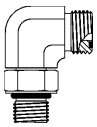
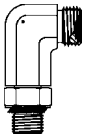
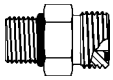
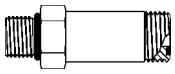
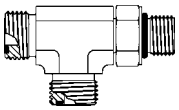
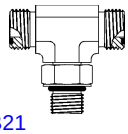
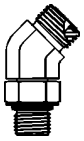
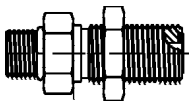
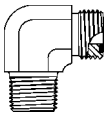
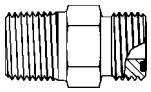
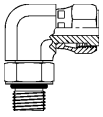
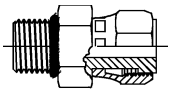
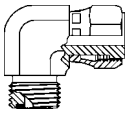
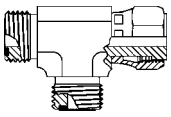
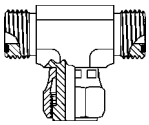
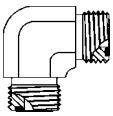
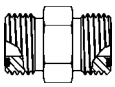
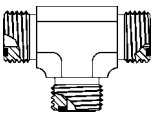
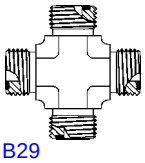
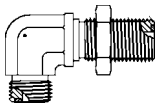
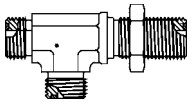
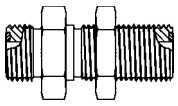
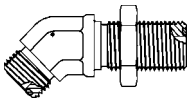
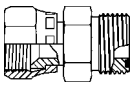
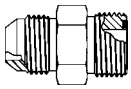
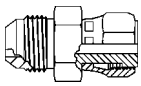
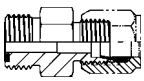
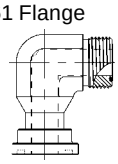
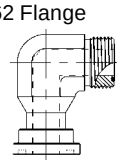
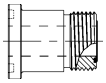
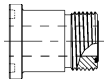
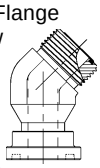
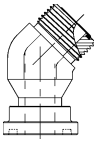
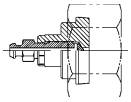
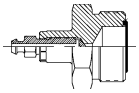
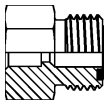
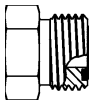
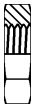
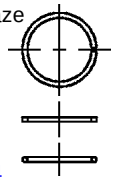
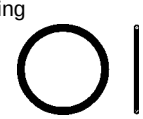
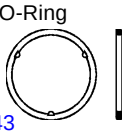
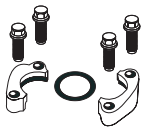
Parker
FluidConnectors

Seal-Lok® O-Ring Face Seal Tube Fittings

The World Standard

Tube to Straight Thread UNF	**C5OLO** Straight Thread Elbow  Page B17	**CC5OLO** Long Straight Thread Elbow  Page B18	**F5OLO** Straight Thread Connector  Page B19	**FF5OLO** Long Straight Thread Connector  Page B20	**R5OLO** Straight Thread Run Tee  Page B20
S5OLO Straight Thread Branch Tee  Page B21	**V5OLO** 45° Straight Thread Elbow  Page B22	**WF5OLO** Straight Thread Bulkhead Connector  Page B31	**Tube to Male NPTF**	**CLO** Male Pipe Elbow  Page B23	**FLO** Male Pipe Connector  Page B24
Swivel to Straight Thread	**AOEL6** Straight Thread Swivel Elbow  Page B25	**F65OL** Straight Thread Swivel Connector  Page B25	**Tube to Seal-Lok Swivel**	**C6LO** Swivel Nut Elbow  Page B26	**R6LO** Swivel Nut Run Tee  Page B26
S6LO Swivel Nut Branch Tee  Page B27	**Tube to Tube**	**ELO** Union Elbow  Page B27	**HLO** Union  Page B28	**JLO** Union Tee  Page B28	**KLO** Union Cross  Page B29
Bulkhead Unions	**WELO** Bulkhead Union Elbow  Page B29	**WJJLO** Bulkhead Union Tee  Page B30	**WLO** Bulkhead Union Straight  Page B30	**WNLO** 45° Bulkhead Union Elbow  Page B31	
Conver-sion Adapters	**LOHX6** 37° Swivel Adapter  Page B32	**XHLO** 37° Male Adapter  Page B32	**XHL6** 37° Male Swivel Adapter  Page B33	**BUHLO** Ferulok Male Adapter  Page B33	
Flange Adapters	**LOEQ1** Code 61 Flange Elbow  Page B34	**LOEQ2** Code 62 Flange Elbow  Page B34	**LOHQ1** Code 61 Flange Connector  Page B35	**LOHQ2** Code 62 Flange Connector  Page B35	**LOVQ1** Code 61 Flange 45° Elbow  Page B36
LOVQ2 Code 62 Flange 45° Elbow  Page B36	**Bleed Adapters**	**FNLBA** ORFS Tube End Cap Bleed Adapter  Page B44	**PNLOBA** ORFS Tube End Plug Bleed Adapter  Page B45		

Auxiliary Compo-nents	**BL** Nut  Page B37	**FNL** Cap  Page B37	**LOHB3** Braze Connector  Page B38	**PNLO** Plug  Page B39	**TL** Sleeve  Page B40
TL-Reducer Reducer Sleeve  Page B40	**TPL** Parflange Sleeve for Inch Tubing  Page B39	**WLNL** Bulkhead Locknut  Page B42	**SBR** Silver Braze Ring for Inch Tubing  Page B44	**TRLO** Tube End Reducer  Page B41	**Face Seal O-Ring** ORFS Tube End O-ring  Page B42
Tabbed Face Seal O-Ring ORFS Tube End Tabbed O-Ring  Page B43	**SAE O-Ring** Straight Thread Port O-ring  Page B43	**Code 61/62 Flange Kits and O-Rings**  Page B45 & B46			

Introduction

The Seal-Lok fitting is the Tube Fittings Division's most recently developed fitting. It was introduced in an effort to eliminate leakage in hydraulic systems and allow higher operating pressures.

The Seal-Lok fitting is an O-ring face seal type fitting that consists of a nut, a fitting body, an O-ring and a sleeve. As shown in Fig. B1, the flat face sleeve is brazed to the tube (the tubing may also be flanged to 90°) and when the fitting is assembled, it compresses an O-ring in a precision machined groove in the fitting body to form a leak tight seal.

Seal-Lok fittings are suitable for any range of tube wall thickness and are also readily adaptable to pipe, metric tubing and hose.

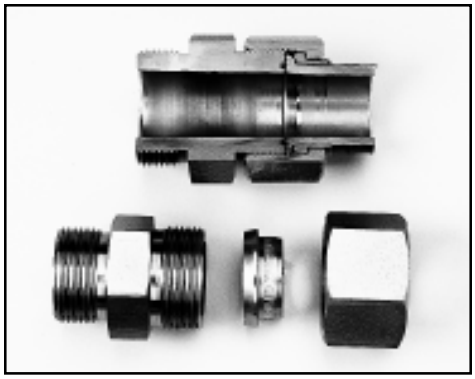


Fig. B1 — Flange Style Seal-Lok Fitting Components (nut, sleeve, fitting body with O-rings) and Assembled Seal-Lok Fitting Cutaway

Design and Construction

The Seal-Lok fitting consists of four main components: a body, a sleeve, an O-ring and a nut.

The Seal-Lok Fitting Body. There are over thirty different body shapes and straights to choose from for specific applications. The body face has a groove which contains a high durometer O-ring that is held captive during installation. In addition, the Seal-Lok fitting body shapes are forged for added strength and longer service life.

Straight products are made from cold drawn barstock. The cold drawing process ensures consistent dimensional tolerances, improved strength and better surface finish.

Seal-Lok fittings are manufactured with a captive O-ring groove (CORG) design for prevention of O-ring fall-out prior to final assembly.

The Seal-Lok Fitting Nut. Smaller size Seal-Lok fitting nuts are cold-formed to provide a more tightly packed grain structure, resulting in a much stronger component. Larger size nuts are machined from cold drawn barstock. Nuts which are expected to go through a brazing cycle are left unplated and are made from a higher grade material to ensure adequate strength, even after being exposed to the annealing temperatures associated with furnace brazing.

The Seal-Lok Flange Sleeve. The preferred method of making a Seal-Lok connection is by using the Parker Parflange machine (pages N21 and N22) to create the 90° flange on the tube end. A flange sleeve is used to support the flange and the tube. It also provides the contact shoulder for the nut, a backup for the 90° tube flange and support at the tube O.D.

The Seal-Lok connection using the Parflange method can be made with either inch or metric tubing by choosing the appropriate sleeve and tooling.

With the flange sleeve, the tube to sleeve attachment is done mechanically by creating a 90° flange in front of the sleeve with the Parflange machine. This flange provides both the holding power and sealing surface (eliminating the braze joint, and hence, a potential leak path found with brazed sleeve attachment). The only seal point is between the fitting body and the tube flange face via the high durometer O-ring.

The flanging process is very fast and requires very little cleaning prior to or after flanging. Thus, the process enhances the integrity of the joint and reduces cost.

A Parflange tube assembly can be connected to a male Seal-Lok hose fitting with ease, eliminating tube brazing to make tube to hose connections.

The Seal-Lok Braze Sleeve. There are two main differences between braze and flange sleeves. The first is that the braze sleeve provides the mating surface between the tube and the fitting body. With a flange connection, the sleeve provides support for the tubing which mates with the fitting body (see Figure B2). The second difference between braze and flange sleeves is the method of attachment to the tube. The braze sleeve, as the name implies, is attached to the tube through brazing. The braze provides holding power as well as a method to seal the joint.

Seal-Lok braze sleeves are manufactured to exacting dimensions. Tightly toleranced dimensions are required to prevent binding in the nut when torqued, provide a flat and smooth sealing surface against the O-ring, and provide the appropriate clearance for silver brazing to the tube.

The braze sleeve provides three basic functions:

- A leak free attachment to tube via silver brazing
- A flat and smooth sealing surface for the O-ring
- A flat and smooth contact shoulder for the nut to connect the tube to the fitting body.

Seal-Lok braze sleeves are manufactured in both even and reducing sizes. The reducing sleeves make it easy to "down size" a large tube to a smaller one.

The Seal-Lok connection can be made with either metric or inch tubing by choosing the appropriate braze sleeve.

The Seal-Lok Braze Connector (LOHB3). A braze connector is essentially a half of a union which can be brazed on to a tube. It effectively performs three functions:

1. Simplifies tube to hose connection using traditional female swivel hose ends and tube brazing.
2. Minimizes components when a tube union is needed.
3. Facilitates line size change (increase or decrease) and minimizes the number of joints and components.

Standard Material Specification. The standard materials used in the manufacture of Seal-Lok fittings are shown below.

Seal-Lok Fittings	Steel		Stainless Steel	
	ASTM	Type	ASTM	Type
Forged Bodies	A576	1214/1215	A182	316
Bar Stock Bodies	A108	12L14	A479	316
Cold Formed Nuts	A576	C1010	--	--
Machined Nuts*	A108	12L14 11L37	A479	316
Braze Sleeves & Braze Connectors	A108	12L14	A262	316L
Flange Sleeves	A108	12L14	A479	316

Table B1 — Standard Material Specifications for Seal-Lok Fittings

*All stainless steel nuts are coated to prevent galling at assembly.

Note: Other materials can be produced upon request.

Threads: The standard products shown in the visual index are manufactured with the applicable thread(s) from the thread forms listed below:

- SAE Straight Thread, UN/UNF Class 2A or 2B
- NPTF and NPT

Finish: Zinc with yellow chromate is used on all standard steel products. Stainless steel fittings are passivated.

Conformance Standards

Approvals

DET Norske Veritas — Approved for use in hydraulic systems up to size 38mm O.D. (1 1/2") as shown on certificate P-9538.

AGA/CGA — Stainless steel fittings approved for use in Natural Gas Vehicle per Engineering Report No. 125-AGA1-85.

American Bureau of Shipping (ABS) — Type approved for hydraulic systems and compressed air/instrument air systems per certificate No. 98-C12949-X.

Specifications

SAE Standards. Seal-Lok fittings meet or exceed all requirements of SAE J1453.

How Seal-Lok Fittings Work

The Seal-Lok fitting body face contains a high durometer O-ring that is held captive in a precision machined groove. As the nut is tightened onto the fitting body, the O-ring is compressed between the body and flat face of the tube flange or braze sleeve to form a tight, positive seal.

As the two faces come in contact, further tightening of the nut produces a sharp rise in assembly torque. A solid pull of the wrench at this point, to recommended assembly torque, completes the assembly.

The sharp torque rise gives a “solid feel” at assembly, and minimizes the possibility of over tightening.

Because the sealing surfaces are flat and perpendicular to the assembly pull, they remain virtually free of distortion during assembly, giving Seal-Lok fittings virtually unlimited remakeability as long as the O-ring is in good condition.

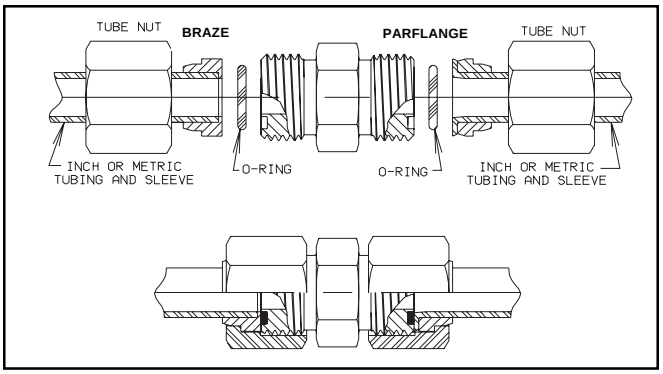


Fig. B2 — Braze and Flange Style Seal-Lok Fitting Components and Assembly

Tube Flanging with the Parker Parflange Machines

The Parflange machine is designed to flange tubing, specifically for use with Parker Seal-Lok (O-ring Face Seal) fittings. Parker has now replaced the widely accepted Parflange 1030 machine with the even more versatile, fully automatic, high speed capable 1040 model. Parker has also introduced a bench mount model called **Parflange 1025**. (See Figure B3). Some of the additional features designed into the **Parflange 1040** are discussed later in this section.

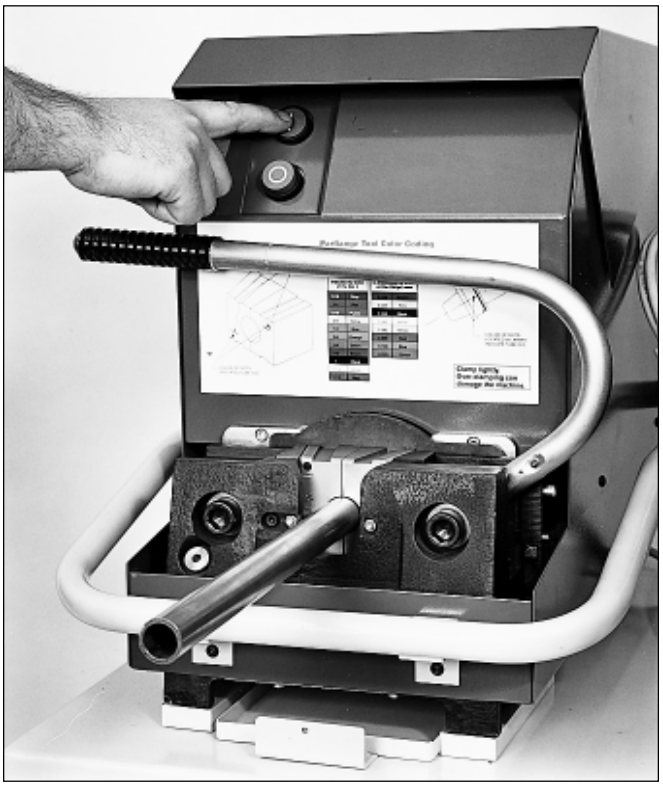


Fig. B3 — Parflange 1025 Machine

The Parflange machines utilize an orbital cold flow forming process to produce a flat, smooth, rigidly supported 90° sealing surface on the tube end. Flanging with Parflange eliminates the need for welding or brazing of the sleeve to the tube end. Some of the many advantages of flanging with Parflange over welding or brazing are listed below.

- The Parflange process is several times faster than most welding or brazing methods. For instance, the 1025 and 1040 models produce flanges at a rate of 9 to 12 times the speed of comparable induction brazing.
- The Parflange process does not require any special pre or post flange cleaning of the tube and sleeve.
- Unlike brazing, the Parflange process does not require any flux, braze alloy, post braze cleaner or rust inhibitor. An environmentally safe lubricant applied to the flanging pin is the only additive associated with the Parflange.
- The Parflange process is environmentally clean and safe. It does not require open flame or any form of heating. Additionally, there is no emission of hazardous fumes, as is prevalent with welding and brazing.
- The Parflange process uses only a fraction of the energy needed for welding or brazing.
- The Parflange process accommodates the use of plated or unplated components (i.e. tube and sleeve). Thus, the need to electroplate assemblies after fabrication is largely eliminated.
- The Parflange process eliminates the potential leak path present at the braze or weld joint.
- The Parflange process produces a burnished sealing surface, typically much smoother than the 125 micro-inch requirement of SAE J1453.

Users of Parflange and Parker's Seal-Lok (O-ring Face Seal) fitting enjoy all the inherent sealing, reliability, time and cost saving benefits, without the many drawbacks which accompany welding or brazing.

The Parflange 1040 machine was developed based on feedback from a wide range of customers. Some of the customer suggested features found on 1040 but were not available on the 1030 model, are:

- Automatic lubrication for the flanging pin.
- Independent and automatic hydraulic tube clamping and releasing system.
- Programmable micro-processor control.
- Capacity for flanging heavier tube walls.
- No need for die removal in separating the flanged tube assembly from the clamping mechanism
- Optional automatic sleeve loader and bowl feeder for high production use.

These new features designed into the 1040 result in time savings, lower risk of error by the operator and maintenance of the proven flange integrity provided by Parflange.

When fitted with the optional automatic sleeve loader, the Parflange 1040 is suitable for high production use. The typical "floor-to-floor" cycle time for flanging with the loader in place is 15 seconds. The automatic sleeve loader is recommended for high volume producers, such as: commercial tube fabricators, large scale manufacturers doing in-house tube fabrication, etc.

For light to moderate tube users, the loader may not be necessary. Flanging without the loader requires manual loading of the sleeve into the die. The floor-to-floor cycle time is therefore more dependent on the speed of the operator. The flange quality is the same whether or not the loader is used.

The Parflange 1025 is a compact bench or cart mountable tube flanging/flaring machine. The 1025 unit is simple to operate, it has several fail proof features and is currently the lowest priced Parflange machine. This machine is especially suited for the light to medium level users involved in original equipment manufacturing, in-plant installations, in-the-field tube fabrication, on-site repairs, shipboard tube fabrication, and so forth. The 1025 has a smaller power unit than the 1040, and is therefore not capable of flanging heavy wall tubing in the larger tube outside diameters. See Bulletin 4390-1025A-USA for more information on Parflange 1025.

