   – 1.79 in.
   – 1.79 in.
   = 56.42 in. or approximately 56 7/16 in. of bulk hose

2. Measure, mark, and cut the bulk hose using a Swagelok hand cutter for thermoplastic hose (MS-HC-SC-1A, must be ordered separately.)
3. Cut hose square.

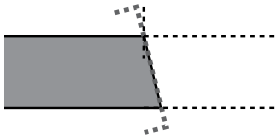


4. Place one end of the hose into the appropriate hole on a

Proper cut



Improper cut



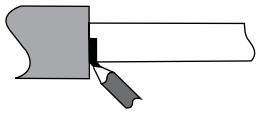
depth insertion gauge (must be ordered separately), until it bottoms out.

Gauge part numbers:
- MS-IGB-TP4-8-CA for 1/4, 3/8, and 1/2 in. hose.
- MS-IGB-TP12-16-CA for 3/4 and 1 in. hose.

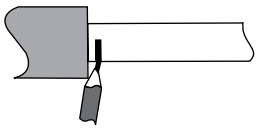
Mark the hose with a sharp grease pencil as close to the gauge as possible.

Note: The bottom of the mark should line up with the top of the insertion gauge.

Proper mark position



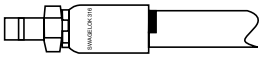
Improper mark position

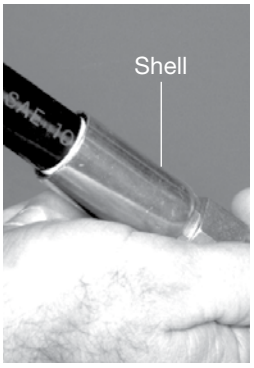


5. Apply a thin coat of SAE 20 weight lubricating oil to approximately the first 1/2 in. (12 mm) depth of the hose ID, if system compatible.
6. Insert the hose into the end connection up to the insertion depth mark.

   Note: The bottom of the mark should line up with the edge of the end connection **shell**.

Proper insertion

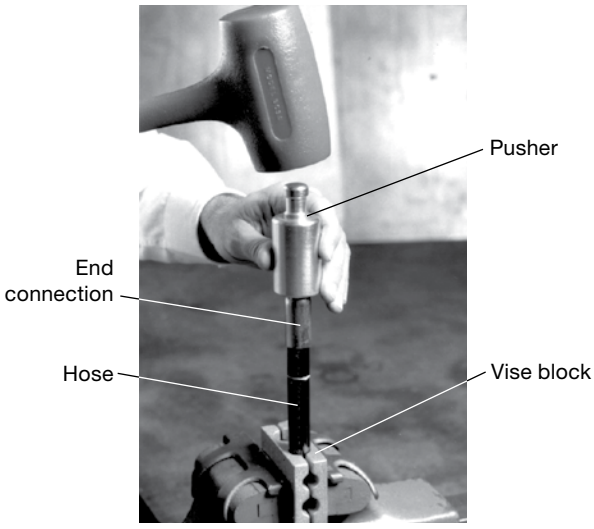




Use the following procedure if insertion is difficult:

1. Clamp a **vise block** slot around the hose, leaving at least twice the distance of the insertion depth mark exposed.

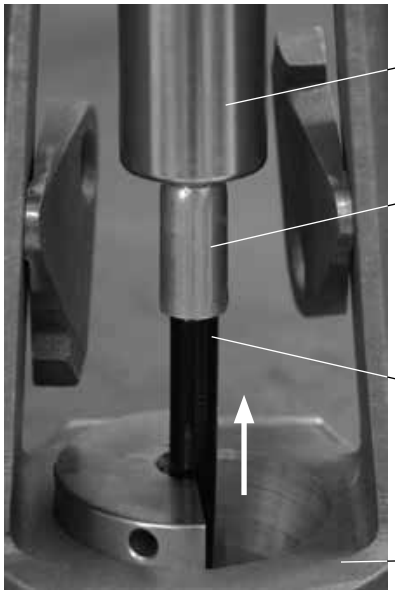
   Vise block part numbers (must be ordered separately):
   - MS-VB-1 for 1/4, 3/8, and 1/2 in. hose,
   - MS-VB-2 for 3/4 and 1 in. hose
2. Insert the **end connection** into the **hose**.
3. Place a **pusher** over the end connection shell.
4. Tap the pusher with a rubber mallet to insert the hose into the end connection up to the insertion depth mark.



