

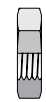
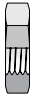
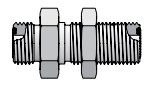
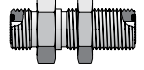
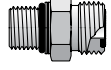
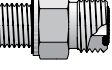
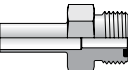
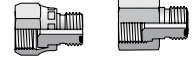
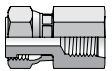
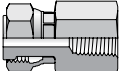
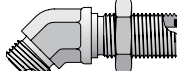
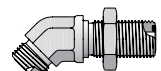


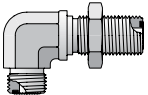
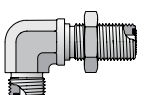
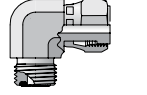
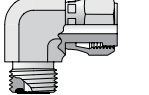
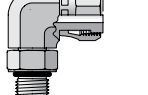
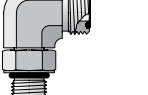
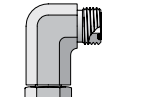
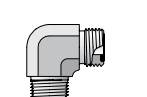
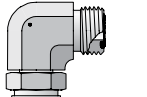
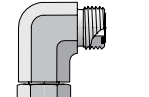
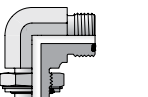
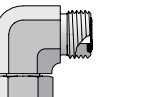
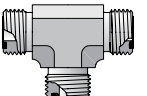
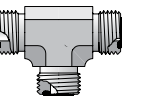
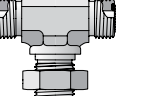
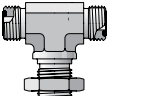
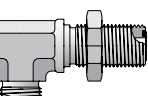
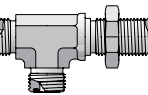
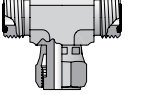
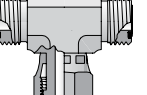
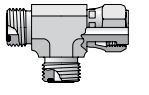
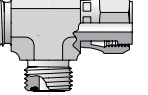
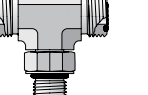
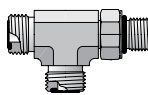
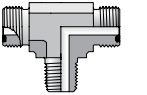
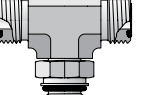
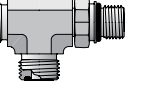
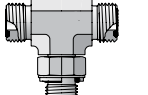
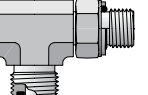
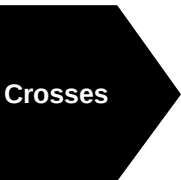
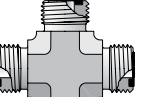
## Seal-Lok™ 0-Ring Face Seal Tube Fittings

A

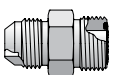
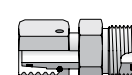
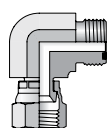


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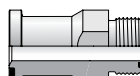
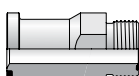
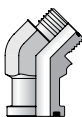
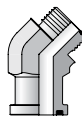
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|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Nuts, Sleeves, Locknuts</b>                                                                                                         | <b>BL</b><br>Tube Nut<br><br>A9                        | <b>BML</b><br>Tube Nut - mm Hex<br><br>A9             | <b>TPLS (Metric)</b><br>Parflange Sleeve<br><br>A9 | <b>TPL (Inch)</b><br>Parflange Sleeve<br><br>A9       | <b>TL (Inch)</b><br>Braze Reducer Sleeve<br><br>A10     |
|                                                                                                                                        | <b>TLS (Metric)</b><br>Braze Reducer Sleeve<br><br>A10 | <b>SBR (Inch and Metric)</b><br>Braze Ring<br><br>A11 | <b>WLNL</b><br>Bulkhead Locknut<br><br>A11         | <b>WLNML</b><br>Blkhd Locknut - mm Hex<br><br>A11       | <b>HLO</b><br>Union<br><br>A12                          |
| <b>HMLO</b><br>Union - mm Hex<br><br>A12              | <b>WLO</b><br>Bulkhead Union<br><br>A12                | <b>WMLO</b><br>Bulkhead Union - mm Hex<br><br>A13     | <b>WF5OLO</b><br>ORFS Blkhd / SAE-ORB<br><br>A13   | <b>F5OLO</b><br>ORFS / SAE-ORB<br><br>A14             | <b>FF5OLO</b><br>ORFS - Long / SAE-ORB<br><br>A14       |
| <b>FLO</b><br>ORFS / NPTF<br><br>A14                  | <b>GLO</b><br>ORFS / NPTF<br><br>A15                   | <b>F87OMLO</b><br>ORFS / ISO 6149<br><br>A15          | <b>F82EDMLO</b><br>ORFS / Metric-ED<br><br>A15     | <b>F42EDMLO</b><br>ORFS / BSPP-ED<br><br>A15          | <b>LOHB3</b><br>ORFS / Braze Socket<br><br>A16          |
| <b>MMLOHB3</b><br>ORFS / Braze - mm Hex<br><br>A16  | <b>LOHT3</b><br>ORFS / Tube Weld<br><br>A16          | <b>Straight Swivels</b>                                                                                                                |                                                                                                                                     | <b>TRLON</b><br>Tube End Reducer<br><br>A17          | <b>LOHL6</b><br>Extender and Expander<br><br>A17      |
| <b>F65OL</b><br>ORFS Swivel / SAE-ORB<br><br>A18    | <b>G65L</b><br>ORFS Swivel / SAE-ORB<br><br>A18      | <b>F6L</b><br>ORFS Swivel / NPTF<br><br>A18         | <b>G6L</b><br>ORFS Swivel / NPTF<br><br>A18      | <b>F687OML</b><br>ORFS Swivel / ISO 6149<br><br>A19 | <b>F682EDML</b><br>ORFS Swivel / Metric-ED<br><br>A19 |
| <b>F642EDML</b><br>ORFS Swivel / BSPP-ED<br><br>A19 | <b>45° Elbows</b>                                                                                                                       |                                                                                                                                        | <b>WNLO</b><br>Bulkhead Union<br><br>A19         | <b>WNMLO</b><br>Bulkhead Union - mm Hex<br><br>A20    | <b>V6LO</b><br>ORFS Swivel Elbow<br><br>A20           |
| <b>V87OMLO</b><br>ORFS / ISO 6149<br><br>A20        | <b>VLO</b><br>ORFS / NPTF<br><br>A21                 | <b>V40MLO</b><br>ORFS / BSPP-ORR<br><br>A21         | <b>90° Elbows</b>                                                                                                                   |                                                                                                                                          | <b>V5OLO</b><br>ORFS / SAE-ORB<br><br>A20             |
|                                                                                                                                        |                                                                                                                                         |                                                                                                                                        |                                                                                                                                     | <b>ELO</b><br>Union Elbow<br><br>A21                | <b>EMLO</b><br>Union Elbow - mm Hex<br><br>A21        |