Parflange machines are presently suitable for flanging imperial size tubing of 1/4" through 1 1/2" O.D. and metric tubing having O.D. of 6mm through 38mm. The machine has the capability of flanging tubing made from carbon steel, stainless steel, aluminum, copper-nickel, nickel-copper (monel), copper and most other metallic materials. Tooling for flanging steel tubing and many of the more popular sizes of stainless steel tubing is readily available. Tooling for flanging other materials or other sizes can be developed on an "as requested" basis.

All Parflange machines are equipped to make 37° tube flare for use with Parker Triple-Lok fittings. The tube materials and tube O.D.'s for 37° flaring are similar to those recommended for flanging.

Extra Tube Cut-Off Length Guide

For tube flanging, the extra tube cut-off lengths shown in Table B2 are required.

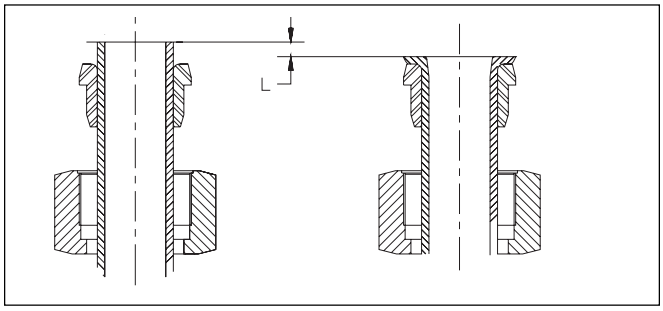


Table Notes:

1. Fractions based on rounding off to the nearest 1/64.
2. This chart is only a guide. Actual dimensions may be different from those shown because of variations in tube wall thickness, inconsistensy in quality of tube cut-off, deburr, and occasional modifications to the Parflange tooling. User should verify actual extra tube cut-off length (with one or two flanges before large scale flanging).

For extra tube cut-off lengths for metric tubing, refer to Table C2 on page C6.

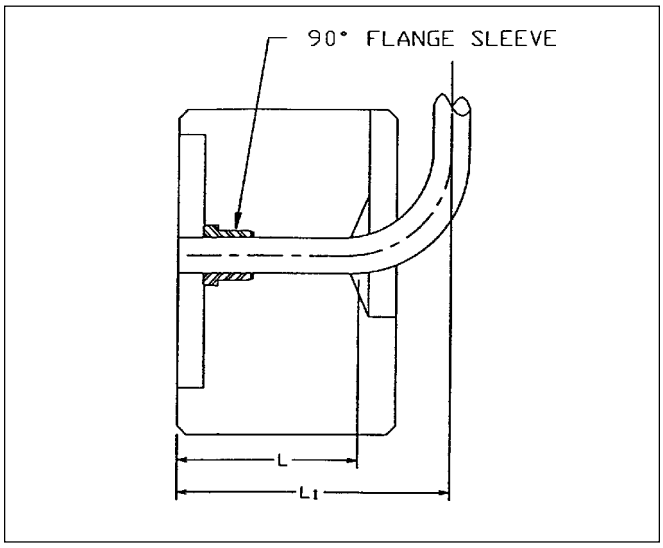
Extra Tube Cut-Off Length, L for Inch Tube 90° Flanging

Tube O.D., Inch	Tube Wall Thickness, Inch										
	.028	.035	.049	.065	.083	.095	.109	.120	.134	.156	.188
1/4	3/16	13/64	5/32								
3/8		9/64	9/64	5/32	5/32	5/32					
1/2		5/32	9/64	9/64	9/64	9/64					
5/8			5/32	5/32	7/64	11/64	5/32	11/64			
3/4			5/32	5/32	1/8	7/64	9/64	5/32	11/64		
1				9/64	9/64	7/64	11/64	11/64	3/16		
1 1/4					5/32	7/64	7/64	1/8	5/32	11/64	11/64
1 1/2				11/64	11/64	3/16	3/16	3/16	3/16	15/64	7/32

Table B2 — Extra Tube Cut-Off Length Guide (Inch Tubing)

Minimum Straight-Length to Start of Bend

For tube flanging, the minimum straight-length to start of bend is shown in Table B3.



90 Degree Flanging

Tube O.D. Inch Sizes	Tube O.D. Metric Sizes	*L (Inch)	*L (mm)	**L1 (Inch)	**L1 (mm)
1/4"	6	1 5/16	35	3 1/8	79
5/16"	8	1 5/16	35	3 5/32	80
3/8"	10	1 5/16	40	3 3/16	81
1/2"	12	1 3/8	40	3 1/4	82
	15	1 3/8	40	3 5/16	84
5/8"	16	1 1/2	41	3 5/16	84
	18	1 5/8	42	3 11/32	85
3/4"	20	1 3/4	50	3 3/8	86
	22	1 7/8	50	3 7/16	87
	25	1 7/8	50	3 1/2	89
1"	28	1 7/8	50	3 9/16	90
	30	1 7/8	50	3 19/32	91
1 1/4"	32	1 7/8	50	3 5/8	92
	35	2	50	3 11/16	94
1 1/2"	38	2	50	3 3/4	95

Table B3 — Minimum straight length to start of bend for 90° flanging

Table Notes:

* L is the minimum straight length to the start of tube bend.

** L_1 is the minimum centerline dimension necessary for 90° bent tube to clear the frame of the 1040 machine. In bending of the tubes, use radius blocks which will ensure that L_1 dimensions are met or exceeded.

Tube Brazing

Silver brazing is the recommended joining method for attaching the braze style sleeve or braze connector to a tube. This process may be accomplished by using a torch, such as the Parker Multi-Flame Torch.

Caution: Silver brazing, as with any other form of brazing or welding, can be dangerous to your health. Proper precaution should be taken during brazing to avoid personal injury and/or over exposure to dangerous fumes.

Dissimilar materials: For maximum joint strength and integrity, braze carbon steel sleeves or connectors to carbon steel tube and stainless steel sleeves or connectors to stainless steel tube. **Mixing tube and sleeve materials affects the required joint clearance at brazing temperature because of their different thermal expansion rates. Therefore, it is not recommended.**

Tube End Preparation

The preparation of the tube end to be brazed is a very important step in the brazing process.

1. Ensure that the tube end is cut squarely (i.e., within ±1 degree).
2. Deburr the O.D. and I.D. of the tube, but avoid exceeding a chamfer of 45° x 0.020" on the O.D.
3. Remove all oil and oxide build-up from the end of the tube for at least the length of the braze joint. Oil may be removed by using an oil-free solvent. Oxide build-up may be removed by pickling or by lightly sanding with an **"aluminum-free"** emery paper.

Selecting and Installing Braze Rings

With Parker's preformed silver braze rings (SBR) all that is required is to select the correct size based on the tube O.D. and to select the correct alloy composition based on the materials being joined. **SBR-SS or SBR may be used for joining carbon steel, but only SBR-SS should be used for brazing when stainless steel is involved.** SBR-SS contains nickel which retards interface corrosion typically experienced in stainless steel brazed joints when exposed to a corrosive media.

Insert the proper braze ring into the braze socket of the sleeve or braze connector that has been cleaned with solvent to remove the protective oil coating. **Remember to assemble BL nut to assembly before brazing.**

Selecting and Applying Flux

During the heating process, flux helps to prevent oxidation of the metal surfaces, dissolves residual oxides and cleans the surface to help the alloy flow. Flux, in some cases, will also serve as a temperature indicator by becoming transparent at about the same temperature that the alloy will melt. Various fluxes are available with different temperature ratings.

Parker flux is available in paste form. The Parker black flux may be used in either silver brazing stainless steel or carbon steel.

Prior to heating, flux can be applied to the braze joint by any combination of brushing, dipping or spraying. All surfaces that are required to be oxide free, such as the flat face of the sleeve, the O-ring groove and threads of the braze connector should be covered with flux. Additionally, the entire braze joint area should be covered with flux.

Fig. B4 — Multi-Flame Torch Brazing

Fixturing the Parts for Brazing

Care should be taken so the braze fixture allows the sleeve to settle and bottom on the tube completely during heating, since the Seal-Lok fitting sleeve is designed for a slip fit, this should happen easily. Short tubes can be brazed in the vertical position; on longer tubes, the joint may need to be in the horizontal position requiring a slight force to seat the sleeve on the tube.

Heating the Part

Torch Brazing: Torch brazing may be accomplished with either a single point torch, a Parker Multi-Flame Torch, or a regular welding torch that has been adjusted to give a gentle flame. A multi-point torch is strongly recommended for brazing sizes 3/4" and above because of the uniform heat produced.

Proper brazing involves heating the assembly to brazing temperature and flowing the filler metal through the joint. Heat should be applied broadly and uniformly to the tube as well as the Seal-Lok fitting. Keep in mind that thicker fitting and tubing sections take longer to heat. The entire assembly should heat to brazing temperature at about the same time. The braze alloy will always flow towards the area of higher temperature. The preformed braze ring has been placed inside the joint area—the last area to reach melting temperature. Therefore, when you see the braze material flow to the outside of the joint, you know the joint is complete. If the sleeve does not settle, a slight pressure will cause the sleeve to settle, completing the braze joint.

Cleaning the Brazed Joint

After stopping heat application, allow about 10 seconds for the braze alloy to solidify. Then, immerse the joint in hot water (approx. 140°F.). To make cleaning easier, add Parker Braze Cleaner to the hot water. This sudden cooling cracks the braze flux residue, making it easier to remove.

Any remaining residue can be removed by careful wire brushing, making sure not to scratch the sealing surface of the sleeve.

Braze Examination

Inspect braze for a fillet all the way around the tube at the far end (small diameter) of the sleeve.

Caution: If there are gaps in the fillet, the joint may not be sound. In this case, rebrazing is recommended. Remove the sleeve and rebraze a new one in its place.

Inspect the sealing surface. There should be no braze alloy overrun or build-up on this face.

If there is build-up, remove it with emery paper, being careful not to scratch the seal surface. If this is not possible, remove the old sleeve and rebraze a new one in its place.

Corrosion Protection After Brazing

This is an extremely important step following brazing and even more so following the use of a braze cleaner.

Braze cleaners such as Handy and Harman Post Braze Cleaner available from Parker and Bernite 45[1] which are used to facilitate the removal of residual flux after brazing, are generally corrosive. The residue left on the surface by the cleaner, especially on the I.D. of the tube, can cause rusting in carbon steel tubes rather quickly, if it is not neutralized. Therefore, it is important to neutralize the cleaner residue after cleaning with a solution such as Bernite 136[2] (mix 4 ounces of Bernite 136 with one gallon of water).

If the brazed parts are not to be used soon after brazing, a coating of rust inhibitors such as WD-40[3] or SP-350[4] is recommended for the braze and heat affected area.

[1] & [2]) Products of Bernite Products, Inc. 84 New York, Westbury, NY 11500 (516) 338-4646.

[3]) A product of WD-40 Company, San Diego, CA 92220.

[4]) A product of CRC Chemicals, USA, Warminister, PA 18974 (215) 674-4300

Assembly

Ensure that the correct O-ring is properly placed in the face seal O-ring groove. It is recommended that a CORG assembly tool (see Fig. B5) be used when installing the O-ring into Seal-Lok Captive O-ring Groove (CORG). The steps for using the CORG assembly tool are:

1. Position the O-ring inside the CORG assembly tool against the pusher.
2. Position the tool over the Seal-Lok tube end until the end is bottomed in the tool.
3. Push the pusher of the tool until the O-ring is released into the groove.

Figure B5 — O-ring Installation Using CORG Assembly Tool

After installation of the O-ring, place the tube assembly against the fitting body so that the flat face of the sleeve (or flanged tube) comes in full contact with the O-ring. Thread the nut on to the fitting body by hand and tighten it to the recommended torque from Table B2.

If torque wrenches are not available, an alternate method of assembly is the Flats From Wrench Resistance (F.F.W.R.) method. Wrench tighten the nut onto the fitting body until wrench resistance is reached. Tighten further to the appropriate F.F.W.R. value from Table B2.

Caution: The torque method of assembly is the preferred method of assembly. It reduces the risk of human error during assembly that is more prevalent in the Flats From Wrench Resistance (F.F.W.R.) method. To ensure the most accurate assembly of the Seal-Lok fitting it is strongly recommended that the torque method be utilized.

SAE Dash Size	Tube Side Thread Size	Tube Side Assembly Torque (+10% -0%)			Flats from Wrench Resistance (F.F.W.R.)	
		in.-lb.	ft.-lb.	N-m	Tube Nuts	Swivel & Hose Ends
-4	9/16-18	220	18	25	1/4 to 1/2	1/2 to 3/4
-6	11/16-16	360	30	40	1/4 to 1/2	1/2 to 3/4
-8	13/16-16	480	40	55	1/4 to 1/2	1/2 to 3/4
-10	1-14	—	60	80	1/4 to 1/2	1/2 to 3/4
-12	1 3/16-12	—	85	115	1/4 to 1/2	1/3 to 1/2
-14	15/16-12	—	95	130	1/4 to 1/2	1/3 to 1/2
-16	1 7/16-12	—	110	150	1/4 to 1/2	1/3 to 1/2
-20	1 11/16-12	—	140	190	1/4 to 1/2	1/3 to 1/2
-24	2-12	—	180	245	1/4 to 1/2	1/3 to 1/2
-32	2 1/2-12	—	360	490	—	—

Table B2 — Seal-Lok Fitting Assembly Torque and F.F.W.R.

1) Fitting dash size designations are expressed in 1/16 of an inch increments. Thus -8 designates 1/2" size (8/16=1/2).
2) These torques and F.F.W.R.'s are for steel fittings, assembled dry, for full rated pressure applications.
3) For lower pressure applications, lower torques may be obtained by contacting the Tube Fittings Division
4) See Table A36 for port assembly torques.

Tube Wall Thickness

Minimum/maximum tube wall thickness is based on the pressure holding capability of Seal-Lok fittings. Tubing outside the recommended range can be used. However, the pressure holding capability of the tube should be closely observed, so as not to exceed the rated pressure of the tube or fitting.

Size		Steel, Alloy Steel, St. Steel, Copper, Monel
O.D. Inches	Dash Number	SAE O-ring Face Seal Seal-Lok
1/4	-4	.020 – .083
3/8	-6	.020 – .109
1/2	-8	.028 – .148
5/8	-10	.035 – .134
3/4	-12	.035 – .148
7/8	-14	.035 – .156
1	-16	.035 – .188
1 1/4	-20	.049 – .220
1 1/2	-24	.049 – .250
2	-32	.058 – .250

Table B3 — Recommended "Min./Max" Tube Wall Thickness for Seal-Lok

Note: Brazing to attach sleeve can be used for all wall thicknesses. For flanging tool availability, see page N23.

Trouble Shooting*

Problem/Probable Causes	Remedy
Leakage at face seal end:	
Misalignment or improper fit	Align the brazed tube end and the connecting fitting properly before tightening the tube nut. Hold the flat face of the mating fitting against the O-ring while threading on the nut and wrench tightening. Ensure that the tube bends are made to the appropriate angle(s).
Damaged, pinched or missing O-ring	Use a new O-ring. Properly install it in theface seal groove. Make sure that the O-ring stays in the groove while tightening the fitting. Holding the flat face of the mating fitting against the O-ring while tightening the nut will prevent the O-ring from coming out of the groove and getting pinched or falling out.
Extruded O-ring	Replace the O-ring and check for the following: - proper alignment (see above) - pressure surges in excess of 133% of rated pressure of the fitting could cause the O-ring to extrude. Tighten the nut to the recommended torque.
Improper O-ring	Make sure the new O-ring is of the proper hardness. Standard Seal-Lok O-rings are of 90 durometer hardness.
Pinched O-ring	An attempt to bleed off air by cracking the seal of Seal-Lok fittings can cause the O-ring to come out of its groove and get pinched. It can then extrude out under pressure. Use Parker bleed adapters for bleeding off air from the system.
Improper tightening	Check the joint for tightness. Retorque to the Parker recommended torque value. If it still leaks, it could be due to any one or com-bination of causes listed below. Take the joint apart and follow the recommendations listed.
Braze overflow on sealing surface	Remove the affected sleeve and re-braze a new one in its place. Do not try to file, sand or grind the braze overflow. Braze alloy tends to flow in the direction of higher temperature. This overflow can occur if the seal surface is at a higher temperature than the tail end of the sleeve when the braze ring starts melting. Therefore, when the ring starts melting, the heat source should be relocated to the small diameter of the sleeve to promote braze flow through the joint.
Damaged fitting	Check and replace fittings. Because of elastomeric seal, Seal-Lok is tolerant of minor imperfections on its sealing surface; but it cannot tolerate gross scratches, nicks, dents, etc. Damaged threads can give a false sense of joint tightness because of their poor threading ability.
Leakage at braze joint:	
Improper joint clearance	Flux and reheat the joint, remove and replace with a sleeve of appropriate material and with recommended bore diameter for proper joint clearance. Repeat brazing in accordance with recommended procedures. Seal-Lok sleeves are designed for .003 to .008 diametrical joint clearance, for silver brazing, with high quality commercial hydraulic tubing.
Mixing of sleeve & tube material	Do not mix sleeve and tube materials. Always use steel sleeves with steel tubing and stainless sleeves with stainless tubing. Mixing materials changes the joint clearance because of different thermal expansion characteristics of the two materials.
Improper/inadequate cleaning	First degrease the tube end and sleeve in suitable alkaline cleaner. Remove oxide build-up with aluminum free emery cloth, if needed.
Improper braze alloy	Use Parker (AWS A5.8 Class B GA-1), (Handy & Harman Easy Flo 45) for steel only and Parker SBR-SS (AWS A5.8 Class B Ag- 24) (Handy & Harman Braze 505) for steel or stainless steel. SBR-SS contains a small amount of nickel to prevent interface corrosion in stainless steel when exposed to corrosive media.
Improper/inadequate flux	Apply flux liberally to the sleeve and tube end. Use AWS FB3A Parker White Flux (Handy & Harman's Handy Flux) for steel only and AWS FB3C Parker Black Flux (Handy & Harman's Type B-1) for steel or stainless steel.
Inadequate/improper braze temperature	The key is to ensure that both the tube and sleeve reach braze temperature at about the same time. A dull red color of the tube and sleeve is a good indication of adequate braze temperature at which the braze ring should melt completely. Too little heat may not melt the braze ring completely, causing incomplete braze flow. Too much heat can cause braze alloy to boil resulting in pinhole type porosity in the joint. It can also burn the flux retarding the braze flow. A complete 360° fillet at the small end of the sleeve is a good indication of full braze flow.

Table B4 — Seal-Lok Fitting Problems and Solutions

*For trouble shooting with Parflange connection, see Bulletin 4390-1040B.

Features, Advantages & Benefits

1. Manufacture — Seal-Lok fittings conform to SAE J1453. This specification not only controls dimensions and tolerances of Seal-Lok fittings, but includes minimum performance requirements. (All shaped fittings are machined from forgings for additional strength.)