Swager Operating Instructions

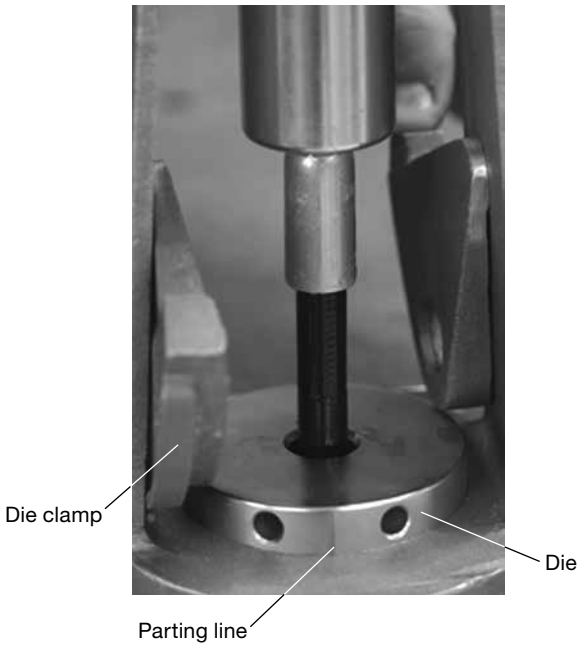
Note: Bench mounting is recommended.
The reaction arm can be used for stability when the hand swager cannot to bolted to a bench or placed in a vise.

1. Lubricate the **shell** with MS-SWAGE-LUBE226.
2. Insert the **hose and end connection assembly** up through the bottom of the **housing** and into the **pusher**. Seat the end connection properly in the pusher.
   Note: The hose and end connection assembly must be held inside the pusher until after step 3.



3. Insert the second **die**. The **parting line** of the dies should be parallel to the **die clamps**.

WARNING Pinch Points

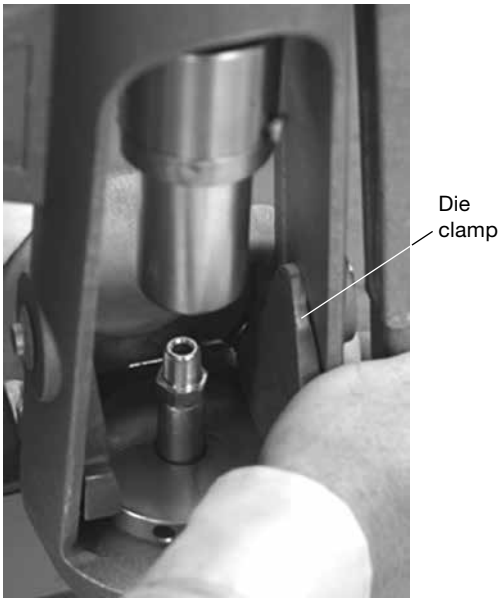


4. Secure both **dies** with the **die clamps**.
   Note: The die faces must be flush with each other.

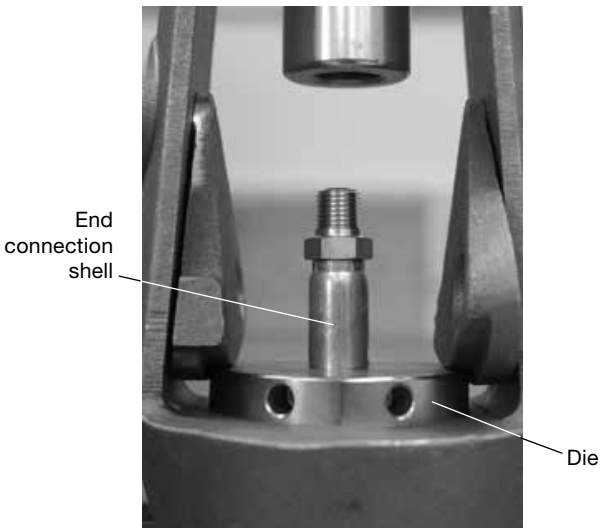
5. Push down on the **die clamps** firmly and evenly until there is no movement.