|                                                                                                                                    |                                                                                                                                     |                                                                                                                                     |                                                                                                                                        |                                                                                                                                      |                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>WELO</b><br>Bulkhead Union<br><br>A22          | <b>WEMLO</b><br>Bulkhead Union - mm Hex<br><br>A22 | <b>C6LO</b><br>ORFS Swivel Elbow<br><br>A23        | <b>C6MLO</b><br>Swivel Elbow - mm Hex<br><br>A23     | <b>AOEL6</b><br>ORFS Swivel / SAE-ORB<br><br>A23  | <b>C5OLO</b><br>ORFS / SAE-ORB<br><br>A23      |
| <b>CC5OLO</b><br>ORFS / SAE-ORB - Long<br><br>A24 | <b>CLO</b><br>ORFS / NPTF<br><br>A24               | <b>C87OMLO</b><br>ORFS / ISO 6149<br><br>A24       | <b>CC87OMLO</b><br>ORFS / ISO 6149 - Long<br><br>A25 | <b>C8OMLO</b><br>ORFS / Metric-ORR<br><br>A25     | <b>C4OMLO</b><br>ORFS / BSPP-ORR<br><br>A26    |
| <b>Tees</b><br>                                   | <b>JLO</b><br>Union Tee<br><br>A26                 | <b>JMLO</b><br>Union Tee - mm Hex<br><br>A26       | <b>WJLO</b><br>Bulkhead Branch<br><br>A26            | <b>WJMLO</b><br>Blkhd Branch - mm Hex<br><br>A27  | <b>WJJLO</b><br>Bulkhead Run<br><br>A27        |
| <b>WJJMLO</b><br>Bulkhead Run - mm Hex<br><br>A28 | <b>S6LO</b><br>ORFS Swivel Branch<br><br>A28       | <b>S6MLO</b><br>Swivel Branch - mm Hex<br><br>A28  | <b>R6LO</b><br>ORFS Swivel Run<br><br>A29            | <b>R6MLO</b><br>Swivel Run - mm Hex<br><br>A29    | <b>S5OLO</b><br>SAE-ORB Branch Tee<br><br>A29  |
| <b>R5OLO</b><br>SAE-ORB Run Tee<br><br>A30      | <b>SLO</b><br>NPTF Branch Tee<br><br>A30         | <b>S87OMLO</b><br>ISO 6149 Branch Tee<br><br>A30 | <b>R87OMLO</b><br>ISO 6149 Run Tee<br><br>A31      | <b>S4OMLO</b><br>BSPP-ORR Branch Tee<br><br>A31 | <b>R4OMLO</b><br>BSPP-ORR Run Tee<br><br>A32 |
| <b>Crosses</b><br>                              | <b>KLO</b><br>Union Cross<br><br>A32             | <b>Plugs, Caps and Bleed Adapters</b><br>        | <b>PNLO</b><br>ORFS Plug<br><br>A33                 | <b>PNMLO</b><br>ORFS Plug - mm Hex<br><br>A33   | <b>FNL</b><br>ORFS Cap<br><br>A33            |
| <b>FNML</b><br>ORFS Cap - mm Hex<br><br>A33     | <b>UPTC Nut Assembly</b><br>                     | <b>UPTC</b><br>Nut Assembly<br><br>A34           |                                                                                                                                        |                                                                                                                                      |                                                                                                                                   |