2. Sealing Capability — An elastomeric O-ring forms the primary sealing element. The O-ring is contained within a precision machined groove on the fitting body. It is compressed into the groove by the flat face of the tube flange or braze sleeve, thus assuring leak free sealing.

3. Pressure Rating — Seal-Lok fittings are the highest working pressure industrial fitting on the market, ranging from high vacuum to 9,000 psi, depending on size.

4. Vibration and Fatigue — Seal-Lok fittings have been extensively used in applications that experience severe vibration and shock with no field problems. See Bulletin 4350-B8 for complete test results.

5. Visible Inspection:

Flanged — The surface of the flange should be reasonably smooth with no deep scratches, gouges or indentations. Minor surface imperfections outside of the seal area are acceptable.

Brazed — Presence of braze alloy 360° around the back of the sleeve (tail) allows for a quick (non-destructive) check for proper braze joint attachment.

6. No Tube Entry — Tube does not enter into the body of the fitting, allowing for zero clearance, drop-in installation of components. This makes repair and maintenance very easy.

7. Assembly — A variety of sleeve attachment methods are now available. These include torch brazing, induction brazing and flanging. Seal-Lok fittings can also be used as hose adapters. Detailed assembly and inspection procedures can be found on pages B5 through B8.

8. Make-Up — From the finger tight position, one short pull on the wrench gives the assembly a quick high rise to required torque. Seal-Lok fittings have a solid “make-up feel” and excellent over-torque resistance.

9. Tube Wall — The brazing of the sleeve to the outside of the tube allows Seal-Lok fittings to be used on thin to heavy wall tubing. Seal-Lok fittings can also be used with the widest range of tubing grades.

10. Reusability/Remakeability — Seal-Lok fittings can be disassembled and reassembled many times. Simply replace the O-ring on the tube end and tighten to recommended torque.

11. Temperature Range — Seal-Lok fittings are suitable for sub-zero through elevated temperature applications. Service temperature is limited by the material of the chosen O-ring.

12. Materials — Seal-Lok can be manufactured from a wide variety of materials. The most popular materials currently used are steel and stainless steel. Upon request, the Tube Fittings Division can machine Seal-Lok fittings from other materials.

13. Envelope Size — Redesign of hydraulic systems are normally unnecessary because Seal-Lok fittings are similar in size to the most popular fitting of all, the Triple-Lok 37° flared fittings. The additional 1 1/2 threads on the port end fit all standard SAE ports. Seal-Lok fittings are excellent hose adapters.

14. Available Configurations — Seal-Lok fittings are available as a standard in over thirty different configurations (as shown in the visual index on pages B2 and B3). Some of these configurations are available in as many as twenty-seven different size combinations. Several of these fittings can actually reduce the total number of connections needed in a system. (Other configurations can be manufactured upon request.)

15. Available Sizes — Seal-Lok fittings are available as standard in sizes 1/4" (-4) through 2" (-32), the largest range of ORFS fittings in the industry. Only Seal-Lok offers sizes 7/8" (-14) and 2" (-32) in the industry.

16. Parflange Technology — Specifically designed to be used with Seal-Lok fittings, the Parflange machines utilize an orbital cold flow forming process to produce a smooth, rigidly supported 90° sealing surface on the tube end. The flanged tube ends meet SAE J1453 for Formed Tube Connections. This patented Parflange process eliminates the need for messy and time-consuming brazing.

17. Captive O-ring Groove — Seal-Lok fittings are manufactured with a captive O-ring groove (CORG) designed to prevent O-ring fall-out prior to final assembly. The CORG design conforms to SAE J1453.

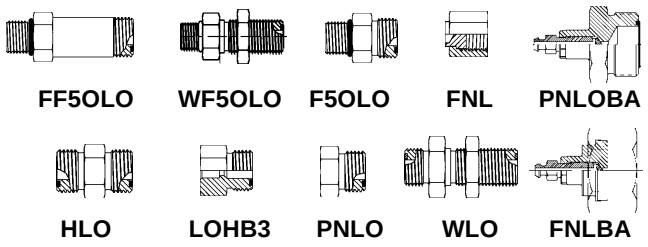
Recommended Working Pressure, PSIG

These recommended working pressures represent the capability of the subject fitting. Nevertheless, in some instances, the wall thickness or type of tubing, hose, or hose connector assembled to the fitting may dictate the maximum pressure to which the assembly should be exposed. It is strongly suggested that these fitting working pressure charts are used in conjunction with appropriate pressure charts for tubing or hose during the fitting selection process.

Refer to the definition of pressure rated static and pressure rated dynamic. The following values are based on a minimum design factor of 4:1 for dynamic and 3:1 for static applications.

Pressure, Rated Static – The maximum pressure that a pressure containing envelope is capable of sustaining in an application not exceeding 30,000 operating cycles in a system free of pressure surges, shocks, vibration, and temperature excursions.

Pressure, Rated Dynamic – The maximum fluctuating pressure load that a pressure containing envelope is capable of sustaining for a minimum of one million operation cycles without failure.



FF5OLO WF5OLO F5OLO FNL PNLOBA

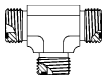
HLO LOHB3 PNLO WLO FNLBA

	STATIC (3:1)		DYNAMIC (4:1)	
Size	STEEL	SS	STEEL	SS
4	12000	15000	9200	9200
4-6	12000	15000	9200	9200
4-8	12000	15000	9200	9200
6-4	12000	15000	9200	9200
6	12000	15000	9200	9200
6-8	12000	15000	9200	9200
6-10	11000	13200	6000	6000
8-4	12000	15000	9200	9200
8-6	12000	15000	9200	9200
8	12000	15000	9200	9200
8-10	11000	13200	6000	6000
8-12	11000	13200	6000	6000
8-16	9500	11400	6000	6000
10-4	11000	13200	6000	6000
10-6	11000	13200	6000	6000
10-8	11000	13200	6000	6000
10	11000	13200	6000	6000
10-12	11000	13200	6000	6000
10-16	9500	11400	6000	6000
12-4	11000	13200	6000	6000
12-6	11000	13200	6000	6000
12-8	11000	13200	6000	6000
12-10	11000	13200	6000	6000
12	11000	13200	6000	6000
12-16	9500	11400	6000	6000
14	9500	11400	6000	6000
16-8	9500	11400	6000	6000
16-10	9500	11400	6000	6000
16-12	9500	11400	6000	6000
16	9500	11400	6000	6000
16-20*	8000	9600	4000	4000
16-24*	6500	7800	4000	4000
20-12*	8000	9600	4000	4000
20-16*	8000	9600	4000	4000
20*	8000	9600	4000	4000
20-24*	6500	7800	4000	4000
24-16*	6500	7800	4000	4000
24-20*	6500	7800	4000	4000
24*	6500	7800	4000	4000
32-20	4000	4800	3000	3000
32-24	4000	4800	3000	3000
32	4000	4800	3000	3000

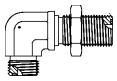
*For higher pressure applications, contact the Tube Fittings Division.

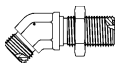
Recommended Working Pressure, PSIG

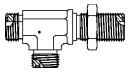

ELO


JLO


KLO


WELO


WNLO


WJJLO

Size	STATIC (3:1)		DYNAMIC (4:1)	
	STEEL	SS	STEEL	SS
4	12000	12000	9200	9200
6	12000	12000	9200	9200
8	12000	12000	9200	9200
10	11000	11000	6000	6000
12	11000	11000	6000	6000
14	9500	9500	6000	6000
16	9500	9500	6000	6000
20*	8000	8000	4000	4000
24*	6500	6500	4000	4000
32	4000	4000	3000	3000

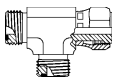
*For higher pressure applications, contact the Tube Fittings Division.

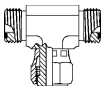

TRLO



F65OL


C6LO


R6LO

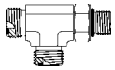

S6LO

Size	STATIC (3:1)		DYNAMIC (4:1)	
	STEEL	SS	STEEL	SS
4	12000	12000	9200	9200
6	12000	12000	9200	9200
8	12000	12000	9200	9200
10	11000	11000	6000	6000
12	11000	11000	6000	6000
14	9500	9500	6000	6000
16	9500	9500	6000	6000
20	6500	6500	4000	4000
24	5000	5000	4000	4000
32	4000	4000	3000	3000


AOEL6


C5OLO


CC5OLO


R5OLO


S5OLO


V5OLO

Size	STATIC (3:1)		DYNAMIC (4:1)	
	STEEL	SS	STEEL	SS
4	8000	8000	6000	6000
4-6	9000	9000	6000	6000
4-8	8000	8000	6000	6000
6-4	8000	8000	6000	6000
6	9000	9000	6000	6000
6-8	8000	8000	6000	6000
6-10	9000	9000	6000	6000
8-4	8000	8000	6000	6000
8-6	9000	9000	6000	6000
8	8000	8000	6000	6000
8-10	9000	9000	6000	6000
8-12	9000	9000	6000	6000
8-16	7500	7500	5500	5500
10-4	8000	8000	6000	6000
10-6	9000	9000	6000	6000
10-8	8000	8000	6000	6000
10	9000	9000	6000	6000
10-12	9000	9000	6000	6000
10-16	7500	7500	5500	5500
12-4	8000	8000	6000	6000
12-6	9000	9000	6000	6000
12-8	8000	8000	6000	6000
12-10	9000	9000	6000	6000
12	9000	9000	6000	6000
12-16	7500	7500	5500	5500
14	7500	7500	5500	5500
16-8	8000	8000	6000	6000
16-10	9000	9000	6000	6000
16-12	9000	9000	6000	6000
16	7500	7500	5500	5500
16-20	5000	5000	4000	4000
16-24	5000	5000	4000	4000
20-12	7000	7000	4000	4000
20-16	7000	7000	4000	4000
20	5000	5000	4000	4000
20-24	5000	5000	4000	4000
24-16	5500	5500	4000	4000
24-20	5000	5000	4000	4000
24	5000	5000	4000	4000
32-20	4000	4000	2500	2500
32-24	4000	4000	2500	2500
32	3500	3500	2500	2500

Recommended Working Pressure, PSIG



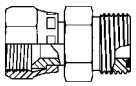
LOHQ1 **LOEQ1** **LOVQ1**

Size	STATIC (3:1)		DYNAMIC (4:1)	
	STEEL	SS	STEEL	SS
12	6600	6600	5000	5000
16	6600	6600	5000	5000
20	5300	5300	4000	4000
24	4500	4500	3000	3000



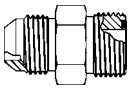
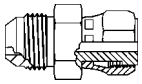
LOHQ2 **LOEQ2** **LOVQ2**

Size	STATIC (3:1)		DYNAMIC (4:1)	
	STEEL	SS	STEEL	SS
12	8000	8000	6000	6000
12-16	8000	8000	6000	6000
16	8000	8000	6000	6000
16-12	8000	8000	6000	6000
20	6600	6600	5000	5000
20-16	6600	6600	5000	5000
24	6000	6000	4500	4500



LOHX6

SIZE	STATIC		DYNAMIC	
	STEEL	SS	STEEL	SS
4	7500	7500	5000	6000
6	6000	7200	4500	5400
8	5000	6000	4000	4800
10	5000	6000	4000	4800
12	4000	4800	3500	4200
16	3000	3600	2500	3000
20	3000	3600	2500	3000
24	2500	3000	2000	2400
32	2000	2400	1500	1800

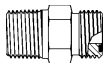
XHLO **XHL6**

SIZE	STATIC		DYNAMIC	
	STEEL	SS	STEEL	SS
4	10000	12000	5000	6000
6	10000	12000	5000	6000
8	8500	10200	5000	6000
10	8000	9600	5000	6000
12	7000	8400	5000	6000
16	6000	7200	4000	4800
20	5000	6000	3000	3600
24	3000	3600	2000	2400
32	2000	2400	1500	1800

Recommended Working Pressure, PSIG

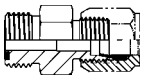
CLO

Size	STATIC (3:1)		DYNAMIC (4:1)	
	STEEL	SS	STEEL	SS
4	8000	9600	6000	6000
4-4	8000	9600	6000	6000
6	10000	12000	6000	6000
6-6	10000	12000	6000	6000
6-8	10000	12000	6000	6000
8	10000	12000	6000	6000
8-8	8500	10200	6000	6000
8-12	7000	8400	4000	4000
10	8000	9600	6000	6000
10-12	7000	8400	4000	4000
12	7000	8400	4000	4000
12-8	8000	9600	6000	6000
12-16	4000	4800	3000	3000
14	4000	4800	3000	3000
16	4000	4800	3000	3000
16-12	5500	6600	4000	4000
20	3000	3600	2500	2500
24	3000	3600	2500	2500



FLO

Size	STATIC (3:1)		DYNAMIC (4:1)	
	STEEL	SS	STEEL	SS
4	10000	12000	6000	6000
4-4	10000	12000	6000	6000
6	10000	12000	6000	6000
6-6	10000	12000	6000	6000
6-8	10000	12000	6000	6000
8	10000	12000	6000	6000
8-8	10000	12000	6000	6000
8-12	10000	12000	6000	6000
10	10000	12000	6000	6000
10-12	8000	9600	6000	6000
12	8000	9600	6000	6000
12-8	8000	9600	6000	6000
12-16	6000	7200	4000	4000
14	6000	7200	4000	4000
16	6000	7200	4000	4000
16-12	8000	9600	5000	5000
20	5000	6000	4000	4000
24	4000	4800	3000	3000



BUHLO

Size	STATIC (3:1)		DYNAMIC (4:1)	
	STEEL	SS	STEEL	SS
6	10000	12000	6000	6000
8	8500	10200	5000	5000
10	8000	9600	5000	5000
12	7000	8400	4500	4500
16	6000	7200	4000	4000

How To Order Seal-Lok Tube Fittings

Nomenclature

Seal-Lok fitting part numbers are constructed from symbols that identify the size and style of the fitting and material used. See pages A4 through A8 for complete data.

Sizes

2 through 32. (Tube sizes are determined by the number of sixteenths of an inch in the tube O.D.)

Material

Machined from steel as a standard. Seal-Lok tube fittings for special applications can be furnished in almost any material suitable for machining.

Example

Fitting needed — Seal-Lok Steel Male Connector for 1/4" O.D. Tube and 3/8" Straight Thread Port. Part number 4-6 F5OLO-S.

4-6	F*	5	O	L	O	-	S
1/4" Tube O.D. (4/16") End 3/8" Str. Thrd Port (6/16")	Male Connector	Straight Thrd Port	O-ring on Port End	Parker Seal-Lok	O-ring on Tube End		Steel

Order the same part without O-rings by eliminating the O's and simply use part number 4-6 F5L-S. Seal-Lok fittings must be ordered in its component parts. Assembled fittings are not available. To complete a flanged assembly using the above part, all of the following components are required:

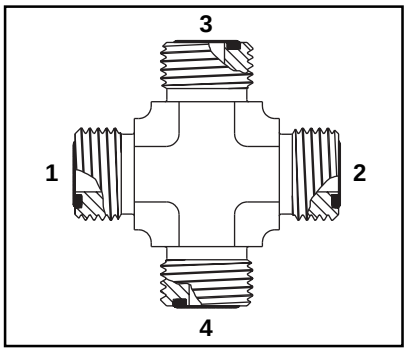
4 BL-S (tube nut)
4 TPL-S (Parflange sleeve)

To complete a brazed assembly using the part above, all of the following components are required:

4 BL-S (tube nut)
4 TL-S (braze sleeve)
4 SBR (silver braze ring, steel)

Crosses and Tees

For tees: First size the run (1 to 2) and then the branch (3).
For crosses: First size the run (1 to 2) and then the branch (3 to 4).



Special Fittings

If design or configuration is questionable, please provide a detailed sketch, drawing or sample part to the Tube Fittings Division.

Special O-rings

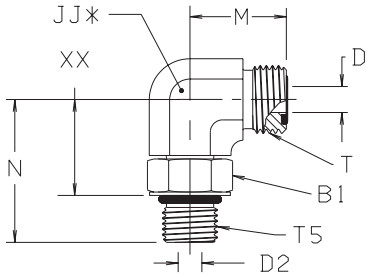
To order stock O-rings other than standard Buna-N (N0552), list the Parker O-ring Division compound number after the fitting material specification.

For example:

4 F5OLO-S	(N0552 O-rings supplied)
4 F5OLO-S V0894	(Fluorocarbon O-rings, e.g., Viton)
4 F5OLO-SS N0756	(Buna-N O-rings for CNG)
4 F5OLO-S 2-011T N0552	(Tabbed O-ring for Seal-Lok end)

Straight Thread Elbow

C5OLO



*JJ — ACROSS WRENCH FLATS

ORFS Tube end / straight thread O-ring

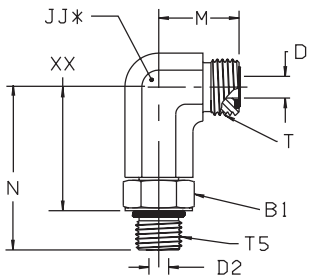
SAE 520220
Part Number Information
C5L - Body only
C5OLO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T5 PORT THD UN/UNF-2A	B1 HEX	D DRILL	D2 DRILL	JJ*	M	N	XX AFTER ASSY.	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 C5OLO	1/4	9/16-18	7/16-20	5/8	0.172	0.172	9/16	0.85	1.29	0.86	•	•
4-6 C5OLO*	1/4	9/16-18	9/16-18	3/4	0.172	0.264	9/16	0.92	1.45	0.98	•	•
6 C5OLO	3/8	11/16-16	9/16-18	3/4	0.264	0.264	3/4	0.98	1.45	0.98	•	•
6-4 C5OLO	3/8	11/16-16	7/16-20	5/8	0.264	0.172	3/4	0.98	1.37	0.94	•	•
6-8 C5OLO*	3/8	11/16-16	3/4-16	15/16	0.264	0.378	3/4	1.04	1.60	1.06	•	•
6-10 C5OLO*	3/8	11/16-16	7/8-14	1 1/16	0.264	0.484	7/8	1.15	1.97	1.34	•	
8 C5OLO	1/2	13/16-16	3/4-16	15/16	0.378	0.378	3/4	1.10	1.60	1.06	•	•
8-6 C5OLO	1/2	13/16-16	9/16-18	3/4	0.378	0.264	3/4	1.10	1.44	0.97	•	•
8-10 C5OLO*	1/2	13/16-16	7/8-14	1 1/16	0.378	0.484	7/8	1.21	1.97	1.34	•	
8-12 C5OLO	1/2	13/16-16	1 1/16-12	1 3/8	0.378	0.609	1 3/16	1.32	2.17	1.44	•	
10 C5OLO	5/8	1-14	7/8-14	1 1/16	0.484	0.484	1 1/16	1.31	1.97	1.34	•	•
10-8 C5OLO	5/8	1-14	3/4-16	15/16	0.484	0.378	1 1/16	1.31	1.80	1.26	•	
10-12 C5OLO	5/8	1-14	1 1/16-12	1 3/8	0.484	0.609	1 3/16	1.41	2.17	1.44	•	
12 C5OLO	3/4	1 3/16-12	1 1/16-12	1 3/8	0.609	0.609	1 3/16	1.47	2.17	1.44	•	•
12-8 C5OLO	3/4	1 3/16-12	3/4-16	3/4	0.609	0.378	1 3/16	1.47	1.84	1.30	•	
12-10 C5OLO	3/4	1 3/16-12	7/8-14	1 1/16	0.609	0.484	1 3/16	1.47	2.01	1.38	•	
12-16 C5OLO	3/4	1 3/16-12	1 5/16-12	1 5/8	0.609	0.812	1 7/16	1.62	2.35	1.62	•	
14 C5OLO**	7/8	1 5/16-12	1 3/16-12	1 1/2	0.709	0.689	1 5/16	1.63	2.30	1.57	•	
16 C5OLO	1	1 7/16-12	1 5/16-12	1 5/8	0.812	0.812	1 7/16	1.64	2.35	1.62	•	•
16-12 C5OLO	1	1 7/16-12	1 1/16-12	1 3/8	0.812	0.609	1 7/16	1.64	2.32	1.59	•	
16-20 C5OLO	1	1 7/16-12	1 5/8-12	1 7/8	0.812	1.024	1 5/8	1.76	2.45	1.72	•	
20 C5OLO	1 1/4	1 11/16-12	1 5/8-12	1 7/8	1.024	1.024	1 5/8	1.76	2.45	1.72	•	•
20-16 C5OLO	1 1/4	1 11/16-12	1 5/16-12	1 5/8	1.024	0.812	1 5/8	1.76	2.42	1.69	•	
20-24 C5OLO	1 1/4	1 11/16-12	1 7/8-12	2 1/8	1.024	1.260	1 7/8	1.92	2.59	1.86	•	
24 C5OLO	1 1/2	2-12	1 7/8-12	2 1/8	1.260	1.260	1 7/8	1.92	2.59	1.86	•	•
24-20 C5OLO	1 1/2	2-12	1 5/8-12	1 7/8	1.260	1.024	1 7/8	1.92	2.59	1.86	•	
32 C5OLO**	2	2 1/2-12	2 1/2-12	2 3/4	1.772	1.575	2 1/2	2.76	3.07	2.34	•	

*JJ for these parts does not conform to SAE.
**Sizes 14 and 32 are not included in SAE J1453.