WARNING Pinch Points

Note: The dies must remain flush with each other.

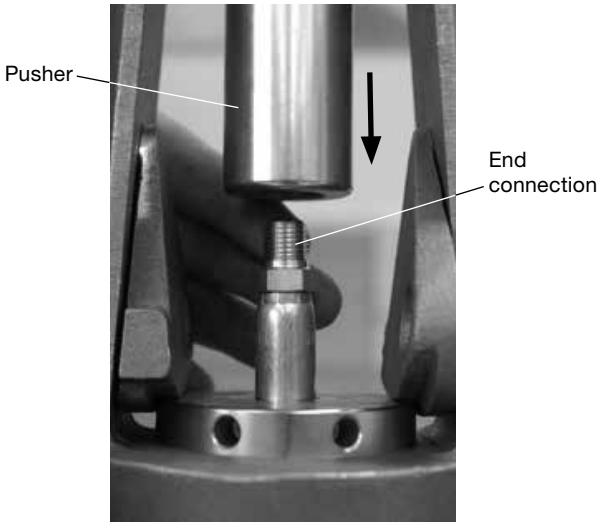


6. Position the **end connection shell** against the **dies**.

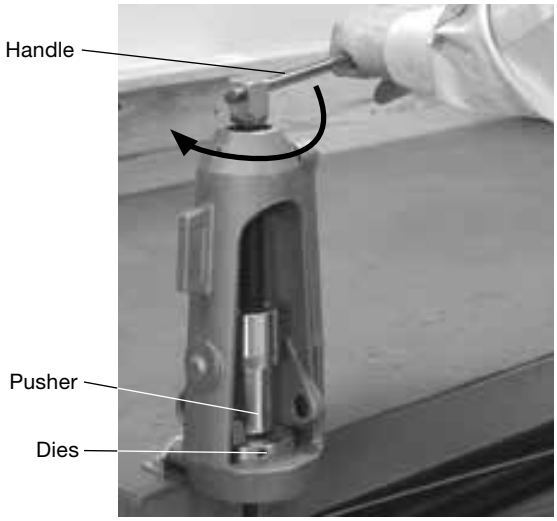


7. Slowly turn the swager handle clockwise to lower the **pusher**. Guide the **end connection** into the pusher.

⚠ CAUTION
Do not allow the pusher to descend uncontrolled. Injury from handle spinning could result.

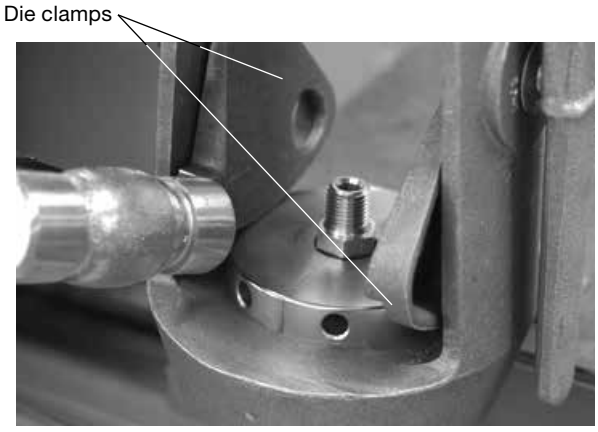


8. Continue to turn the **handle** clockwise until the **pusher** makes contact with the **dies**. The swaging action is finished when the handle will no longer turn.