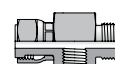
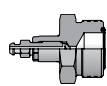
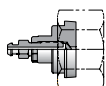
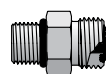
## Conversion Adapters (Shown in Section K)

|                                                                                   |                                                                                         |                                                                                         |                                                                                         |                                                                                           |                                                                                           |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
|  | <b>XHLO</b><br>37° Flare / ORFS                                                         | <b>XHL6</b><br>37° Flare / ORFS Swivel                                                  | <b>LOHX6</b><br>ORFS / 37° Swivel                                                       | <b>BUHLO</b><br>ORFS / Flareless (inch)                                                   | <b>LOHU86</b><br>Metric Swivel (EO)/ORFS                                                  |
|                                                                                   | <br>K3 | <br>K3 | <br>K3 | <br>K4 | <br>K4 |
| <b>LOEX6</b><br>ORFS / 37° Swivel                                                 | <br>K3 |                                                                                         |                                                                                         |                                                                                           |                                                                                           |

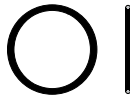
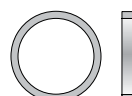
## Flange Adapters (Shown in Section L)

|                                                                                   |                                                                                            |                                                                                          |                                                                                          |                                                                                            |                                                                                            |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|  | <b>LOHQ1</b><br>Code 61 / ORFS                                                             | <b>LOHQ2</b><br>Code 62 / ORFS                                                           | <b>LOVQ1</b><br>Code 61 / ORFS                                                           | <b>LOVQ2</b><br>Code 62 / ORFS                                                             | <b>LOEQ1</b><br>Code 61 / ORFS                                                             |
|                                                                                   | <br>L12   | <br>L12 | <br>L30 | <br>L30 | <br>L31 |
| <b>LOEQ2</b><br>Code 62 / ORFS                                                    | <br>L31 |                                                                                          |                                                                                          |                                                                                            |                                                                                            |

## Diagnostic, Bleed Adapters & Screen Fittings (Shown in Section M)

|                                                                                     |                                                                                           |                                                                                           |                                                                                            |                                                                                              |                                                                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|  | <b>LOHL6 Orifice</b><br>Orifice Swivel with Orifice / ORFS                                | <b>LOHL6G5TP</b><br>Orifice Swivel / ORFS / SAE-ORB                                       | <b>PNLOBA</b><br>Bleed Screw / ORFS                                                        | <b>FNLBA</b><br>Bleed Screw / SAE-ORB                                                        | <b>Screen Fittings</b>                                                                       |
|                                                                                     | <br>M9 | <br>M5 | <br>M10 | <br>M10 | <br>M12 |

## O-Rings and Seals (Shown in Section N)

|                                                                                           |                                                                                           |                                                                                           |                                                                                           |                                                                                             |                                                                                             |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|        | <b>ORFS O-Ring</b>                                                                        | <b>SAE O-Ring</b>                                                                         | <b>ISO 6149 O-Ring</b>                                                                    | <b>Metric O-Ring</b>                                                                        | <b>Metric Retaining Ring</b>                                                                |
|                                                                                           | <br>N4 | <br>N4 | <br>N5 | <br>N5 | <br>N5 |
| <b>BSPP O-Ring</b>                                                                        | <b>BSPP Retaining O-Ring</b>                                                              | <b>EOlastic Seal Ring</b>                                                                 |                                                                                           |                                                                                             |                                                                                             |
| <br>N6 | <br>N6 | <br>N6 |                                                                                           |                                                                                             |                                                                                             |

## Seal-Lok Introduction

The Seal-Lok fitting meets or exceeds the strict requirements of SAE J1453 and ISO 8434-3. It is an O-ring face seal type fitting that consists of a nut, a body, an O-ring and a sleeve. As shown in Fig. A2, the tube is flanged to 90° (or the tube may be brazed instead to a braze-type sleeve). When the fitting is assembled, it compresses an O-ring in the precision machined groove of the fitting body to form a leak tight seal.

Seal-Lok fittings are suitable for a wide range of tube wall thicknesses and are readily adaptable to inch or metric tubing and hose. (Please refer to Tables U3 and U4 located in the Appendix section for min./max. tube wall thickness for inch and metric tubing, respectively). Seal-Lok's leak-free design and rugged construction make it suitable for a wide range of applications where higher pressures, vibration and impulse are prevalent.

## How Seal-Lok Fittings Work

The Seal-Lok fitting body face contains a high durometer trap seal to maximize retention in a precision machined groove also known as a Captive O-Ring Groove (CORG) referenced in Fig. A1. As the nut is tightened onto the fitting body, the trap seal is compressed between the body and flat face of the tube flange or braze sleeve to form a tight, positive seal (see Fig. A2).

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, minimizing 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 practically unlimited remakability. The O-ring should be inspected at each disassembly and replaced when necessary. **See the O-Rings and Seals section for information on replacement ORFS O-rings.**

Because the tubing is a sealing surface, it must be smooth, free of any nicks, scratches, spiral tool marks, splits or weld beads. Seamless tube is recommended for Seal-Lok fittings for ease in flanging and bending. Certain types of harder tubes that are not fully annealed may not be suitable for flanging due to the potential for immediate or long-term cracking of the tube flange. For specific tube type and wall thickness recommendations, please see Table U3 in the Appendix Section.