Long Straight Thread Elbow

CC5OLO



*JJ — ACROSS WRENCH FLATS

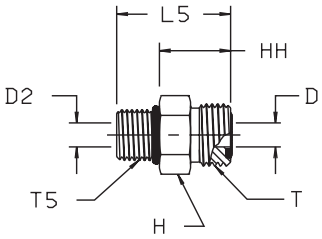
ORFS Tube end / straight thread O-ring

SAE 521520
Part Number Information
CC5L - Body only
CC5OLO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T5 PORT THD UN/UNF-2A	B1 HEX	D DRILL	D2 DRILL	JJ*	M	N	XX AFTER ASSY.	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 CC5OLO	1/4	9/16-18	7/16-20	5/8	0.172	0.172	9/16	0.85	2.23	1.80	•	
6 CC5OLO	3/8	11/16-16	9/16-18	3/4	0.264	0.264	3/4	0.98	2.61	2.14	•	
8 CC5OLO	1/2	13/16-16	3/4-16	15/16	0.378	0.378	3/4	1.10	2.95	2.41	•	
10 CC5OLO	5/8	1-14	7/8-14	1 1/16	0.484	0.484	1 1/16	1.31	3.51	2.88	•	
12 CC5OLO	3/4	1 3/16-12	1 1/16-12	1 3/8	0.609	0.609	1 3/16	1.47	3.97	3.24	•	
16 CC5OLO	1	1 7/16-12	1 5/16-12	1 5/8	0.812	0.812	1 7/16	1.64	4.51	3.78	•	

Straight Thread Connector

F5OLO



B

ORFS tube end / straight thread O-ring

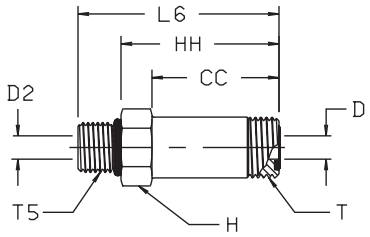
SAE 520120
Part Number Information
F5L - Body only
F5OLO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE. O.D	T TUBE END UN/UNF-2A	T5 PORT THD UN/UNF-2A	D** DRILL	D2** DRILL	H HEX	HH AFTER ASSY.	L5	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 F5OLO	1/4	9/16-18	7/16-20	0.172	0.172	5/8	0.70	1.13	•	•
4-6 F5OLO	1/4	9/16-18	9/16-18	0.172	0.264	3/4	0.73	1.20	•	•
4-8 F5OLO	1/4	9/16-18	3/4-16	0.172	0.378	7/8	0.77	1.32	•	
6 F5OLO	3/8	11/16-16	9/16-18	0.264	0.264	3/4	0.78	1.25	•	•
6-4 F5OLO	3/8	11/16-16	7/16-20	0.264	0.172	3/4	0.91	1.34	•	•
6-8 F5OLO	3/8	11/16-16	3/4-16	0.264	0.264	7/8	0.83	1.38	•	•
6-10 F5OLO	3/8	11/16-16	7/8-14	0.264	0.484	1	0.90	1.53	•	
8 F5OLO	1/2	13/16-16	3/4-16	0.378	0.378	7/8	0.89	1.44	•	•
8-6 F5OLO	1/2	13/16-16	9/16-18	0.378	0.264	7/8	1.00	1.47	•	•
8-10 F5OLO	1/2	13/16-16	7/8-14	0.378	0.484	1	0.96	1.59	•	
8-12 F5OLO	1/2	13/16-16	1 1/16-12	0.378	0.609	1 1/4	1.02	1.75	•	
8-16 F5OLO	1/2	13/16-16	1 5/16-12	0.378	0.812	1 1/2	1.06	1.79	•	
10 F5OLO	5/8	1-14	7/8-14	0.484	0.484	1 1/16	1.07	1.70	•	•
10-8 F5OLO	5/8	1-14	3/4-16	0.484	0.378	1 1/16	1.23	1.78	•	
10-12 F5OLO	5/8	1-14	1 1/16-12	0.484	0.484	1 1/4	1.13	1.86	•	
12 F5OLO	3/4	1 3/16-12	1 1/16-12	0.609	0.609	1 1/4	1.19	1.92	•	•
12-8 F5OLO	3/4	1 3/16-12	3/4-16	0.609	0.378	1 1/4	1.36	1.91	•	
12-10 F5OLO	3/4	1 3/16-12	7/8-14	0.609	0.484	1 1/4	1.36	1.99	•	
12-16 F5OLO	3/4	1 3/16-12	1 5/16-12	0.609	0.609	1 1/2	1.23	1.96	•	
14 F5OLO*	7/8	1 5/16-12	1 3/16-12	0.709	0.709	1 3/8	1.18	1.91	•	
16 F5OLO	1	1 7/16-12	1 5/16-12	0.812	0.812	1 1/2	1.25	1.98	•	•
16-12 F5OLO	1	1 7/16-12	1 1/16-12	0.812	0.609	1 1/2	1.41	2.14	•	
16-20 F5OLO	1	1 7/16-12	1 5/8-12	0.812	1.024	1 7/8	1.33	2.06	•	
20 F5OLO	1 1/4	1 11/16-12	1 5/8-12	1.024	1.024	1 7/8	1.33	2.06	•	•
20-16 F5OLO	1 1/4	1 11/16-12	1 5/16-12	1.024	0.812	1 7/8	1.55	2.28	•	
20-24 F5OLO	1 1/4	1 11/16-12	1 7/8-12	1.024	1.260	2 1/8	1.40	2.13	•	
24 F5OLO	1 1/2	2-12	1 7/8-12	1.260	1.260	2 1/8	1.40	2.13	•	•
24-20 F5OLO	1 1/2	2-12	1 5/8-12	1.260	1.024	2 1/8	1.62	2.35	•	
32 F5OLO*	2	2 1/2-12	2 1/2-12	1.575	1.575	2 3/4	1.59	2.32	•	

*Sizes 14 and 32 are not included in SAE J1453.
**Manufacturing option permits a single drill through equal to the smaller of D and D2.

Long Straight Thread Connector

FF5OLO



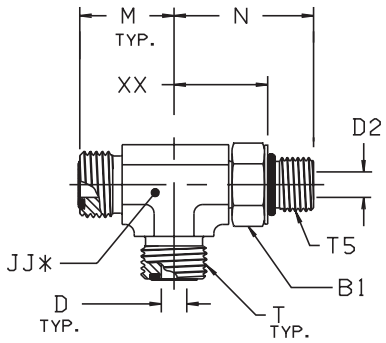
ORFS tube end / straight thread O-ring

SAE 520122
Part Number Information
FF5L - Body only
FF5OLO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T5 PORT THD UN/UNF-2A	CC	D DRILL	D2 DRILL	H HEX	HH AFTER ASSY.	L6	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 FF5OLO	1/4	9/16-18	7/16-20	1.33	0.172	0.172	5/8	1.64	2.07	•	
6 FF5OLO	3/8	11/16-16	9/16-18	1.45	0.264	0.264	3/4	1.80	2.27	•	
8 FF5OLO	1/2	13/16-16	3/4-16	1.74	0.378	0.378	7/8	2.13	2.68	•	
10 FF5OLO	5/8	1-14	7/8-14	2.04	0.484	0.484	1 1/16	2.50	3.13	•	
12 FF5OLO	3/4	1 3/16-12	1 1/16-12	2.05	0.609	0.609	1 5/16	3.03	3.76	•	
16 FF5OLO	1	1 7/16-12	1 5/16-12	2.85	0.812	0.812	1 5/8	3.41	4.14	•	
20 FF5OLO	1 1/4	1 11/16-12	1 5/8-12	3.39	1.024	1.024	1 7/8	4.03	4.76	•	
24 FF5OLO	1 1/2	2-12	1 7/8-12	3.82	1.260	1.260	2 1/8	4.53	5.26	•	

Straight Thread Run Tee

R5OLO



ORFS tube ends / straight thread O-ring

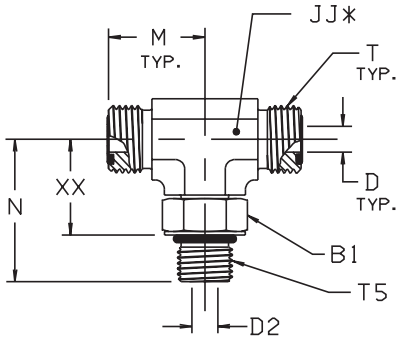
SAE 520428
Part Number Information
R5L - Body only
R5OLO - Assembled with O-rings
All dimensions are in inches

*JJ — ACROSS WRENCH FLATS

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T5 PORT THD UN/UNF-2A	B1 HEX	D DRILL	D2 DRILL	JJ	M	N	XX AFTER ASSY.	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 R5OLO	1/4	9/16-18	7/16-20	5/8	0.172	0.172	9/16	0.85	1.29	0.86	•	•
6 R5OLO	3/8	11/16-16	9/16-18	3/4	0.264	0.264	3/4	0.98	1.45	0.98	•	•
8 R5OLO	1/2	13/16-16	3/4-16	15/16	0.378	0.378	3/4	1.10	1.60	1.06	•	•
10 R5OLO	5/8	1-14	7/8-14	1 1/16	0.484	0.484	1 1/16	1.31	1.97	1.34	•	•
12 R5OLO	3/4	1 3/16-12	1 1/16-12	1 3/8	0.609	0.609	1 3/16	1.47	2.17	1.44	•	•
16 R5OLO	1	1 7/16-12	1 5/16-12	1 5/8	0.812	0.812	1 7/16	1.64	2.35	1.62	•	•
20 R5OLO	1 1/4	1 11/16-12	1 5/8-12	1 7/8	1.024	1.024	1 5/8	1.76	2.45	1.72	•	
24 R5OLO	1 1/2	2-12	1 7/8-12	2 1/8	1.260	1.260	1 7/8	1.92	2.59	1.86	•	

Straight Thread Branch Tee

S5OLO



ORFS tube ends / straight thread O-ring

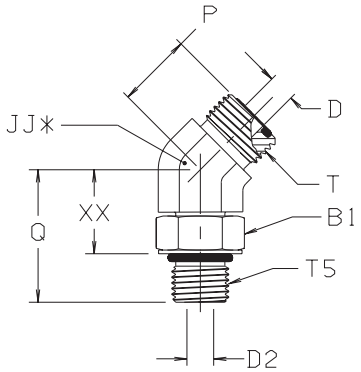
SAE 520429
Part Number Information
S5L - Body only
S5OLO - Assembled with O-rings
All dimensions are in inches

*JJ — ACROSS WRENCH FLATS

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T5 PORT THD UN/UNF-2A	B1 HEX	D DRILL	D2 DRILL	JJ	M	N	XX AFTER ASSY.	STANDARD MATERIAL FROM STOCK	
											S	SS
4 S5OLO	1/4	9/16-18	7/16-20	5/8	0.172	0.172	9/16	0.85	1.29	0.86	•	•
6 S5OLO	3/8	11/16-16	9/16-18	3/4	0.264	0.264	3/4	0.98	1.45	0.98	•	•
8 S5OLO	1/2	13/16-16	3/4-16	15/16	0.378	0.378	3/4	1.10	1.60	1.06	•	•
10 S5OLO	5/8	1-14	7/8-14	1 1/16	0.484	0.484	1 1/16	1.31	1.97	1.34	•	
12 S5OLO	3/4	1 3/16-12	1 1/16-12	1 3/8	0.609	0.609	1 3/16	1.47	2.17	1.44	•	•
16 S5OLO	1	1 7/16-12	1 5/16-12	1 5/8	0.812	0.812	1 7/16	1.64	2.35	1.62	•	•
20 S5OLO	1 1/4	1 11/16-12	1 5/8-12	1 7/8	1.024	1.024	1 5/8	1.76	2.45	1.72	•	
24 S5OLO	1 1/2	2-12	1 7/8-12	2 1/8	1.260	1.260	1 7/8	1.92	2.59	1.86	•	

45° Straight Thread Elbow

V5OLO



*JJ — ACROSS HEX FLATS

ORFS tube end / straight thread O-ring

SAE 520320
Part Number Information
V5L - Body only
V5OLO - Assembled with O-rings
All dimensions are in inches

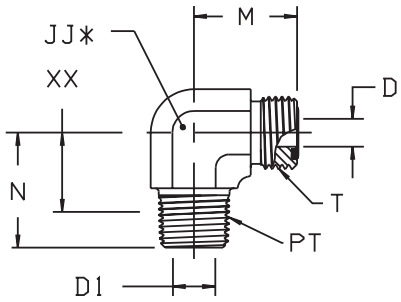
TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T5 PORT THD UN/UNF-2A	B1 HEX	D DRILL	D2 DRILL	JJ*	P	Q	XX AFTER ASSY.	STANDARD MATERIAL FROM STOCK S	SS
4 V5OLO	1/4	9/16-18	7/16-20	5/8	0.172	0.172	9/16	0.63	1.18	0.75	•	•
4-6 V5OLO	1/4	9/16-18	9/16-18	3/4	0.172	0.264	3/4	0.68	1.30	0.83	•	
6 V5OLO	3/8	11/16-16	9/16-18	3/4	0.264	0.264	3/4	0.74	1.30	0.83	•	•
6-4 V5OLO	3/8	11/16-16	7/16-20	5/8	0.264	0.172	3/4	0.74	1.22	0.79	•	
6-8 V5OLO*	3/8	11/16-16	3/4-16	15/16	0.264	0.378	3/4	0.74	1.43	0.89	•	
8 V5OLO	1/2	13/16-16	3/4-16	15/16	0.378	0.378	3/4	0.80	1.43	0.89	•	•
8-6 V5OLO	1/2	13/16-16	9/16-18	3/4	0.378	0.264	3/4	0.80	1.27	0.80	•	
8-10 V5OLO*	1/2	13/16-16	7/8-14	1 1/16	0.378	0.484	3/4	0.82	1.76	1.13	•	
10 V5OLO	5/8	1-14	7/8-14	1 1/16	0.484	0.484	1 1/16	0.92	1.76	1.13	•	•
10-8 V5OLO	5/8	1-14	3/4-16	15/16	0.484	0.378	1 1/16	0.92	1.59	1.05	•	
10-12 V5OLO	5/8	1-14	1 1/16-12	1 3/8	0.484	0.609	1 3/16	0.96	1.97	1.24	•	
12 V5OLO	3/4	1 3/16-12	1 1/16-12	1 3/8	0.609	0.609	1 3/16	1.02	1.97	1.24	•	•
12-10 V5OLO	3/4	1 3/16-12	7/8-14	1 1/16	0.609	0.484	1 3/16	1.02	1.81	1.18	•	
12-16 V5OLO	3/4	1 3/16-12	1 5/16-12	1 5/8	0.609	0.812	1 7/16	1.16	2.06	1.33	•	
14 V5OLO**	7/8	1 5/16-12	1 3/16-12	1 1/2	0.709	0.689	1 5/16	1.18	2.03	1.30	•	
16 V5OLO	1	1 7/16-12	1 5/16-12	1 5/8	0.812	0.812	1 7/16	1.18	2.06	1.33	•	
16-12 V5OLO	1	1 7/16-12	1 1/16-12	1 3/8	0.812	0.609	1 7/16	1.18	2.03	1.30	•	
16-20 V5OLO	1	1 7/16-12	1 5/8-12	1 7/8	0.812	1.024	1 5/8	1.26	2.11	1.38	•	
20 V5OLO	1 1/4	1 11/16-12	1 5/8-12	1 7/8	1.024	1.024	1 5/8	1.26	2.11	1.38	•	
24 V5OLO	1 1/2	2-12	1 7/8-12	2 1/8	1.260	1.260	1 7/8	1.45	2.11	1.38	•	

* JJ for these parts does not conform to SAE.
** Size 14 is not included in SAE J1453.