9. Rotate the **handle** counterclockwise until the **pusher** has reached the top of the **housing**.

10. Loosen the **die clamps** using a hammer.

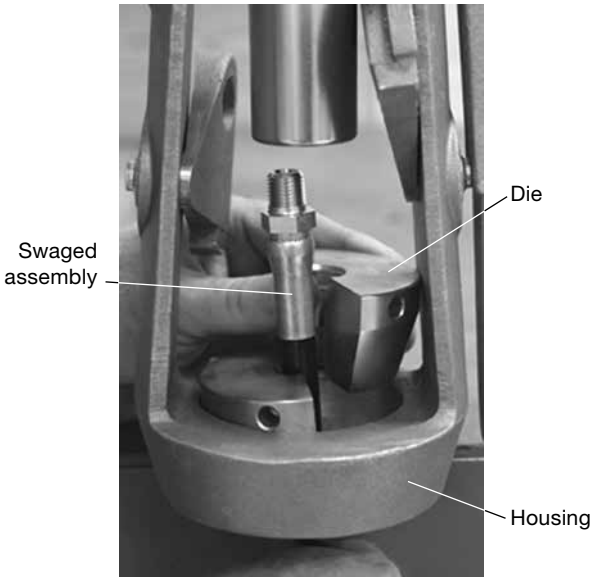


11. Push up on the hose to release the assembly from the dies. Maintain control of the dies.

⚠ WARNING Pinch Points

⚠ CAUTION
Failure to maintain control of the dies may allow a die to drop out of the housing causing injury to the user or damage to the dies.

12. Remove one **die** from the **housing** while holding the **swaged assembly**. Remove the swaged assembly through the bottom of the housing.



Inspect the first swaged assembly to ensure it is within tolerance prior to swaging additional end connections of the same hose size and type.

⚠ **CAUTION**
Failure to verify the swaged assembly is within tolerance may result in leakage and hose failure.

Measuring Swage Diameter

Begin at a point between 1/4 to 1/2 in. (6 to 13 mm) from the end of the shell and measure 360° around the shell. Do not measure at the **parting line**.

Measuring Bell Length

Measure from behind the hex to the point where the bell stops or where the swage diameter ends.

Hose Size in.	**Hose Type**	**Swage Diameter** in. (mm)	**Bell Length** in. (mm)
1/4	7N, 7R, 8R, 7P	0.563 to 0.573 (14.3 to 14.6)	0.66 to 0.72 (16.8 to 18.3)
3/8		0.689 to 0.699 (17.5 to 17.8)	0.72 to 0.78 (18.3 to 19.8)
1/2		0.843 to 0.853 (21.4 to 21.7)	
3/4	8R, 7P	1.155 to 1.170 (29.3 to 29.7)	
1	8R	1.483 to 1.493 (37.7 to 37.9)	0.91 to 0.97 (23.1 to 24.6)
1	7P	1.450 to 1.460 (36.8 to 37.1)	0.78 to 0.84 (19.8 to 21.3)

General Maintenance

After use, clean dies, pusher, and other hose swager components with isopropyl alcohol to remove lubricant.

End Connections and Pushers

- For a complete ordering number, add **SS** for 316 stainless steel or **S** for steel as a prefix to the basic ordering number.
- To determine the length to cut the bulk hose, subtract the cutoff length for each end connection from the desired overall assembly length. Lengths are for reference only, subject to change.