## Reference locations

**Dynamic Pressure Ratings:** Please refer to the last column of the part number tables located on the following pages of this section for the appropriate dynamic pressure ratings.

**Recommended Tube Wall Thickness:** Please refer to Table U3 located in the Appendix section.

**Assembly and Installation:** Please refer to Seal-Lok Assembly located within the Assembly/Installation section of this catalog.

**Standard material specifications:** Please refer to Table U1 located in the Appendix section.

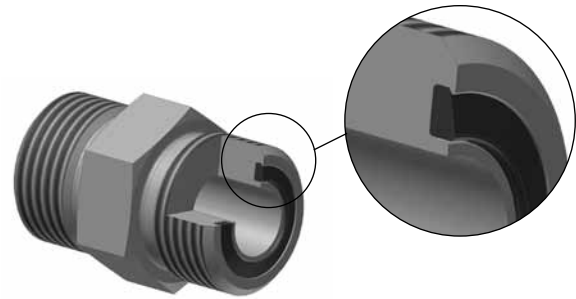


Fig. A1 — Captive O-ring Groove (CORG) Cutaway with Parker's trap seal

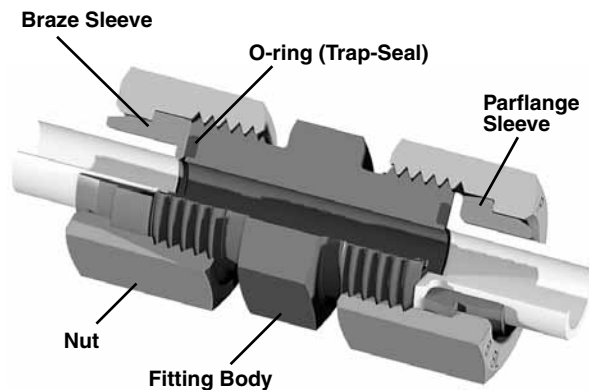


Fig. A2 — Seal-Lok Union cutaway with flanged and brazed assemblies

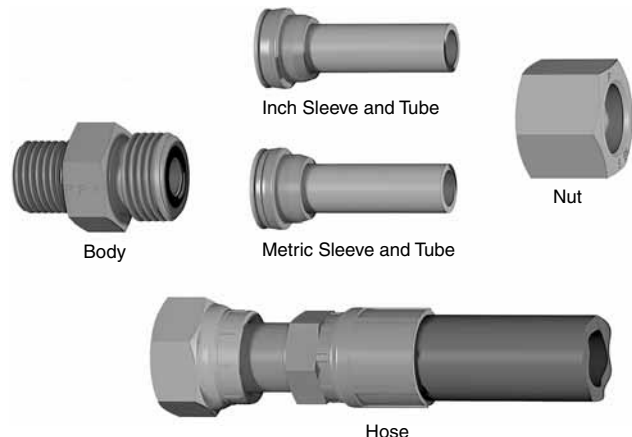


Fig. A3 — Seal-Lok Works with Inch or Metric Tube and Hose

Dimensions and pressures for reference only, subject to change.

**Seal Material Selection:** Please refer to Table T8 in the General Technical section of this catalog.

**Tube Wall Thickness:** Recommended min/max tube wall thicknesses for inch and metric Seal-Lok are provided in Tables U3 and U4 in the Appendix section, respectively. When using the braze method, all tube wall thicknesses can be used. For Parflange min/max tube wall thickness range, please refer to page R24 for tooling availability.



**Fig. A4 — UPTC Seal-Lok is adaptable to a UPTC hydraulic or thermoplastic hose assembly. To be used with ET, EN, or EU hose ends.**

## International Acceptance

The tube/hose end connection for metric Seal-Lok is the same as standard (inch) Seal-Lok. It consists of a body, a flange or braze sleeve, an O-ring and a nut. The difference is at the port end of the fitting. Instead of the SAE straight thread connection for example, it features a similar connection with metric threads per ISO 6149-2 or ISO 9974-1. Additionally, the fitting body, tube nut and locknut are manufactured with metric hexes or wrench flats for shaped fittings. The metric Seal-Lok fittings meet or exceed all requirements of ISO 8434-3.

To identify the metric sleeves used for metric tubing, there is a groove machined into the TPLS & TLS sleeves.

### UPTC Pressure Ratings

| Size | Pressure (psi) | Pressure (Bar) |
|------|----------------|----------------|
| -4   | 5800           | 400            |
| -6   | 5000           | 345            |
| -8   | 4250           | 293            |
| -10  | 4000           | 276            |
| -12  | 3125           | 216            |
| -16  | 3125           | 216            |

**Table A1 — UPTC Seal-Lok pressure ratings.**

## Universal Push-to-Connect (UPTC) Introduction

Traditionally, the fluid power industry has utilized threaded connectors to make a leak free connection. The speed of making connections is slow and the reliability of the connection is dependent on proper assembly procedures. Parker's UPTC connectors, on the other hand, rely on a mechanical retaining mechanism (other than threads) for holding power. No tools are required to assemble, and the reliability and speed of making connections with the UPTC design is greatly improved.