Male Pipe Elbow

CLO

ORFS tube end / male pipe end



*JJ — ACROSS WRENCH FLATS

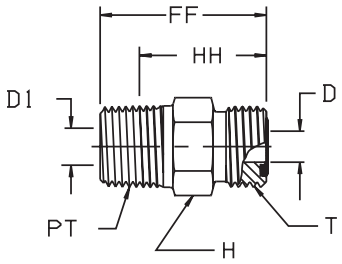
Part Number Information
CL - Body only
CLO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	PT PORT THD NPTF	D DRILL	D1 DRILL	JJ	M	N	XX AFTER ASSY.	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 CLO	1/4	9/16-18	1/8-27	0.172	0.188	9/16	0.85	0.80	0.57	•	•
4-4 CLO	1/4	9/16-18	1/4-18	0.172	0.281	9/16	0.85	1.12	0.78	•	•
4-6 CLO	1/4	9/16-18	3/8-18	0.172	0.406	3/4	0.97	1.22	0.87		•
6 CLO	3/8	11/16-16	1/4-18	0.264	0.281	3/4	0.98	1.09	0.75	•	•
6-6 CLO	3/8	11/16-16	3/8-18	0.264	0.406	3/4	0.98	1.22	0.87	•	•
6-8 CLO	3/8	11/16-16	1/2-14	0.264	0.531	7/8	1.15	1.47	1.01	•	•
8 CLO	1/2	13/16-16	3/8-18	0.378	0.406	3/4	1.10	1.22	0.87	•	•
8-4 CLO	1/2	13/16-16	1/4-18	0.378	0.281	3/4	1.10	1.22	0.87		•
8-8 CLO	1/2	13/16-16	1/2-14	0.378	0.531	7/8	1.10	1.47	1.01	•	•
8-12 CLO	1/2	13/16-16	3/4-14	0.378	0.719	1 1/16	1.32	1.59	1.11	•	
10 CLO	5/8	1-14	1/2-14	0.484	0.531	1 1/16	1.31	1.47	1.01	•	•
10-12 CLO	5/8	1-14	3/4-14	0.484	0.719	1 3/16	1.41	1.59	1.11	•	
12 CLO	3/4	1 3/16-12	3/4-14	0.609	0.719	1 3/16	1.47	1.59	1.11	•	•
12-8 CLO	3/4	1 3/16-12	1/2-14	0.609	0.531	1 3/16	1.47	1.59	1.13	•	
12-16 CLO	3/4	1 3/16-12	1-11 1/2	0.609	0.938	1 5/16	1.62	1.97	1.40	•	
14 CLO*	7/8	1 5/16-12	3/4-14	0.709	0.709	1 5/16	1.63	1.69	1.21	•	
16 CLO	1	1 7/16-12	1-11 1/2	0.812	0.938	1 7/16	1.64	1.97	1.40	•	•
16-12 CLO	1	1 7/16-12	3/4-14	0.812	0.719	1 7/16	1.64	1.78	1.30	•	
20 CLO	1 1/4	1 11/16-12	1 1/4-11 1/2	1.024	1.250	1 5/8	1.76	2.38	1.79	•	
24 CLO	1 1/2	2-12	1 1/2-11 1/2	1.260	1.500	1 7/8	1.92	2.64	2.05	•	
24-20 CLO	1 1/2	2-12	1 1/4-11 1/2	1.260	1.250	1 7/8	1.92	2.61	2.02	•	

*Size 14 is not included in SAE J1453.

Male Pipe Connector

FLO



ORFS tube end / male pipe end

Part Number Information
FL - Body only
FLO - Assembled with O-rings
All dimensions are in inches

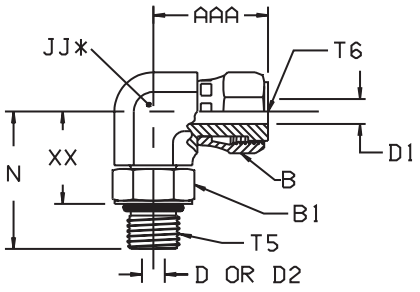
TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	PT PORT THD NPTF	D* DRILL	D1* DRILL	FF	H HEX	HH AFTER ASSY.	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 FLO	1/4	9/16-18	1/8-27	0.172	0.188	1.07	5/8	0.83	•	•
4-4 FLO	1/4	9/16-18	1/4-18	0.172	0.281	1.26	5/8	0.92	•	•
4-6 FLO	1/4	9/16-18	3/8-18	0.172	0.172	1.32	3/4	0.98	•	•
6 FLO	3/8	11/16-16	1/4-18	0.264	0.264	1.25	3/4	0.91	•	•
6-6 FLO	3/8	11/16-16	3/8-18	0.264	0.406	1.34	3/4	0.99	•	•
6-8 FLO	3/8	11/16-16	1/2-14	0.264	0.531	1.55	7/8	1.09	•	•
8 FLO	1/2	13/16-16	3/8-18	0.378	0.406	1.48	7/8	1.13	•	•
8-4 FLO	1/2	13/16-16	1/4-18	0.378	0.281	1.48	7/8	1.13		•
8-8 FLO	1/2	13/16-16	1/2-14	0.378	0.531	1.64	7/8	1.18	•	•
8-12 FLO	1/2	13/16-16	3/4-14	0.378	0.719	1.69	1 1/8	1.21	•	•
10 FLO	5/8	1-14	1/2-14	0.484	0.531	1.82	1 1/16	1.36	•	•
10-12 FLO	5/8	1-14	3/4-14	0.484	0.719	1.82	1 1/8	1.34	•	
12 FLO	3/4	1 3/16-12	3/4-14	0.609	0.719	1.93	1 1/4	1.45	•	•
12-8 FLO	3/4	1 3/16-12	1/2-14	0.609	0.531	1.93	1 1/4	1.47	•	
12-16 FLO	3/4	1 3/16-12	1-11 1/2	0.609	0.938	2.13	1 3/8	1.56	•	
14 FLO**	7/8	1 5/16-12	3/4-14	0.709	0.709	2.00	1 3/8	1.52	•	
16 FLO	1	1 7/16-12	1-11 1/2	0.812	0.938	2.19	1 1/2	1.62	•	•
16-12 FLO	1	1 7/16-12	3/4-14	0.812	0.719	2.00	1 1/2	1.52	•	
20 FLO	1 1/4	1 11/16-12	1 1/4-11 1/2	1.024	1.250	2.30	1 7/8	1.71	•	
24 FLO	1 1/2	2-12	1 1/2-11 1/2	1.260	1.500	2.40	2 1/8	1.81	•	

* Manufacturing option permits a single drill through equal to the smaller of D and D1.
** Size 14 is not included in SAE J1453.

B

Straight Thread Swivel Elbow

AOEL6



*JJ — ACROSS WRENCH FLATS

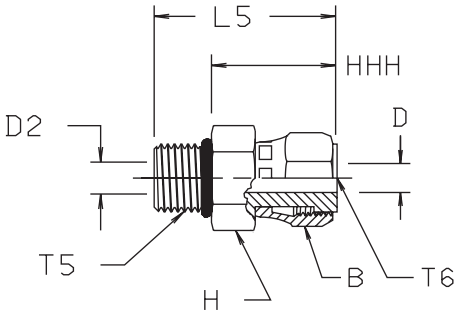
ORFS swivel / straight thread O-ring

SAE 520281
Part Number Information
AEL6 - Body only
AOEL6 - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T5 PORT THD UN/UNF-2A	T6 SWIVEL UN/UNF-2B	AAA	B HEX	B1 HEX	D1 DRILL	D2 DRILL	JJ	N	XX AFTER ASSY.	STANDARD MATERIAL FROM STOCK S	SS
4 AOEL6	1/4	7/16-20	9/16-18	1.07	11/16	5/8	0.166	0.172	9/16	1.29	0.86	•	
6 AOEL6	3/8	9/16-18	11/16-16	1.17	13/16	3/4	0.264	0.264	3/4	1.45	0.98	•	
8 AOEL6	1/2	3/4-16	13/16-16	1.49	15/16	15/16	0.358	0.378	3/4	1.60	1.06	•	
10 AOEL6	5/8	7/8-14	1-14	1.65	1 1/8	1 1/16	0.453	0.484	1 1/16	1.97	1.34	•	
12 AOEL6	3/4	1 1/16-12	1 3/16-12	1.82	1 3/8	1 3/8	0.547	0.609	1 3/16	2.17	1.44	•	
16 AOEL6	1	1 5/16-12	1 7/16-12	2.10	1 5/8	1 5/8	0.783	0.812	1 7/16	2.35	1.67	•	
20 AOEL6	1 1/4	1 5/8-12	1 11/16-12	2.29	1 7/8	1 7/8	1.024	1.024	1 5/8	2.45	1.72	•	
24 AOEL6	1 1/2	1 7/8-12	2-12	2.41	2 1/4	2 1/8	1.260	1.260	1 7/8	2.59	1.86	•	

Straight Thread Swivel Connector

F65OL



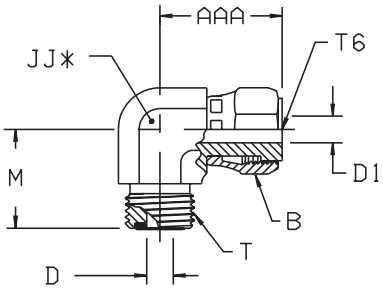
ORFS swivel / Straight thread O-ring

SAE 520181
Part Number Information
F65L - Body only
F65OL - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE. O.D	T TUBE END UN/UNF-2A	T5 PORT THD UN/UNF-2A	B HEX	D DRILL	D2 DRILL	H HEX	HHH AFTER ASSY.	L5	STANDARD MATERIAL FROM STOCK S	SS
4 F65OL	1/4	9/16-18	7/16-20	11/16	0.172	0.172	5/8	1.03	1.46	•	
6 F65OL	3/8	11/16-16	9/16-18	13/16	0.264	0.264	3/4	1.11	1.58	•	
8 F65OL	1/2	13/16-16	3/4-16	15/16	0.378	0.378	7/8	1.39	1.95	•	
10 F65OL	5/8	1-14	7/8-14	1 1/8	0.484	0.484	1 1/16	1.49	2.13	•	
12 F65OL	3/4	1 3/16-12	1 1/16-12	1 3/8	0.609	0.609	1 1/4	1.62	2.34	•	
16 F65OL	1	1 7/16-12	1 5/16-12	1 5/8	0.812	0.812	1 1/2	1.93	2.66	•	

Swivel Nut Elbow

C6LO



*JJ — ACROSS WRENCH FLATS

ORFS swivel / ORFS tube end

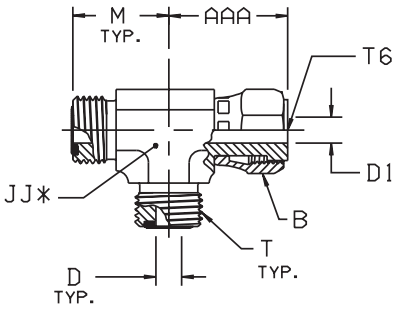
SAE 520221
Part Number Information
C6L - Body only
C6LO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T6 SWIVEL UN/UNF-2B	AAA	B HEX	D DRILL	D1 DRILL	JJ	M	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 C6LO	1/4	9/16-18	9/16-18	1.07	11/16	0.172	0.166	9/16	0.85	•	•
6 C6LO	3/8	11/16-16	11/16-16	1.17	13/16	0.264	0.264	3/4	0.98	•	•
8 C6LO	1/2	13/16-16	13/16-16	1.49	15/16	0.378	0.358	3/4	1.10	•	•
10 C6LO	5/8	1-14	1-14	1.65	1 1/8	0.484	0.453	1 1/16	1.31	•	•
12 C6LO	3/4	1 3/16-12	1 3/16-12	1.82	1 3/8	0.609	0.547	1 3/16	1.47	•	•
14 C6LO*	7/8	1 5/16-12	1 5/16-12	2.07	1 1/2	0.709	0.709	1 5/16	1.63	•	
16 C6LO	1	1 7/16-12	1 7/16-12	2.10	1 5/8	0.812	0.783	1 7/16	1.64	•	•
20 C6LO	1 1/4	1 11/16-12	1 11/16-12	2.29	1 7/8	1.024	1.024	1 5/8	1.76	•	
24 C6LO	1 1/2	2-12	2-12	2.41	2 1/4	1.260	1.260	1 7/8	1.92	•	

*Size 14 is not included in SAE J1453.

Swivel Nut Run Tee

R6LO



*JJ — ACROSS WRENCH FLATS

ORFS swivel / ORFS tube ends

SAE 520432
Part Number Information
R6L - Body only
R6LO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T6 SWIVEL UN/UNF-2B	AAA	B HEX	D DRILL	D1 DRILL	JJ	M	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 R6LO	1/4	9/16-18	9/16-18	1.07	11/16	0.172	0.166	9/16	0.85	•	
6 R6LO	3/8	11/16-16	11/16-16	1.17	13/16	0.264	0.264	3/4	0.98	•	
8 R6LO	1/2	13/16-16	13/16-16	1.49	15/16	0.378	0.358	3/4	1.10	•	
10 R6LO	5/8	1-14	1-14	1.65	1 1/8	0.484	0.453	1 1/16	1.31	•	
12 R6LO	3/4	1 3/16-12	1 3/16-12	1.82	1 3/8	0.609	0.547	1 3/16	1.47	•	
14 R6LO*	7/8	1 5/16-12	1 5/16-12	2.07	1 1/2	0.709	0.709	1 5/16	1.63	•	
16 R6LO	1	1 7/16-12	1 7/16-12	2.10	1 5/8	0.812	0.781	1 7/16	1.64	•	
20 R6LO	1 1/4	1 11/16-12	1 11/16-12	2.29	1 7/8	1.024	1.024	1 5/8	1.76	•	
24 R6LO	1 1/2	2-12	2-12	2.41	2 1/4	1.260	1.260	1 7/8	1.92	•	

*Size 14 is not included in SAE J1453.

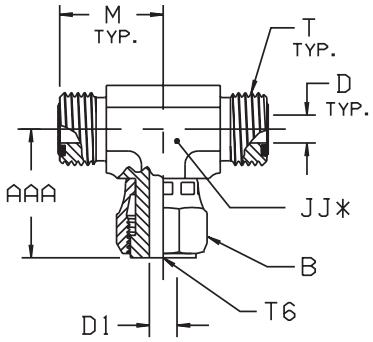
B

Swivel Nut Branch Tee

S6LO

ORFS swivel / ORFS tube ends

SAE 520433
Part Number Information
S6L - Body only
S6LO - Assembled with O-rings
All dimensions are in inches



*JJ — ACROSS WRENCH FLATS

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T6 SWIVEL UN/UNF-2B	AAA	B HEX	D DRILL	D1 DRILL	JJ	M	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 S6LO	1/4	9/16-18	9/16-18	1.07	11/16	0.172	0.166	9/16	0.85	•	•
6 S6LO	3/8	11/16-16	11/16-16	1.17	13/16	0.264	0.264	3/4	0.98	•	•
8 S6LO	1/2	13/16-16	13/16-16	1.49	15/16	0.378	0.358	3/4	1.10	•	•
10 S6LO	5/8	1-14	1-14	1.65	1 1/8	0.484	0.453	1 1/16	1.31	•	•
12 S6LO	3/4	1 3/16-12	1 3/16-12	1.82	1 3/8	0.609	0.547	1 3/16	1.47	•	•
14 S6LO*	7/8	1 5/16-12	1 5/16-12	2.07	1 1/2	0.709	0.709	1 5/16	1.63	•	
16 S6LO	1	1 7/16-12	1 7/16-12	2.10	1 5/8	0.812	0.781	1 7/16	1.64	•	
20 S6LO	1 1/4	1 11/16-12	1 11/16-12	2.29	1 7/8	1.024	1.024	1 5/8	1.76	•	
24 S6LO	1 1/2	2-12	2-12	2.41	2 1/4	1.260	1.260	1 7/8	1.92	•	

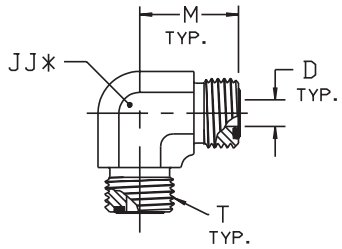
*Size 14 is not included in SAE J1453.

Union Elbow

ELO

ORFS tube end / ORFS tube end

SAE 520201
Part Number Information
EL - Body only
ELO - Assembled with O-rings
All dimensions are in inches



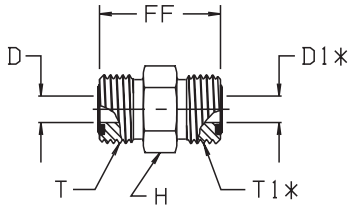
*JJ — ACROSS WRENCH FLATS

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	D DRILL	JJ	M	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 ELO	1/4	9/16-18	0.172	9/16	0.85	•	•
6 ELO	3/8	11/16-16	0.264	3/4	0.98	•	•
8 ELO	1/2	13/16-16	0.378	3/4	1.10	•	•
10 ELO	5/8	1-14	0.484	1 1/16	1.31	•	
12 ELO	3/4	1 3/16-12	0.609	1 3/16	1.47	•	•
14 ELO*	7/8	1 5/16-12	0.709	1 5/16	1.63	•	
16 ELO	1	1 7/16-12	0.812	1 7/16	1.64	•	
20 ELO	1 1/4	1 11/16-12	1.024	1 5/8	1.76	•	
24 ELO	1 1/2	2-12	1.260	1 7/8	1.92	•	•
32 ELO*	2	2 1/2-12	1.772	2 1/2	2.76	•	

*Sizes 14 and 32 are not included in SAE J1453.

Union

HLO



*D1 & T1 ARE FOR JUMP SIZES ONLY.
OTHERWISE D & T ARE TYPICAL

ORFS tube end / ORFS tube end

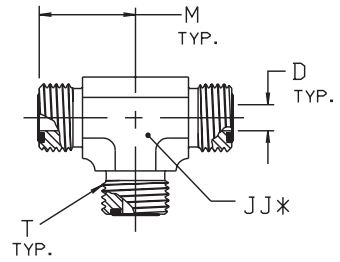
SAE 520101
Part Number Information
HL - Body only
HLO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T1 TUBE END UN/UNF-2A	D** DRILL	D1** DRILL	FF	H HEX	STANDARD MATERIAL FROM STOCK S	SS
4 HLO	1/4	9/16-18		0.172		1.08	5/8	•	•
6 HLO	3/8	11/16-16		0.264		1.22	3/4	•	•
6-4 HLO	3/8 to 1/4	11/16-16	9/16-18	0.264	0.172	1.17	3/4	•	
8 HLO	1/2	13/16-16		0.378		1.39	7/8	•	•
8-6 HLO	1/2 to 3/8	13/16-16	11/16-16	0.378	0.264	1.33	7/8	•	
10 HLO	5/8	1-14		0.484		1.68	1 1/16	•	•
10-8 HLO	5/8 to 1/2	1-14	13/16-16	0.484	0.378	1.57	1 1/16	•	
12 HLO	3/4	1 3/16-12		0.609		1.85	1 1/4	•	•
12-10 HLO	3/4 to 5/8	1 3/16-12	1-14	0.609	0.484	1.80	1 1/4	•	
14 HLO*	7/8	1 5/16-12		0.709		1.87	1 3/8	•	
16 HLO	1	1 7/16-12		0.812		1.94	1 1/2	•	•
16-12 HLO	1 to 3/4	1 7/16-12	1 3/16-12	0.812	0.609	1.92	1 1/2	•	
20 HLO	1 1/4	1 11/16-12		1.024		2.02	1 3/4	•	
24 HLO	1 1/2	2-12		1.260		2.09	2 1/8	•	•
32 HLO*	2	2 1/2-12		1.772		2.87	2 3/4	•	

*Sizes 14 and 32 are not included in SAE J1453.
**Manufacturing option permits a single drill through equal to the smaller of D and D1.