End Connection			Hose Size in.	Basic Ordering Number	Cutoff Length in. (mm)	Pusher Ordering Number
Type		**Size**				
Swagelok tube adapter 	fractional	1/4 in.	1/4	-TP4-TA4	1.43 (36.3)	MS-P-TA4
		3/8 in.	1/4	-TP4-TA6	1.43 (36.3)	MS-P-4TA6
			3/8	-TP6-TA6	1.50 (38.1)	MS-P-TA6
		1/2 in.	1/2	-TP8-TA8	1.84 (46.7)	MS-P-SLTA8
		5/8 in.	1/2	-TP8-TA10	1.84 (46.7)	MS-P-8TA10
		3/4 in.	3/4	-TP12-TA12	1.94 (49.3)	MS-P-TA12
		1 in.	1	-TP16-TA16	2.26 (57.4)	MS-P-TA16
	metric	6 mm	1/4	-TP4-TM6	1.43 (36.3)	MS-P-TA4
		8 mm	1/4	-TP4-TM8	1.43 (36.3)	MS-P-4TM8
		10 mm	3/8	-TP6-TM10	1.50 (38.1)	MS-P-TA6
		12mm	1/2	-TP8-TM12	1.84 (46.7)	MS-P-SLTA8
Swagelok tube fitting 	fractional	1/4 in.	1/4	-TP4-SL4	1.54 (39.1)	MS-P-SL4
		3/8 in.	3/8	-TP6-SL6	1.63 (41.4)	MS-P-SL6
		1/2 in.	1/2	-TP8-SL8	1.72 (43.7)	MS-P-SLTA8
	metric	6 mm	1/4	-TP4-SM6	1.54 (39.1)	MS-P-SL4
		8 mm	1/4	-TP4-SM8	1.55 (39.4)	MS-P-4SM8
		10 mm	1/4	-TP4-SM10	1.80 (45.7)	MS-P-4SM10
			3/8	-TP6-SM10	1.64 (41.7)	MS-P-SL6
		12 mm	1/2	-TP8-SM12	1.74 (44.2)	MS-P-SLTA8
SAE 37° female swivel 		1/4 in.	1/4	-TP4-AS4	1.59 (40.4)	MS-P-AS4
		3/8 in.	3/8	-TP6-AS6	1.71 (43.4)	MS-P-AS6
		1/2 in.	1/2	-TP8-AS8	1.77 (45.0)	MS-P-AS8
60° male cone, female swivel (ISO/BSP parallel thread) 		1/4 in.	1/4	-TP4-BM4	1.42 (36.1)	MS-P-BM4
		3/8 in.	3/8	-TP6-BM6	1.57 (39.9)	MS-P-BM6
		1/2 in.	1/2	-TP8-BM8	1.67 (42.4)	MS-P-BM8
30° female cone, female swivel (ISO/BSP parallel thread) 		1/4 in.	1/4	-TP4-BS4	1.53 (38.9)	MS-P-BS4
		3/8 in.	3/8	-TP6-BS6	1.69 (42.9)	MS-P-BS6
		1/2 in.	1/2	-TP8-BS8	1.81 (46.0)	MS-P-BS8
Universal globe seal, metric female swivel nut 		14 mm	1/4	-TP4-MC14	1.35 (34.3)	MS-P-MC14
		18 mm	3/8	-TP6-MC18	1.46 (37.1)	MS-P-MC18
		22 mm	1/2	-TP8-MC22	1.52 (38.6)	MS-P-MC22
Male pipe threads, NPT 		1/4 in.	1/4	-TP4-PM4	1.25 (31.8)	MS-P-PM4
			3/8	-TP6-PM4	1.34 (34.0)	MS-P-PM6
		3/8 in.	3/8	-TP6-PM6	1.34 (34.0)	MS-P-PM6
		1/2 in.	1/2	-TP8-PM8	1.53 (38.9)	MS-P-PM8
Male pipe threads, ISO/BSP tapered 		1/4 in.	1/4	-TP4-MT4	1.25 (31.8)	MS-P-PM4
		3/8 in.	3/8	-TP6-MT6	1.34 (34.0)	MS-P-PM6
		1/2 in.	1/2	-TP8-MT8	1.53 (38.9)	MS-P-PM8
Male pipe threads, ISO/BSP parallel 		1/4 in.	1/4	-TP4-MS4	1.50 (38.1)	MS-P-MS4
		3/8 in.	3/8	-TP6-MS6	1.42 (36.1)	MS-P-MS6
		1/2 in.	1/2	-TP8-MS8	1.44 (36.6)	MS-P-MS8