## Design and Construction

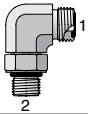
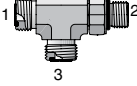
UPTC Seal-Lok consists of a base Seal-Lok ORFS fitting, a UPTC nut (including internal sealing and retaining elements) and a UPTC hose assembly, as shown in figure A4. The base ORFS fitting is a highly reliable and widely available off-the-shelf standard SAE J1453 adapter. The sealing O-Ring is supported by a pressure energized anti-extrusion ring that prevents O-Ring extrusion and ensures tight sealing even under high pressure. Once fully engaged, the retaining element is positively trapped between the male and UPTC nut. The dust seal keeps contamination out as well as giving a visual indication that the male stud has been inserted all the way. There is also a clear tactile indicator at the end of the push indicating a proper connection. Once a proper connection is made, the dust seal is covered by the UPTC nut. Proof of full engagement for easy inspection and quality control.

Once connected, the UPTC nut is permanently attached to the UPTC hose end similar to a traditional swivel nut. To disconnect, just use a wrench to unscrew the UPTC nut from the base adapter. Re-connect is possible by tightening the UPTC nut back to the base adapter, if the connection is not damaged. If the hose is damaged, it can be replaced by installing a readily available standard Seal-Lok ORFS hose assembly, or a new UPTC assembly.

### Features

- Available in sizes 1/4", 3/8", 1/2", 5/8", 3/4", and 1"
- Utilizes all Seal-Lok adapters for a wide variety of configurations, as well as excellent field serviceability
- Meets or exceeds SAE 100R2 pressure ratings (see Table A1)
- Includes visual and tactile installation indicators
- Self-aligning nipple eliminates hose twist during assembly
- No special tooling required for disassembly
- Utilizes elastomeric seals, including Parker's patented Trap-Seal

## How to order examples

| Base Seal-Lok Part                                                                | UPTC Part #    | Explanation                                                                       |
|-----------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------|
|  | 8 C5OLO-S      | <b>8UR10 C5OLO-S</b> Uniform size, UPTC subassembly on 1st end only               |
|                                                                                   | 8-10 C5OLO-S   | <b>8-10UR10 C5OLO-S</b> Jump size, UPTC subassembly on 1st end only               |
|  | 8 R5OLO-S      | <b>8UR101 R5OLO-S</b> Uniform size, UPTC subassembly on 1st and 3rd end           |
|                                                                                   | 8-10-8 R5OLO-S | <b>8-10-8UR001 R5OLO-S</b> Jump size, UPTC subassembly on 3rd end only            |
|                                                                                   | 8-10-8 R5OLO-S | <b>8-10-8UR100 R5OLO-S</b> Jump size, UPTC subassembly on 1st end only            |
|  | 8M14F87OMLOS   | <b>8M14UR10F87OMLOS</b> Compressed nomenclature, UPTC subassembly on 1st end only |

## The Parker Advantage

**Trap Seal™:** The patented trapezoidal seal of the Seal-Lok tube end allows for maximum o-ring retention in the CORG groove. This advantage over the competition increases the productivity of assembly as well as offers the maximum assurance for a leak free connection. Ultimately, operational and maintenance costs can be avoided.

**Resistance to over-torque:** The minimum requirement for a Seal-Lok connection is to withstand 200% torque above the rated value. This reduces the frequency of metal distortion and the potential of leaks. Seal-Lok reduces production assembly and maintenance costs by its resistance to over-torque.

**Zero clearance:** The flat face of Seal-Lok allows for easy and fast drop-in installation. This reduces rework costs from a design and assembly perspective. Maintenance cost can be avoided due to the time savings of disassembly and assembly.

**High pressure rating:** Seal-Lok offers a high pressure rating which can be used in a wide range of applications. This provides the opportunity to standardize across multiple product lines, saving procurement and inventory costs.

**Superior Plating:** Superior plating gives Parker steel tube fittings unmatched protection against red rust. In neutral salt spray test per ASTM B117, Parker Triple-Lok fittings substantially exceeded the SAE requirement of 96 hours to red rust.

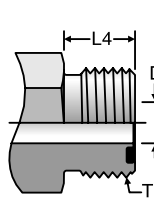
**Robust Port Stud:** The adjustable port stud is manufactured with a longer locknut designed to cover the uppermost threads completely. Since the backup washer is never exposed to the upper threads, it cannot be damaged during assembly. During assembly, exposed upper threads, as common with fittings from other fitting manufacturers, can lead to a deformed backup washer that can pinch the o-ring and create an o-ring extrusion gap that has the potential to leak. The longer locknut also provides a greater grip area for the wrench.

**Unlimited reusability:** When a Seal-Lok connection is completely assembled and disassembled, very little metal is distorting in the connection. So, Seal-Lok allows for unlimited reusability in the field, reducing the component replacement and maintenance costs of the connection.

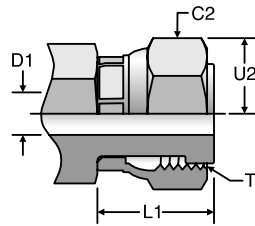
**Universal Push to Connect (UPTC):** Parker's UPTC offers a quick and easy way to assemble Seal-Lok configurations. UPTC is ideal for hard to reach applications or to speed up the process of assembly. The tangible operational and maintenance costs associated with each connection made will be reduced when using UPTC.