Union Tee

JLO



*JJ — ACROSS WRENCH FLATS

ORFS tube ends

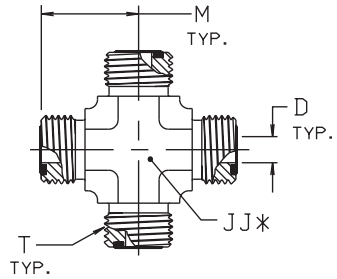
SAE 520401
Part Number Information
JL - Body only
JLO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	D DRILL	JJ	M	STANDARD MATERIAL FROM STOCK S	SS
4 JLO	1/4	9/16-18	0.172	9/16	0.85	•	•
6 JLO	3/8	11/16-16	0.264	3/4	0.98	•	•
8 JLO	1/2	13/16-16	0.378	3/4	1.10	•	•
10 JLO	5/8	1-14	0.484	1 1/16	1.31	•	•
12 JLO	3/4	1 3/16-12	0.609	1 3/16	1.47	•	•
14 JLO*	7/8	1 5/16-12	0.709	1 5/16	1.63	•	
16 JLO	1	1 7/16-12	0.812	1 7/16	1.64	•	•
20 JLO	1 1/4	1 11/16-12	1.024	1 5/8	1.76	•	
24 JLO	1 1/2	2-12	1.260	1 7/8	1.92	•	•
32 JLO*	2	2 1/2-12	1.772	2 1/2	2.76	•	

*Sizes 14 and 32 are not included in SAE J1453.

Union Cross

KLO



*JJ — ACROSS WRENCH FLATS

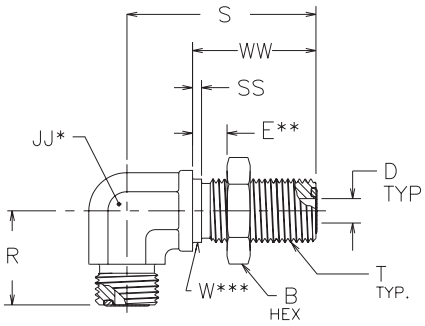
ORFS tube ends

SAE 520501
Part Number Information
KL - Body only
KLO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	D DRILL	JJ	M	STANDARD MATERIAL FROM STOCK S	SS
4 KLO	1/4	9/16-18	0.172	9/16	0.85	•	
6 KLO	3/8	11/16-16	0.264	3/4	0.98	•	
8 KLO	1/2	13/16-16	0.378	3/4	1.10	•	
10 KLO	5/8	1-14	0.484	1 1/16	1.31	•	
12 KLO	3/4	1 3/16-12	0.609	1 3/16	1.47	•	
16 KLO	1	1 7/16-12	0.812	1 7/16	1.64	•	
20 KLO	1 1/4	1 11/16-12	1.024	1 5/8	1.76	•	

Bulkhead Union Elbow

WELO



ORFS tube end / ORFS tube end

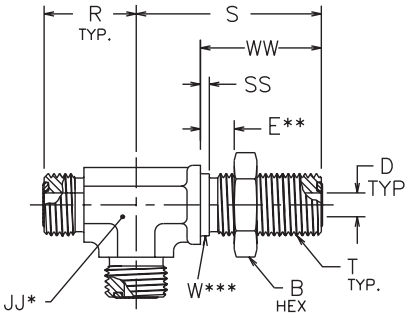
SAE 520701
Part Number Information
WEL - Body only
WELO - Assembled with O-rings
WELO - WLNL - Assembled with O-rings and locknut
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	B HEX	D DRILL	E** MAX	JJ*	R	S	SS	W*** DIA.	WW	STANDARD MATERIAL FROM STOCK S	SS
4 WELO	1/4	9/16-18	13/16	0.172	0.53	9/16	0.89	1.85	0.06	0.56	1.24	•	
6 WELO	3/8	11/16-16	1	0.264	0.53	3/4	1.02	2.05	0.06	0.69	1.34	•	
8 WELO	1/2	13/16-16	1 1/8	0.378	0.53	3/4	1.14	2.18	0.06	0.81	1.44	•	
10 WELO	5/8	1-14	1 5/16	0.484	0.52	1 1/16	1.36	2.48	0.06	1.00	1.60	•	
12 WELO	3/4	1 3/16-12	1 1/2	0.609	0.50	1 3/16	1.52	2.65	0.06	1.19	1.64	•	
14 WELO**	7/8	1 5/16-12	1 5/8	0.709	0.51	1 7/16	1.67	2.80	0.06	1.31	1.66	•	
16 WELO	1	1 7/16-12	1 3/4	0.812	0.51	1 7/16	1.67	2.80	0.06	1.44	1.66	•	
20 WELO	1 1/4	1 11/16-12	2	1.024	0.51	1 5/8	1.79	2.97	0.06	1.69	1.66	•	
24 WELO	1 1/2	2-12	2 3/8	1.260	0.51	1 7/8	1.95	3.13	0.06	2.00	1.66	•	

* Across wrench flats.
** Maximum bulkhead thickness.
*** Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".
**** Size 14 is not included in SAE J1453.

Bulkhead Run Tee

WJJLO



ORFS tube end (all three ends)

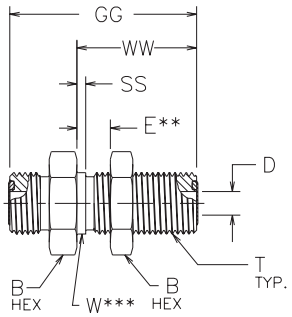
SAE 520958
Part Number Information
WJJL - Body only
WJJLO - Assembled with O-rings
WJJLO - WLNL - Assembled wtih O-rings and locknut
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	B HEX	D DRILL	E** MAX	JJ*	R	S	SS	W*** DIA.	WW	STANDARD MATERIAL FROM STOCK S	SS
4 WJJLO	1/4	9/16-18	13/16	0.172	0.53	9/16	0.89	1.85	0.06	0.56	1.24	•	
6 WJJLO	3/8	11/16-16	1	0.264	0.53	3/4	1.02	2.05	0.06	0.69	1.34	•	
8 WJJLO	1/2	13/16-16	1 1/8	0.378	0.53	3/4	1.14	2.18	0.06	0.81	1.44	•	
10 WJJLO	5/8	1-14	1 5/16	0.484	0.52	1 1/16	1.36	2.48	0.06	1.00	1.60	•	
12 WJJLO	3/4	1 3/16-12	1 1/2	0.609	0.50	1 3/16	1.52	2.65	0.06	1.19	1.64	•	
16 WJJLO	1	1 7/16-12	1 3/4	0.812	0.51	1 7/16	1.67	2.80	0.06	1.44	1.66	•	
20 WJJLO	1 1/4	1 11/16-12	2	1.024	0.51	1 5/8	1.79	2.97	0.06	1.69	1.66	•	
24 WJJLO	1 1/2	2-12	2 3/8	1.260	0.51	1 7/8	1.95	3.13	0.06	2.00	1.66	•	

* Across wrench flats.
** Maximum bulkhead thickness.
*** Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Bulkhead Union

WLO



ORFS tube end / ORFS tube end

SAE 520601
Part Number Information
WL - Body only
WLO - Assembled with O-rings
WLO - WLNL - Assembled with O-rings and locknut
All dimensions are in inches

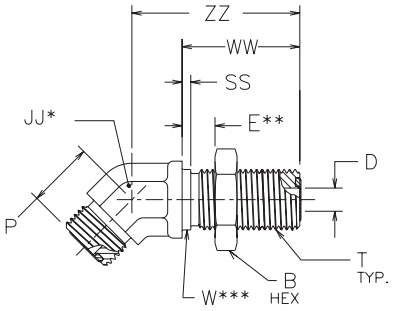
TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	B HEX	D DRILL	E** MAX	GG	SS	W*** DIA.	WW	STANDARD MATERIAL FROM STOCK S	SS
4 WLO	1/4	9/16-18	13/16	0.172	0.53	1.90	0.06	0.56	1.24	•	•
6 WLO	3/8	11/16-16	1	0.264	0.53	2.09	0.06	0.69	1.34	•	•
8 WLO	1/2	13/16-16	1 1/8	0.378	0.53	2.30	0.06	0.81	1.44	•	•
10 WLO	5/8	1-14	1 5/16	0.484	0.52	2.62	0.06	1.00	1.60	•	
12 WLO	3/4	1 3/16-12	1 1/2	0.609	0.50	2.72	0.06	1.19	1.64	•	•
14 WLO*	7/8	1 5/16-12	1 5/8	0.709	0.51	2.76	0.06	1.31	1.66	•	
16 WLO	1	1 7/16-12	1 3/4	0.812	0.51	2.76	0.06	1.44	1.66	•	
20 WLO	1 1/4	1 11/16-12	2	1.024	0.51	2.76	0.06	1.69	1.66	•	
24 WLO	1 1/2	2-12	2 3/8	1.260	0.51	2.76	0.06	2.00	1.66	•	

* Size 14 is not included ni SAE J1453.
** Maximum bulkhead thickness.
*** Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

B

45° Bulkhead Union Elbow

WNLO



ORFS tube end / ORFS tube end

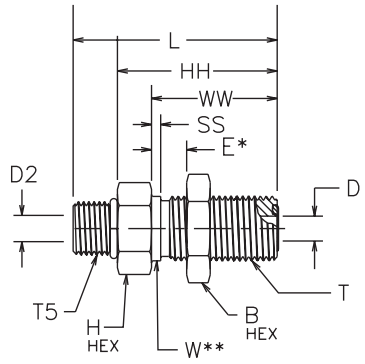
SAE 520801
Part Number Information
WNL - Body only
WNLO - Assembled with O-rings
WNLO - WLNL - Assembled with O-rings and locknut
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	B HEX	D DRILL	E** MAX	JJ*	P	SS	W*** DIA.	WW	ZZ	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 WNLO	1/4	9/16-18	13/16	0.172	0.53	9/16	0.63	0.06	0.56	1.24	1.73	•	
6 WNLO	3/8	11/16-16	1	0.264	0.53	3/4	0.74	0.06	0.69	1.34	1.91	•	
8 WNLO	1/2	13/16-16	1 1/8	0.378	0.53	3/4	0.80	0.06	0.81	1.44	2.01	•	
10 WNLO	5/8	1-14	1 5/16	0.484	0.52	1 1/16	0.92	0.06	1.00	1.60	2.23	•	
12 WNLO	3/4	1 3/16-12	1 1/2	0.609	0.50	1 3/16	1.02	0.06	1.19	1.64	2.39	•	
16 WNLO	1	1 7/16-12	1 3/4	0.812	0.51	1 7/16	1.18	0.06	1.44	1.66	2.57	•	
20 WNLO	1 1/4	1 11/16-12	2	1.024	0.51	1 5/8	1.26	0.06	1.69	1.66	2.64	•	
24 WNLO	1 1/2	2-12	2 3/8	1.260	0.51	1 7/8	1.45	0.06	2.00	1.66	2.64	•	

* Across wrench flats.
** Maximum bulkhead thickness.
*** Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Straight Thread Bulkhead Connector

WF5OLO



ORFS Tube End / Straight Thread O-ring

Part Number Information
WF5L - Body Only
WF5OLO-WLNL - Assembled with O-rings and locknut
WF5OLO - Assembled with O-rings
All dimensions are in inches

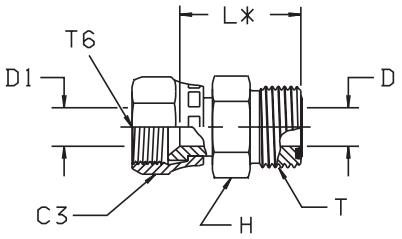
TUBE FITTING PART #	TUBE O.D.	T UN/UNF-2A	T5 UN/UNF-2A	B HEX	D DRILL	D2 DRILL	E* MAX	H HEX	HH	L	SS	W** DIA	WW	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4-6 WF5OLO	1/4	9/16-18	9/16-18	13/16	0.172	0.297	0.53	13/16	1.71	2.18	0.06	0.56	1.24		
6 WF5OLO	3/8	11/16-16	9/16-18	1	0.264	0.297	0.53	1	1.81	2.28	0.06	0.69	1.34		
8 WF5OLO	1/2	13/16-16	3/4-16	1 1/8	0.378	0.391	0.53	1 1/8	2.03	2.57	0.06	0.81	1.44		

* Maximum bulkhead thickness.
** Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

37° Swivel Adapter

LOHX6

37° swivel / ORFS tube end



*L — END TO BASE OF FLARE

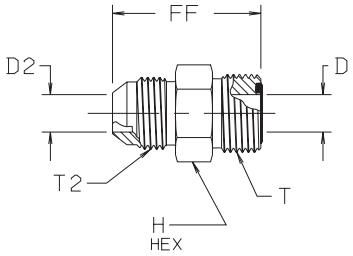
Part Number Information
LHX6 - Body only
LOHX6 - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T6 SWIVEL UN/UNF-2B	C3 HEX	D DRILL	D1 DRILL	H HEX	L	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 LOHX6	1/4	9/16-18	7/16-20	5/8	0.172	0.172	5/8	1.04	•	
6 LOHX6	3/8	11/16-16	9/16-18	3/4	0.264	0.264	3/4	1.14	•	
8 LOHX6	1/2	13/16-16	3/4-16	7/8	0.378	0.378	7/8	1.32	•	
10 LOHX6	5/8	1-14	7/8-14	1 1/16	0.484	0.484	1 1/16	1.52	•	
12 LOHX6	3/4	1 3/16-12	1 1/16-12	1 1/4	0.609	0.609	1 1/4	1.63	•	
16 LOHX6	1	1 7/16-12	1 5/16-12	1 1/2	0.812	0.812	1 1/2	1.79	•	

37° Male Adapter

XHLO

37° tube end / ORFS tube end

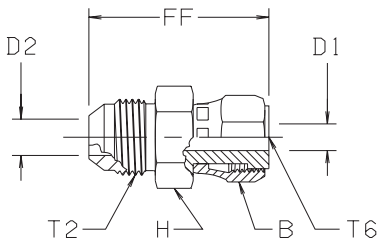


Part Number Information
XHL - Body only
XHLO - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T2 TUBE END UN/UNF-2A	D DRILL	D2 DRILL	FF	H HEX	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 XHLO	1/4	9/16-18	7/16-20	0.172	0.172	1.25	5/8	•	
6 XHLO	3/8	11/16-16	9/16-18	0.264	0.264	1.34	3/4	•	
8 XHLO	1/2	13/16-16	3/4-16	0.378	0.378	1.55	7/8	•	
10 XHLO	5/8	1-14	7/8-14	0.484	0.484	1.83	1 1/16	•	
12 XHLO	3/4	1 3/16-12	1 1/16-12	0.609	0.609	2.05	1 1/4	•	
16 XHLO	1	1 7/16-12	1 5/16-12	0.812	0.812	2.16	1 1/2	•	
20 XHLO	1 1/4	1 11/16-12	1 5/8-12	1.024	1.024	2.29	1 3/4	•	
24 XHLO	1 1/2	2-12	1 7/8-12	1.260	1.260	2.48	2 1/8	•	

37° Male Swivel Adapter

XHL6



B

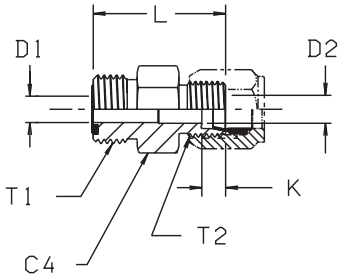
ORFS swivel / 37° tube end

Part Number Information
XHL6 - Body only
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T2 TUBE END UN/UNF-2A	T6 SWIVEL UN/UNF-2B	B HEX	D1 DRILL	D2	FF	H HEX	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 XHL6	1/4	7/16-20	9/16-18	11/16	0.165	0.165	1.50	5/8	•	
6 XHL6	3/8	9/16-18	11/16-16	13/16	0.264	0.264	1.61	3/4	•	
8 XHL6	1/2	3/4-16	13/16-16	15/16	0.358	0.358	1.90	7/8	•	
10 XHL6	5/8	7/8-14	1-14	1 1/8	0.453	0.453	2.20	1 1/16	•	
12 XHL6	3/4	1 1/16-12	1 3/16-12	1 3/8	0.547	0.547	2.50	1 1/4	•	
16 XHL6	1	1 5/16-12	1 7/16-12	1 5/8	0.783	0.783	2.66	1 1/2	•	
20 XHL6	1 1/4	1 5/8-12	1 11/16-12	1 7/8	1.024	1.024	2.80	1 11/16	•	

Ferulok Male Adapter

BUHLO



ORFS tube end / Flareless tube end

Part Number Information
UHL - Body only
BUHLO - Assembled with flareless nut & sleeve and ORFS O-Ring
All dimensions are in inches

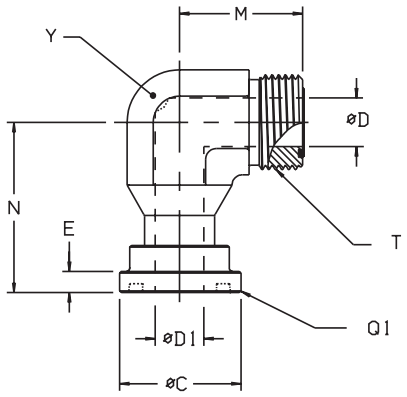
TUBE FITTING PART #	TUBE O.D.	T1 TUBE UN/UNF-2A	T2 TUBE UN/UNF-2A	C4 HEX	D1 DRILL	D2 DRILL	K	L	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
6 BUHLO	3/8	11/16-16	9/16-18	3/4	0.264	0.281	0.26	1.25	•	
8 BUHLO	1/2	13/16-16	3/4-16	7/8	0.378	0.422	0.31	1.45	•	
10 BUHLO	5/8	1-14	7/8-14	1 1/16	0.484	0.500	0.36	1.70	•	
12 BUHLO	3/4	1 3/16-12	1 /16-12	1 1/4	0.609	0.656	0.36	1.88	•	
16 BUHLO	1	1 7/16/12	1 5/16-12	1 1/2	0.812	0.875	0.42	1.94	•	

Code 61 Flange Elbow

LOEQ1

ORFS Tube End / Flange End

Part Number Information
LEQ1 - Body only
LOEQ1 - Assembled with ORFS O-Ring
All dimensions are in inches



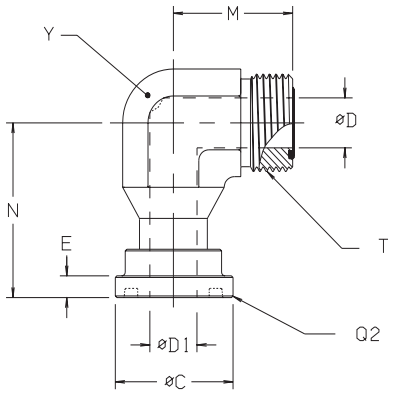
TUBE FITTING PART #	TUBE O.D.	Q1 CODE 61 FLANGE SIZE	T TUBE END UN/UNF-2A	D DRILL	D1 DRILL	M	N	Y	C	E	STANDARD MATERIAL FROM STOCK S	SS
12 LOEQ1	3/4	3/4	1 3/16-12	0.609	0.609	1.47	2.13	1 3/16	1.500	0.265	•	
16 LOEQ1	1	1	1 7/16-12	0.812	0.812	1.64	2.37	1 7/16	1.750	0.315	•	
20 LOEQ1	1 1/4	1 1/4	1 11/16-12	1.024	1.024	1.76	2.62	1 5/8	2.000	0.315	•	
24 LOEQ1	1 1/2	1 1/2	2-12	1.260	1.260	1.92	3.12	1 7/8	2.375	0.315	•	

Code 62 Flange Elbow

LOEQ2

ORFS Tube End / Flange End

Part Number Information
LEQ2 - Body only
LOEQ2 - Assembled with ORFS O-Ring
All dimensions are in inches

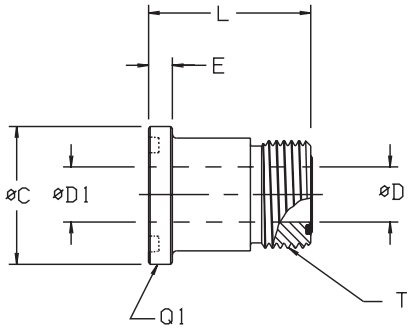


TUBE FITTING PART #	TUBE O.D.	Q2 CODE 62 FLANGE SIZE	T TUBE END UN/UNF-2A	D DRILL	D1 DRILL	M	N	Y	C	E	STANDARD MATERIAL FROM STOCK S	SS
12 LOEQ2	3/4	3/4	1 3/16-12	0.609	0.609	1.47	2.13	1 3/16	1.625	0.345	•	
16 LOEQ2	1	1	1 7/16-12	0.812	0.812	1.64	2.37	1 7/16	1.875	0.375	•	
20 LOEQ2	1 1/4	1 1/4	1 11/16-12	1.024	1.024	1.76	2.62	1 5/8	2.125	0.405	•	
24 LOEQ2	1 1/2	1 1/2	2-12	1.260	1.260	1.92	3.12	1 7/8	2.500	0.495	•	

Code 61 Flange Connector

LOHQ1

ORFS Tube End / Flange End



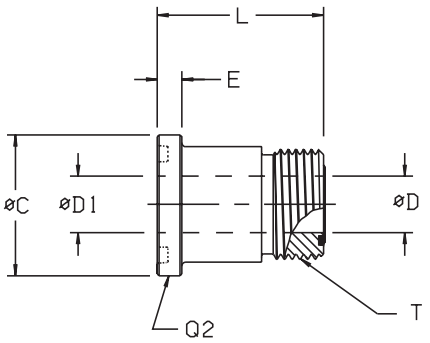
Part Number Information
LHQ1 - Body only
LOHQ1 - Assembled with ORFS O-ring
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	Q1 CODE 61 FLANGE SIZE	T TUBE END UN/UNF-2A	D DRILL	D1 DRILL	L	C	E	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
12 LOHQ1	3/4	3/4	1 3/16-12	0.609	0.609	1.80	1.500	0.265	•	
16 LOHQ1	1	1	1 7/16-12	0.812	0.812	1.88	1.750	0.315	•	
20 LOHQ1	1 1/4	1 1/4	1 11/16-12	1.024	1.024	1.82	2.000	0.315	•	
24 LOHQ1	1 1/2	1 1/2	2-12	1.260	1.260	1.94	2.375	0.315	•	

Code 62 Flange Connector

LOHQ2

ORFS Tube End / Flange End



Part Number Information
LHQ2 - Body only
LOHQ2 - Assembled with ORFS O-ring
All dimensions are in inches

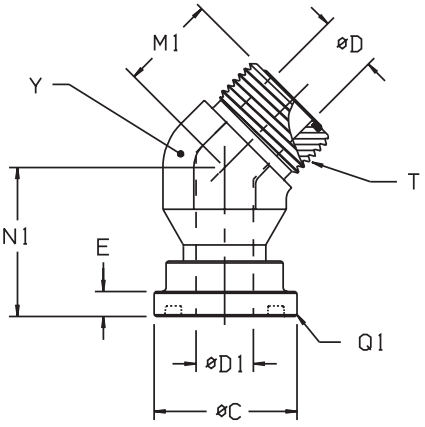
TUBE FITTING PART #	TUBE O.D.	Q2 CODE 62 FLANGE SIZE	T TUBE END UN/UNF-2A	D DRILL	D1 DRILL	L	C	E	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
12 LOHQ2	3/4	3/4	1 3/16-12	0.609	0.609	2.04	1.625	0.345	•	
12-16 LOHQ2	3/4	1	1 3/16-12	0.609	0.609	2.25	1.875	0.375	•	
16 LOHQ2	1	1	1 7/16-12	0.812	0.812	2.25	1.875	0.375	•	
20 LOHQ2	1 1/4	1 1/4	1 11/16-12	1.024	1.024	2.44	2.125	0.405	•	
24 LOHQ2	1 1/2	1 1/2	2-12	1.260	1.260	2.63	2.500	0.495	•	

Code 61 Flange 45° Elbow

LOVQ1

ORFS Tube End / Flange End

Part Number Information
LVQ1 - Body only
LOVQ1 - Assembled with ORFS O-ring
All dimensions are in inches



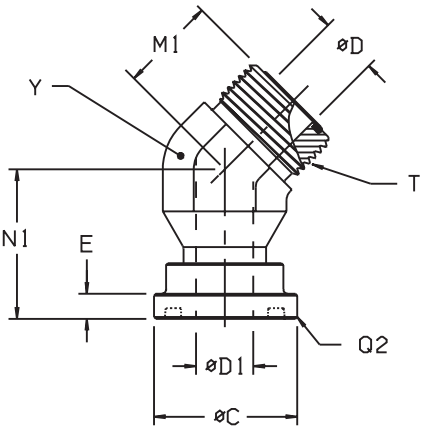
TUBE FITTING PART #	TUBE O.D.	Q1 CODE 61 FLANGE SIZE	T TUBE END UN/UNF-2A	D DRILL	D1 DRILL	M1	N1	Y	C	E	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
12 LOVQ1	3/4	3/4	1 3/16-12	0.609	0.609	1.02	1.58	1 3/16	1.500	0.265	•	
16 LOVQ1	1	1	1 7/16-12	0.812	0.812	1.18	1.85	1 7/16	1.750	0.315	•	
20 LOVQ1	1 1/4	1 1/4	1 11/16-12	1.024	1.024	1.26	2.04	1 5/8	2.000	0.315	•	
24 LOVQ1	1 1/2	1 1/2	2-12	1.260	1.260	1.45	2.38	1 7/8	2.350	0.315	•	

Code 62 Flange 45° Elbow

LOVQ2

ORFS Tube End / Flange End

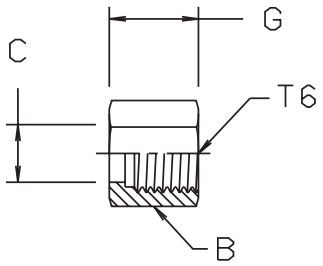
Part Number Information
LVQ2 - Body only
LOVQ2 - Assembled with ORFS O-ring
All dimensions are in inches



TUBE FITTING PART #	TUBE O.D.	Q2 CODE 62 FLANGE SIZE	T TUBE END UN/UNF-2A	D DRILL	D1 DRILL	M1	N1	Y	C	E	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
12 LOVQ2	3/4	3/4	1 3/16-12	0.609	0.609	1.02	1.58	1 3/16	1.625	0.345	•	
16 LOVQ2	1	1	1 7/16-12	0.812	0.812	1.18	1.85	1 7/16	1.875	0.375	•	
20 LOVQ2	1 1/4	1 1/4	1 11/16-12	1.024	1.024	1.26	2.04	1 5/8	2.125	0.405	•	
24 LOVQ2	1 1/2	1 1/2	2-12	1.260	1.260	1.45	2.38	1 7/8	2.500	0.495	•	

Nut

BL



ORFS tube nut

SAE 520110

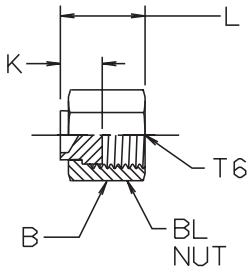
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T6 UN/UNF-2B	B HEX	C	G	STANDARD MATERIAL FROM STOCK	
						S	SS
4 BL	1/4	9/16-18	11/16	0.41	0.58	•	•
6 BL	3/8	11/16-16	13/16	0.53	0.67	•	•
8 BL	1/2	13/16-16	15/16	0.65	0.83	•	•
10 BL	5/8	1-14	1 1/8	0.83	0.93	•	•
12 BL	3/4	1 3/16-12	1 3/8	0.95	1.02	•	•
12-14 BL	7/8	1 3/16-12	1 3/8	0.99	1.22	•	
14 BL*	7/8	1 5/16-12	1 1/2	1.08	1.04	•	
16 BL	1	1 7/16-12	1 5/8	1.14	1.10	•	•
20 BL	1 1/4	1 11/16-12	1 7/8	1.42	1.10	•	•
24 BL	1 1/2	2-12	2 1/4	1.73	1.10	•	•
32 BL*	2	2 1/2-12	2 7/8	2.22	1.30	•	

*Sizes 14 and 32 are not included in SAE J1453.

Cap

FNL



ORFS tube end cap

SAE 520112

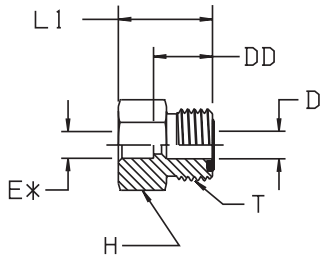
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T6 UN/UNF-2B	B HEX	K	L	STANDARD MATERIAL FROM STOCK	
						S	SS
4 FNL	1/4	9/16-18	11/16	0.34	0.65	•	•
6 FNL	3/8	11/16-16	13/16	0.37	0.74	•	•
8 FNL	1/2	13/16-16	15/16	0.47	0.90	•	•
10 FNL	5/8	1-14	1 1/8	0.47	1.00	•	•
12 FNL	3/4	1 3/16-12	1 3/8	0.53	1.10	•	•
14 FNL*	7/8	1 5/16-12	1 1/2	0.61	1.14	•	
16 FNL	1	1 7/16-12	1 5/8	0.59	1.16	•	•
20 FNL	1 1/4	1 11/16-12	1 7/8	0.59	1.16	•	•
24 FNL	1 1/2	2-12	2 1/4	0.59	1.16	•	•
32 FNL*	2	2 1/2-12	2 7/8	0.80	1.47	•	

*Sizes 14 and 32 are not included in SAE J1453.

Braze Connector

LOHB3



ORFS tube end / silver braze socket*

SAE 520104
Part Number Information
LHB3 - Body only
LOHB3 - Assembled with O-rings
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	D DRILL	DD	E* DIA. TUBE SOCKET	H HEX	L1	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
4 LOHB3	1/4	9/16-18	0.172	0.52	0.26	5/8	0.86	•	
4-6 LOHB3	1/4 to 3/8	9/16-18	0.172	0.52	0.38	5/8	0.86	•	
6 LOHB3	3/8	11/16-16	0.264	0.56	0.38	3/4	0.90	•	
6-4 LOHB3	3/8 to 1/4	11/16-16	0.264	0.56	0.26	3/4	0.90	•	
6-8 LOHB3	3/8 to 1/2	11/16-16	0.264	0.56	0.51	3/4	0.90	•	
8 LOHB3	1/2	13/16-16	0.378	0.63	0.51	7/8	0.97	•	
8-4 LOHB3	1/2 to 1/4	13/16-16	0.378	0.64	0.26	7/8	0.97	•	
8-6 LOHB3	1/2 to 3/8	13/16-16	0.378	0.63	0.38	7/8	0.97	•	
8-10 LOHB3	1/2 to 5/8	13/16-16	0.378	0.63	0.63	7/8	0.97	•	
8-12 LOHB3	1/2 to 3/4	13/16-16	0.378	0.67	0.76	1 1/16	1.16	•	
10 LOHB3	5/8	1-14	0.484	0.73	0.63	1 1/16	1.07	•	
10-6 LOHB3	5/8 to 3/8	1-14	0.484	0.73	0.38	1 1/16	1.07	•	
10-8 LOHB3	5/8 to 1/2	1-14	0.484	0.73	0.51	1 1/16	1.07	•	
10-12 LOHB3	5/8 to 3/4	1-14	0.484	0.74	0.76	1 1/16	1.23	•	
12 LOHB3	3/4	1 3/16-12	0.609	0.83	0.76	1 1/4	1.32	•	
12-8 LOHB3	3/4 to 1/2	1 3/16-12	0.609	0.83	0.51	1 1/4	1.16	•	
12-10 LOHB3	3/4 to 5/8	1 3/16-12	0.609	0.83	0.63	1 1/4	1.16	•	
12-16 LOHB3	3/4 to 1	1 3/16-12	0.609	0.83	1.01	1 1/2	1.38	•	
14 LOHB3*	7/8	1 5/16-12	0.709	0.97	0.88	1 3/8	1.52	•	
16 LOHB3	1	1 7/16-12	0.812	0.97	1.01	1 1/2	1.52	•	
16-8 LOHB3	1 to 1/2	1 7/16-12	0.812	0.97	0.51	1 1/2	1.30	•	
16-12 LOHB3	1 to 3/4	1 7/16-12	0.812	0.97	0.76	1 1/2	1.46	•	
16-20 LOHB3	1 to 1 1/4	1 7/16-12	0.812	0.97	1.26	1 3/4	1.52	•	
20 LOHB3	1 1/4	1 11/16-12	1.024	0.97	1.26	1 3/4	1.52	•	
20-16 LOHB3	1 1/4 to 1	1 11/16-12	1.024	0.97	1.01	1 3/4	1.52	•	
20-24 LOHB3	1 1/4 to 1 1/2	1 11/16-12	1.024	0.97	1.51	2 1/8	1.52	•	
24 LOHB3	1 1/2	2-11 1/2	1.260	0.97	1.51	2 1/8	1.52	•	
24-20 LOHB3	1 1/2 to 1 1/4	2-11 1/2	1.260	0.97	1.26	2 1/8	1.52	•	

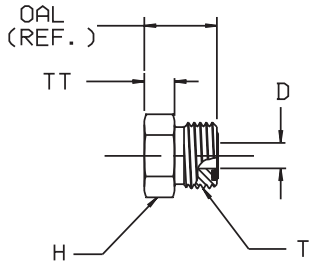
Unplated part, oil dipped for corrosion protection.
*Size 14 is not included in SAE J1453.
E* is for silver brazing. Standard steel parts are not recommended for welding.

NOTE: If ordered with O-ring assembled, the O-ring must be removed prior to brazing operation.

B

Plug

PNLO



ORFS tube end plug

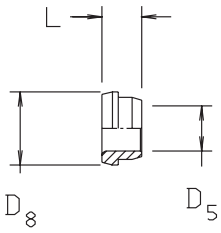
SAE 520109
Part Number Information
PNL - Body only
PNLO - Assembled with O-ring
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	D DRILL	H HEX	OAL (REF)	TT	STANDARD MATERIAL FROM STOCK S	SS
4 PNLO	1/4	9/16-18	0.172	5/8	0.66	0.20	•	
6 PNLO	3/8	11/16-16	0.264	3/4	0.76	0.32	•	
8 PNLO	1/2	13/16-16	0.378	7/8	0.86	0.35	•	
10 PNLO	5/8	1-14	0.484	1 1/16	1.02	0.41	•	
12 PNLO	3/4	1 3/16-12	0.609	1 1/4	1.08	0.41	•	
14 PNLO*	7/8	1 5/16-12	0.709	1 3/8	1.18	0.49	•	
16 PNLO	1	1 7/16-12	0.812	1 1/2	1.10	0.41	•	
20 PNLO	1 1/4	1 11/16-12	1.024	1 3/4	1.10	0.41	•	
24 PNLO	1 1/2	2-12	1.260	2 1/8	1.10	0.41	•	
32 PNLO*	2	2 1/2-12	1.772	2 3/4	1.37	0.50	•	

*Sizes 14 and 32 are not included in SAE J1453.

Parflange Sleeve for Inch Tubing

TPL



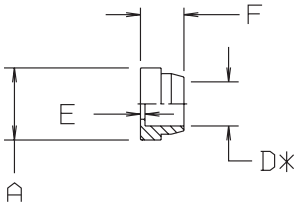
ORFS Mechanically Attachable Sleeve

All dimensions are in inches

TUBE FITTING PART #	D5 TUBE O.D.	D8 DIA.	L	STANDARD MATERIAL FROM STOCK S	SS
4 TPL	1/4	.50	0.30	•	•
6 TPL	3/8	.62	0.34	•	•
8 TPL	1/2	.74	0.42	•	•
10 TPL	5/8	.92	0.42	•	
12 TPL	3/4	1.09	0.47	•	•
16 TPL	1	1.34	0.53	•	•
20 TPL	1 1/4	1.59	0.52	•	
24 TPL	1 1/2	1.91	0.49	•	
32 TPL	2	2.39	0.54	•	

Sleeve

TL



*D IS FOR SILVER BRAZING

ORFS silver braze sleeve*

SAE 520115

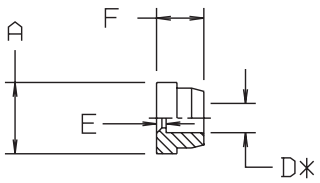
All dimensions are in inches

TUBE FITTING PART #	D* TUBE O.D.	A DIA.	D*	E	F	STANDARD MATERIAL FROM STOCK S	SS
4 TL	1/4	0.50	0.26	0.04	0.37	•	•
6 TL	3/8	0.62	0.38	0.04	0.37	•	•
8 TL	1/2	0.75	0.51	0.04	0.37	•	•
10 TL	5/8	0.92	0.63	0.06	0.41	•	•
12 TL	3/4	1.10	0.76	0.06	0.55	•	•
14 TL*	7/8	1.22	0.88	0.06	0.55	•	
16 TL	1	1.35	1.01	0.06	0.61	•	•
20 TL	1 1/4	1.60	1.26	0.06	0.61	•	•
24 TL	1 1/2	1.91	1.51	0.06	0.61	•	•
32 TL*	2	2.41	2.01	0.06	0.65	•	

Unplated part, oil dipped for corrosion protection.
*Sizes 14 and 32 are not included in SAE J1453.