Dimensions and pressures for reference only, subject to change.

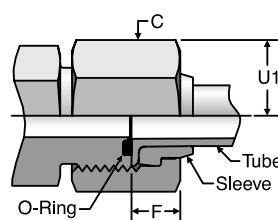
## Seal-Lok O-Ring Face Seal Tube Ends



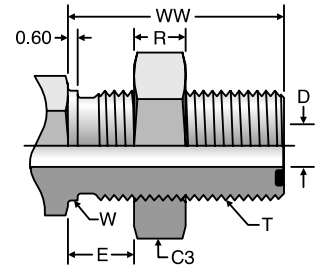
**Seal-Lok Male  
Tube End**



**Seal-Lok Female  
Swivel**



**Seal-Lok Tube End  
Assembly**



**Seal-Lok Bulkhead**

|               |           |                | Thread     | Tube Nut Hex      |           | Swivel Nut Hex |              | Bulkhead Locknut Hex |      | Nominal Drill Tube End | Nominal Drill Swivel End | Max Bulkhead Thickness | Tube Nut Assembled Allowance | Swivel Turn Back | Male Turn Back | Bulkhead |                 |      | Across Corners |      |
|---------------|-----------|----------------|------------|-------------------|-----------|----------------|--------------|----------------------|------|------------------------|--------------------------|------------------------|------------------------------|------------------|----------------|----------|-----------------|------|----------------|------|
|               |           |                |            | Locknut Thickness | Pilot Dia | Length         | Tube Nut Hex | Swivel Nut Hex       |      |                        |                          |                        |                              |                  |                |          |                 |      |                |      |
| SAE Dash Size | Tube O.D. | (mm)           | T          | C                 |           | C2             |              | C3                   |      | D <sup>1)</sup>        | D1 <sup>1)</sup>         | E                      | F                            | L1               | L4             | R        | W <sup>2)</sup> | WW   | U1             | U2   |
|               |           |                |            | (in.)             | (mm)      | (in.)          | (mm)         | (in.)                | (mm) | (in)                   | (in)                     | (in)                   | (in)                         | (in)             | (in)           | (in)     | (in)            | (in) | (in)           | (in) |
| 4             | 1/4       | 6              | 9/16-18    | 11/16             | 17        | 11/16          | 17           | 13/16                | 22   | 0.177                  | 0.157                    | 0.55                   | 0.270                        | 0.642            | 0.394          | 0.27     | 0.563           | 1.24 | 0.80           | 0.80 |
| 6             | 3/8       | 8<br>10        | 11/16-16   | 13/16             | 22        | 13/16          | 22           | 1                    | 27   | 0.256                  | 0.256                    | 0.55                   | 0.340                        | 0.715            | 0.441          | 0.32     | 0.688           | 1.34 | 0.94           | 0.94 |
| 8             | 1/2       | 12             | 13/16-16   | 15/16             | 24        | 15/16          | 24           | 1 1/8                | 30   | 0.374                  | 0.354                    | 0.55                   | 0.400                        | 0.865            | 0.512          | 0.35     | 0.813           | 1.44 | 1.08           | 1.08 |
| 10            | 5/8       | 14<br>15<br>16 | 1-14       | 1 1/8             | 30        | 1 1/8          | 30           | 1 5/16               | 36   | 0.492                  | 0.453                    | 0.55                   | 0.455                        | 0.980            | 0.618          | 0.41     | 1.000           | 1.60 | 1.30           | 1.30 |
| 12            | 3/4       | 18<br>20       | 1 3/16-12  | 1 3/8             | 36        | 1 3/8          | 36           | 1 1/2                | 41   | 0.610                  | 0.551                    | 0.55                   | 0.510                        | 1.110            | 0.677          | 0.41     | 1.188           | 1.64 | 1.58           | 1.58 |
| 14            | 7/8       | —              | 1 5/16-12  | 1 1/2             |           | 1 1/2          |              | 1 5/8                |      | 0.709                  | 0.709                    | 0.55                   | 0.512                        | 1.145            | 0.697          | 0.41     | 1.313           | 1.66 | 1.74           | 1.74 |
| 16            | 1         | 22<br>25       | 1 7/16-12  | 1 5/8             | 41        | 1 5/8          | 41           | 1 3/4                | 46   | 0.807                  | 0.787                    | 0.55                   | 0.596                        | 1.190            | 0.697          | 0.41     | 1.438           | 1.66 | 1.88           | 1.88 |
| 20            | 1 1/4     | 28<br>30<br>32 | 1 11/16-12 | 1 7/8             | 50        | 1 7/8          | 50           | 2                    | 50   | 1.024                  | 1.024                    | 0.55                   | 0.566                        | 1.251            | 0.697          | 0.41     | 1.688           | 1.66 | 2.16           | 2.16 |
| 24            | 1 1/2     | 35<br>38       | 2-12       | 2 1/4             | 60        | 2 1/4          | 60           | 2 3/8                | 60   | 1.260                  | 1.260                    | 0.55                   | 0.545                        | 1.330            | 0.697          | 0.41     | 2.000           | 1.66 | 2.60           | 2.60 |
| 32            | 2         | 42<br>50       | 2 1/2-12   | 2 7/8             |           | 2 7/8          |              | 2 3/4                |      | 1.772                  | 1.732                    | 0.50                   | 0.606                        | 1.690            | 0.874          | 0.54     | 2.500           | 1.83 | 3.32           | 3.32 |

1) D and D1 nominal may vary from the values shown in the chart by 0.004 to 0.008. Also, D for -4 metric based Seal-Lok may be D.197 (5 mm) to satisfy ISO 8434-3 (1994 edition). Contact the Tube Fittings Division if there are any questions.