Reducer Sleeve

TL Reducer



*D IS FOR SILVER BRAZING

ORFS silver braze sleeve reducer*

SAE 520115

All dimensions are in inches

TUBE FITTING PART #	TUBE O.D. REDUCTION	A	D*	E	F	STANDARD MATERIAL FROM STOCK S	SS
6-4 TL	3/8 to 1/4	0.62	0.26	0.08	0.41	•	•
8-4 TL	1/2 to 1/4	0.75	0.26	0.14	0.47	•	
8-6 TL	1/2 to 3/8	0.75	0.38	0.14	0.47	•	
10-4 TL	5/8 to 1/4	0.92	0.26	0.20	0.53	•	
10-6 TL	5/8 to 3/8	0.92	0.38	0.20	0.53	•	
10-8 TL	5/8 to 1/2	0.92	0.51	0.20	0.53	•	
12-4 TL	3/4 to 1/4	1.10	0.26	0.24	0.57	•	
12-6 TL	3/4 to 3/8	1.10	0.38	0.24	0.57	•	
12-8 TL	3/4 to 1/2	1.10	0.51	0.24	0.57	•	
12-10 TL	3/4 to 5/8	1.10	0.63	0.24	0.57	•	
12-14 TL	3/4 to 7/8	1.10	0.88	0.06	0.65	•	
16-8 TL	1 to 1/2	1.35	0.51	0.28	0.61	•	
16-10 TL	1 to 5/8	1.35	0.63	0.28	0.61	•	
16-12 TL	1 to 3/4	1.35	0.76	0.18	0.67	•	
16-14 TL	1 to 7/8	1.35	0.88	0.12	0.67	•	
20-12 TL	1 1/4 to 3/4	1.60	0.76	0.28	0.77	•	
20-16 TL	1 1/4 to 1	1.60	1.01	0.28	0.83	•	
24-16 TL	1 1/2 to 1	1.91	1.01	0.28	0.83	•	
24-20 TL	1 1/2 to 1 1/4	1.91	1.26	0.28	0.83	•	

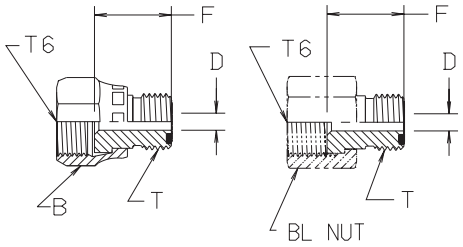
Unplated part, oil dipped for corrosion protection.

Tube End Reducer

TRLO

ORFS swivel / ORFS tube end

SAE 520123
Part Number Information
TRL - Body only
TRL-BL - Body with Large Nut
TRLO - Body with O-Ring
TRLO-BL - Body with O-Ring and Large Nut
All dimensions are in inches



ASSEMBLED WITH CRIMP NUT

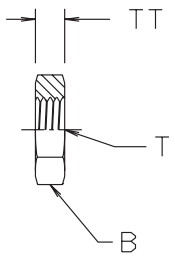
ASSEMBLED WITH LARGE BL NUT

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	T6 UN/UNF-2B	B HEX	D DRILL	F	STANDARD MATERIAL FROM STOCK S	STANDARD MATERIAL FROM STOCK SS
*6-4 TRLO	3/8 to 1/4	9/16-18	11/16-16	13/16	0.172	0.77	•	•
8-4 TRLO	1/2 to 1/4	9/16-18	13/16-16	15/16	0.172	0.86	•	•
*8-6 TRLO	1/2 to 3/8	11/16-16	13/16-16	15/16	0.264	0.88	•	•
10-4 TRLO	5/8 to 1/4	9/16-18	1-14	1 1/8	0.172	0.90	•	
10-6 TRLO	5/8 to 3/8	11/16-16	1-14	1 1/8	0.264	0.95	•	
10-8 TRLO	5/8 to 1/2	13/16-16	1-14	1 1/8	0.378	1.02	•	•
12-4 TRLO	3/4 to 1/4	9/16-18	1 3/16-12	1 3/8	0.172	0.98	•	
12-6 TRLO	3/4 to 3/8	11/16-16	1 3/16-12	1 3/8	0.264	1.03	•	•
12-8 TRLO	3/4 to 1/2	13/16-16	1 3/16-12	1 3/8	0.378	1.09	•	•
*12-10 TRLO	3/4 to 5/8	1-14	1 3/16-12	1 3/8	0.484	1.16	•	
14-12 TRLO**	7/8 to 3/4	1 3/16-12	1 5/16-12	1 1/2	0.609	1.32	•	
16-8 TRLO	1 to 1/2	13/16-16	1 7/16-12	1 5/8	0.378	1.15	•	•
16-10 TRLO	1 to 5/8	1-14	1 7/16-12	1 5/8	0.484	1.26	•	
*16-12 TRLO	1 to 3/4	1 3/16-12	1 7/16-12	1 5/8	0.609	1.30	•	•
16-14 TRLO**	1 to 7/8	1 5/16-12	1 7/16-12	1 5/8	0.709	1.34	•	
20-12 TRLO	1 1/4 to 3/4	1 3/16-12	1 11/16-12	1 7/8	0.609	1.32	•	
*20-16 TRLO	1 1/4 to 1	1 7/16-12	1 11/16-12	1 7/8	0.812	1.51	•	
24-16 TRLO	1 1/2 to 1	1 7/16-12	2-12	2 1/4	0.812	1.23	•	•
24-20 TRLO	1 1/2 to 1 1/4	1 11/16-12	2-12	2 1/4	1.024	1.35	•	
**32-20 TRLO	2 to 1 1/4	1 11/16-12	2 1/2-12	2 7/8	1.024	1.42	•	
**32-24 TRLO	2 to 1 1/2	2-12	2 1/2-12	2 7/8	1.260	1.42	•	

* These sizes come manufactured with a crimp style nut on the large end, therefore, levels TRL-BL and TRLO-BL do not apply.
**Sizes 14 and 32 are not included in SAE J1453.

Bulkhead Locknut

WLNL



Bulkhead fitting locknut

SAE 520118

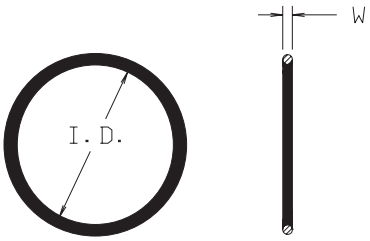
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2B	B HEX	TT	STANDARD MATERIAL FROM STOCK	
					S	SS
4 WLNL	1/4	9/16-18	13/16	0.27	•	•
6 WLNL	3/8	11/16-16	1	0.32	•	•
8 WLNL	1/2	13/16-16	1 1/8	0.35	•	•
10 WLNL	5/8	1-14	1 5/16	0.41	•	
12 WLNL	3/4	1 3/16-12	1 1/2	0.41	•	•
14 WLNL*	7/8	1 5/16-12	1 5/8	0.41	•	
16 WLNL	1	1 7/16-12	1 3/4	0.41	•	
20 WLNL	1 1/4	1 11/16-12	2	0.41	•	
24 WLNL	1 1/2	2-12	2 3/8	0.41	•	

*Size 14 is not included in SAE J1453.

ORFS Tube End O-ring

Face Seal O-Ring



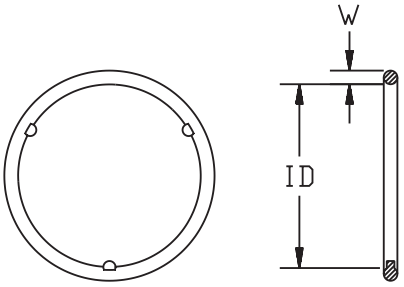
Part Number Information
Specify size and compound
Example: 2-018 N0756
All dimensions are in inches

TUBE FITTING SIZE	O-RING PART #	TUBE O.D.	I.D.	W	STANDARD MATERIAL FROM STOCK		
					N0552	V0894	N0756
4	2-011	1/4	0.30	0.07	•	•	•
6	2-012	3/8	0.36	0.07	•	•	•
8	2-014	1/2	0.49	0.07	•	•	•
10	2-016	5/8	0.61	0.07	•	•	
12	2-018	3/4	0.74	0.07	•	•	
14	2-020	7/8	0.86	0.07	•		
16	2-021	1	0.93	0.07	•	•	
20	2-025	1 1/4	1.18	0.07	•	•	
24	2-029	1 1/2	1.49	0.07	•	•	
32	2-135	2	1.93	0.10	•	•	

N0552 is the standard 90-durometer Nitrile (e.g., Buna-N).
V0894 is an optional 90-durometer fluorocarbon (e.g., Viton).
N0756 is an optional 75-durometer Nitrile (e.g., Buna-N) for CNG applications.
Other compounds may be purchased from O-ring Division (606) 269-2351.
See page A29 for O-ring Material Selection and data.

ORFS Tube End Tabbed O-Ring

Tabbed Face Seal O-Ring*



B

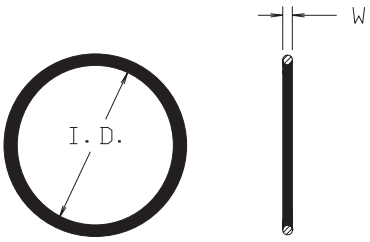
Part Number Information
Specify size and compound
Example: 2-011T N0552
All dimensions are in inches

TUBE FITTING SIZE	O-RING PART #	TUBE O.D.	I.D.	W	STANDARD MATERIAL FROM STOCK		
					N0552	V0894	N0756
4	2-011T	1/4	0.30	0.07	•		
6	2-012T	3/8	0.36	0.07	•		
8	2-014T	1/2	0.49	0.07	•		

N0552 is the standard 90-durometer Nitrile (e.g., Buna-N).
V0894 is an optional 90-durometer fluorocarbon (e.g., Viton).
N0756 is an optional 75-durometer Nitrile (e.g., Buna-N) for CNG applications.
Other compounds may be purchased from O-ring Division (606) 269-2351.
See page A29 for O-ring Material Selection and data.
* To be used with non-captive O-ring groove (CORG) designed fittings for prevention of O-ring fall out.

SAE Straight Thread Port O-ring

SAE O-Ring



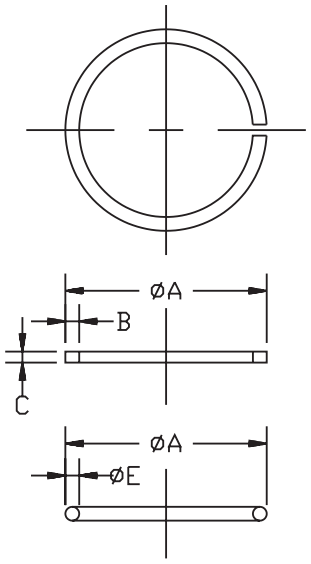
Part Number Information
Specify size and compound
Example: 3-906 N0552
All dimensions are in inches

TUBE FITTING SIZE	O-RING PART #	TUBE O.D.	I.D.	W	STANDARD MATERIAL FROM STOCK		
					N0552	V0894	N0756
2	3-902	1/8	0.24	0.06	•	•	
3	3-903	3/16	0.30	0.06	•	•	
4	3-904	1/4	0.35	0.07	•	•	•
5	3-905	5/16	0.41	0.07	•	•	
6	3-906	3/8	0.47	0.08	•	•	•
8	3-908	1/2	0.64	0.09	•	•	•
10	3-910	5/8	0.76	0.10	•	•	
12	3-912	3/4	0.92	0.12	•	•	
14	3-914	7/8	1.05	0.12	•	•	
16	3-916	1	1.17	0.12	•	•	
20	3-920	1 1/4	1.48	0.12	•	•	
24	3-924	1 1/2	1.72	0.12	•	•	
32	3-932	2	2.34	0.12	•	•	

N0552 is the standard 90-durometer Nitrile (e.g., Buna-N).
V0894 is an optional 90-durometer fluorocarbon (e.g., Viton).
N0756 is an optional 75-durometer Nitrile (e.g., Buna-N) for CNG applications.
Other compounds may be purchased from O-ring Division (606) 269-2351.
See page A29 for O-ring Material Selection and data.

Silver Braze Ring for Inch Tubing

SBR



Part Number Information
Specify size and tube material
Example: 8 SBR (Braze ring for 1/2" steel or copper tubing)
8 SBR-SS (Braze ring for 1/2" stainless steel tubing)
All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	A	B	C	E	STANDARD MATERIAL FROM STOCK	
						S	SS
4 SBR	1/4	0.33	-	-	0.05	•	•
6 SBR	3/8	0.49	0.07	0.03	-	•	•
8 SBR	1/2	0.57	0.07	0.03	-	•	•
10 SBR	5/8	0.61	0.07	0.03	-	•	•
12 SBR	3/4	0.65	0.08	0.04	-	•	•
14 SBR	7/8	0.72	-	-	0.06		
16 SBR	1	0.80	0.08	0.04	-	•	•
20 SBR	1 1/4	0.88	0.08	0.04	-	•	•
24 SBR	1 1/2	1.00	0.08	0.04	-	•	•
32 SBR	2	1.98	-	-	0.09	•	

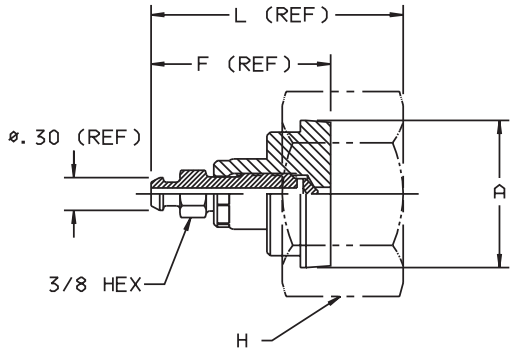
SBR recommended for steel or copper tubing.
SBR-SS recommended for stainless tubing, but can be used on steel tubing.
Contact the Tube Fittings Division for braze rings used in marine applications.

ORFS Tube End Cap Bleed Adapter

FNLBA

Use with Standard BL Nut

All dimensions are in inches



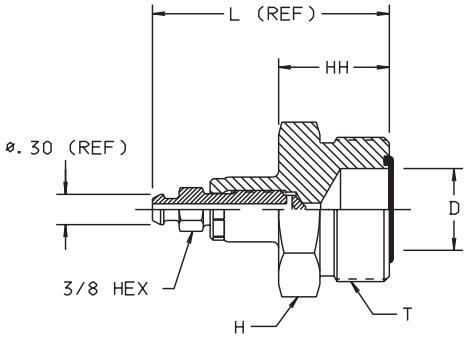
TUBE FITTING PART #	TUBE O.D.	A	F	L	H	STANDARD MATERIAL FROM STOCK	
						S	SS
8 FNLBA	1/2	.75	1.63	2.07	15/16	•	
10 FNLBA	5/8	.89	1.63	2.17	1 1/8	•	
12 FNLBA	3/4	1.06	1.63	2.21	1 3/8	•	
16 FNLBA	1	1.31	1.63	2.21	1 5/8	•	
20 FNLBA	1 1/4	1.56	1.63	2.21	1 7/8	•	
24 FNLBA	1 1/2	1.88	1.63	2.21	2 1/4	•	

Tightening torque for bleed screw is 35-40 in-lb.

B

ORFS Tube End Plug Bleed Adapter

PNLOBA



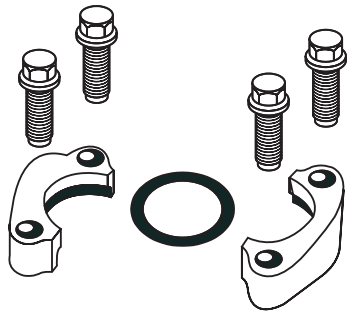
Part Number Information
PNLBA - Body Only
PNLOBA - Assembled with O-Ring

All dimensions are in inches

TUBE FITTING PART #	TUBE O.D.	T TUBE END UN/UNF-2A	D DRILL	HH	L	H	STANDARD MATERIAL FROM STOCK S	SS
4 PNLOBA	1/4	9/16-18	.172	.80	1.90	11/16	•	
6 PNLOBA	3/8	11/16-16	.264	.85	1.97	3/4	•	
8 PNLOBA	1/2	13/16-16	.378	.91	2.07	7/8	•	
10 PNLOBA	5/8	1-12	.484	1.02	2.19	1 1/16	•	
12 PNLOBA	3/4	1 3/16-12	.608	1.08	2.27	1 1/4	•	
16 PNLOBA	1	1 7/16-12	.812	1.10	2.35	1 1/2	•	
20 PNLOBA	1 1/4	1 11/16-12	1.024	1.10	2.41	1 3/4	•	
24 PNLOBA	1 1/2	2-12	1.260	1.10	2.48	2 1/8	•	

Tightening torque for bleed screw is 35-40 in-lb.

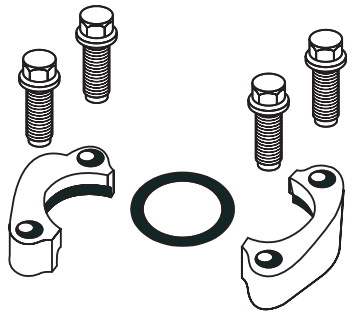
5151HK SAE Flange Kit
(Code 61)



HOSE PRODUCTS DIVISION KIT PART #	SAE FLANGE SIZE	FLANGE HALF [1]	O-RING [2]	GRADE 5 4 BOLTS	LOCKWASHERS 4
5151HK-8	1/2	51H-8	711510-6	5/16-18x1 1/4	5/16
5151HK-12	3/4	51H-12	711510-5	3/8-16x1 1/4	3/8
5151HK-16	1	51H-16	711510-4	3/8-16x1 1/4	3/8
5151HK-20	1 1/4	51H-20	711510-3	7/16-14x1 1/2	7/16
5151HK-24	1 1/2	51H-24	711510-2	1/2-13x1 1/2	1/2
5151HK-32	2	51H-32	711510-1	1/2-13x1 1/2	1/2

1) O-rings may also be purchased from Parker O-ring Division.
2) Code 61, Code 62 Flange Kits and O-Rings may be purchased from the Hose Products Division (216) 943-5700. O-ring compound is 90-durometer nitrile, e.g., Buna-N.

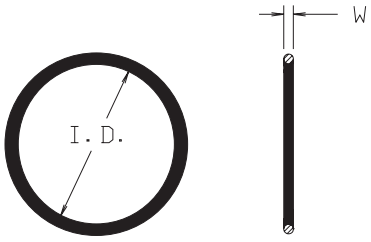
HFHFHK SAE Flange Kit
(Code 62)



HOSE PRODUCTS DIVISION KIT PART #	SAE FLANGE SIZE	FLANGE HALF [1]	O-RING [2]	GRADE 5 4 BOLTS	LOCKWASHERS 4
HFHFHK-12	3/4	HFH-12	711510-5	3/8-16X1 1/2	3/8
HFHFHK-16	1	HFH-16	711510-4	7/16-14X1 3/4	7/16
HFHFHK-20	1 1/4	HFH-20	711510-3	1/2-13X1 3/4	1/2
HFHFHK-24	1 1/2	HFH-24	711510-2	5/8-11X2 1/4	5/8
HFHFHK-32	2	HFH-32	711510-1	3/4-10X2 3/4	3/4

1) O-rings may also be purchased from Parker O-ring Division.
2) Code 61, Code 62 Flange Kits and O-Rings may be purchased from the Hose Products Division (216) 943-5700. O-ring compound is 90-durometer nitrile, e.g., Buna-N.

O-Rings —
Code 61 and Code 62 Flanges



HOSE PRODUCTS DIVISION PART # [1]	PARKER O-RING SIZE [2]	SIZE	W	I.D.
711510-6	2-210	1/2	0.139	0.734
711510-5	2-214	3/4	0.139	0.984
711510-4	2-219	1	0.139	1.296
711510-3	2-222	1 1/4	0.139	1.484
711510-2	2-225	1 1/2	0.139	1.859
711510-1	2-228	2	0.139	2.234

1) O-rings may also be purchased from Parker O-ring Division.
2) Code 61, Code 62 Flange Kits and O-Rings may be purchased from the Hose Products Division (216) 943-5700. O-ring compound is 90-durometer nitrile, e.g., Buna-N.

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