2) Recommended clearance hole = W + 0.015.

3) See page N4 for ORFS O-rings.

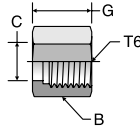
4) Note: For port and stud end dimensions reference section F: Pipe Fittings and Port Adapters.

Dimensions and pressures for reference only, subject to change.

## BL

Tube Nut  
ORFS

SAE 520110



| TUBE<br>FITTING<br>PART # | END<br>SIZE<br>(in.) | T6<br>UNF/UNF-2B | B<br>HEX<br>(in.) | C<br>(in.) | G<br>(in.) | Material |     |
|---------------------------|----------------------|------------------|-------------------|------------|------------|----------|-----|
|                           |                      |                  |                   |            |            | -S       | -SS |
| 4 BL                      | 1/4                  | 9/16 - 18        | 11/16             | 0.410      | 0.59       | •        | •   |
| 5 BL                      | 5/16                 | 5/8 - 18         | 3/4               | 0.470      | 0.63       | •        | •   |
| 6 BL                      | 3/8                  | 11/16 - 18       | 13/16             | 0.530      | 0.67       | •        | •   |
| 8 BL                      | 1/2                  | 13/16 - 16       | 15/16             | 0.650      | 0.79       | •        | •   |
| 10 BL                     | 5/8                  | 1 - 14           | 1 1/8             | 0.830      | 0.94       | •        | •   |
| 12 BL                     | 3/4                  | 1 3/16 - 12      | 1 3/8             | 0.950      | 1.04       | •        | •   |
| 12-14 BL                  | 7/8                  | 1 3/16 - 12      | 1 3/8             | 0.990      | 1.20       | •        | •   |
| 14 BL                     | 7/8                  | 1 5/16 - 12      | 1 1/2             | 1.075      | 1.04       | •        | •   |
| 16 BL                     | 1                    | 1 7/16 - 12      | 1 5/8             | 1.150      | 1.08       | •        | •   |
| 20 BL                     | 1 1/4                | 1 11/16 - 12     | 1 7/8             | 1.420      | 1.08       | •        | •   |
| 24 BL                     | 1 1/2                | 2 - 12           | 2 1/4             | 1.730      | 1.08       | •        | •   |
| 32 BL*                    | 2                    | 2 1/2 - 12       | 2 7/8             | 2.220      | 1.30       | •        | •   |

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

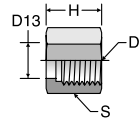
\*\* These tube nuts should not be exposed to annealing temperatures, such as furnace brazing. Contact the Tube Fittings Division for information on special nuts.

• Stainless steel tube nuts are prelubricated for ease of assembly.

## BML

Tube Nut – mm Hex  
ORFS

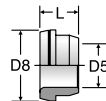
ISO 8434-3 NA  
SAE 52M0110A



| TUBE<br>FITTING<br>PART # | END SIZE |       | D<br>THREAD<br>UN/UNF-2B | D13<br>DRILL<br>(mm) | H<br>(mm) | S<br>HEX<br>(mm) | Material<br>- S |
|---------------------------|----------|-------|--------------------------|----------------------|-----------|------------------|-----------------|
|                           | (mm)     | (in.) |                          |                      |           |                  |                 |
| 4BML                      | 6        | 1/4   | 9/16 - 18                | 10.50                | 15.0      | 17               | •               |
| 6BML                      | 8,10     | 3/8   | 11/16 - 16               | 13.55                | 17.5      | 22               | •               |
| 8BML                      | 12       | 1/2   | 13/16 - 16               | 16.60                | 20.0      | 24               | •               |
| 10BML                     | 14,15,16 | 5/8   | 1 - 14                   | 21.10                | 24.0      | 30               | •               |
| 12BML                     | 18,20    | 3/4   | 1 3/16 - 12              | 24.15                | 26.5      | 36               | •               |
| 16BML                     | 22,25    | 1     | 1 7/16 - 12              | 29.10                | 27.5      | 41               | •               |
| 20BML                     | 28,30,32 | 1 1/4 | 1 11/16 - 12             | 36.00                | 27.5      | 50               | •               |
| 24BML                     | 35,38    | 1 1/2 | 2 - 12                   | 44.00                | 27.5      | 60               | •               |

## TPLS (Metric)

Parflange Sleeve for  
Metric Tubing  
ORFS Mechanically  
Attachable Sleeve



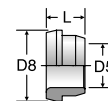
| TUBE<br>FITTING<br>PART # | USED<br>WITH<br>FITTING<br>SIZE | D5<br>END<br>SIZE<br>(mm) | D8<br>DIA<br>(mm) | L<br>(mm) | Material<br>-S |
|---------------------------|---------------------------------|---------------------------|-------------------|-----------|----------------|
|                           |                                 |                           |                   |           |                |
| TPLS6                     | -4                              | 6                         | 12.75             | 7.5       | •              |
| TPLS8                     | -6                              | 8                         | 15.75             | 8.5       | •              |
| TPLS10                    | -6                              | 10                        | 15.75             | 8.5       | •              |
| TPLS12                    | -8                              | 12                        | 18.90             | 10.5      | •              |
| TPLS14                    | -10                             | 14                        | 23.50             | 10.5      | •              |
| TPLS15                    | -10                             | 15                        | 23.50             | 10.5      | •              |
| TPLS16                    | -10                             | 16                        | 23.50             | 10.5      | •              |
| TPLS18                    | -12                             | 18                        | 27.80             | 12.0      | •              |
| TPLS20                    | -12                             | 20                        | 27.80             | 12.0      | •              |
| TPLS25                    | -16                             | 25                        | 34.00             | 13.5      | •              |
| TPLS30                    | -20                             | 30                        | 40.50             | 13.0      | •              |
| TPLS32                    | -20                             | 32                        | 40.50             | 13.0      | •              |
| TPLS35                    | -24                             | 35                        | 48.50             | 12.5      | •              |
| TPLS38                    | -24                             | 38                        | 48.50             | 12.5      | •              |

• Must be mechanically attached using Parflange system.

• Additional -S not required, TPLS6 is complete part number.

## TPL (Inch)

Parflange Sleeve  
for Inch Tubing  
ORFS Mechanically  
Attachable Sleeve



| TUBE<br>FITTING<br>PART # | D5<br>END<br>SIZE<br>(in.) | D8<br>DIA<br>(in.) | L<br>(in.) | Material<br>-S |
|---------------------------|----------------------------|--------------------|------------|----------------|
|                           |                            |                    |            |                |
| 4 TPL                     | 1/4                        | 0.50               | 0.30       | •              |
| 6 TPL                     | 3/8                        | 0.62               | 0.34       | •              |
| 8 TPL                     | 1/2                        | 0.74               | 0.42       | •              |
| 10 TPL                    | 5/8                        | 0.92               | 0.42       | •              |
| 12 TPL                    | 3/4                        | 1.09               | 0.47       | •              |
| 16 TPL                    | 1                          | 1.34               | 0.53       | •              |
| 20 TPL                    | 1 1/4                      | 1.59               | 0.51       | •              |
| 24 TPL                    | 1 1/2                      | 1.91               | 0.49       | •              |
| 32 TPL                    | 2                          | 2.39               | 0.54       | •              |

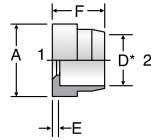
• Must be mechanically attached using Parflange system.

Dimensions and pressures for reference only, subject to change.

**TL (Inch)**

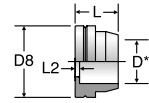
Braze Sleeve for Inch Tubing  
ORFS Silver Braze Sleeve Reducer

SAE 520115

**TLS (Metric)**

Braze Sleeve for Metric Tubing  
ORFS Silver Braze Sleeve

ISO 8434-3 BRSL  
SAE 5201M15



| TUBE<br>FITTING<br>PART # | END SIZE   |            | A<br>(in.) | D*<br>(in.) | E<br>(in.) | F<br>(in.) | Material |     |
|---------------------------|------------|------------|------------|-------------|------------|------------|----------|-----|
|                           | 1<br>(in.) | 2<br>(in.) |            |             |            |            | -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       | •        | •   |
| 6-4 TL                    | 3/8        | 1/4        | 0.62       | 0.26        | 0.08       | 0.41       | •        | •   |
| 8 TL                      | 1/2        |            | 0.75       | 0.51        | 0.04       | 0.37       | •        | •   |
| 8-4 TL                    | 1/2        | 1/4        | 0.75       | 0.26        | 0.14       | 0.47       | •        | •   |
| 8-6 TL                    | 1/2        | 3/8        | 0.75       | 0.38        | 0.14       | 0.47       | •        | •   |
| 10 TL                     | 5/8        |            | 0.92       | 0.63        | 0.06       | 0.41       | •        | •   |
| 10-4 TL                   | 5/8        | 1/4        | 0.92       | 0.26        | 0.20       | 0.53       | •        | •   |
| 10-6 TL                   | 5/8        | 3/8        | 0.92       | 0.38        | 0.20       | 0.53       | •        | •   |
| 10-8 TL                   | 5/8        | 1/2        | 0.92       | 0.51        | 0.20       | 0.53       | •        | •   |
| 12 TL                     | 3/4        |            | 1.10       | 0.76        | 0.06       | 0.55       | •        | •   |
| 12-4 TL                   | 3/4        | 1/4        | 1.10       | 0.26        | 0.24       | 0.57       | •        | •   |
| 12-6 TL                   | 3/4        | 3/8        | 1.10       | 0.38        | 0.24       | 0.57       | •        | •   |
| 12-8 TL                   | 3/4        | 1/2        | 1.10       | 0.51        | 0.24       | 0.57       | •        | •   |
| 12-10 TL                  | 3/4        | 5/8        | 1.10       | 0.63        | 0.22       | 0.57       | •        | •   |
| 12-14 TL**                | 3/4        | 7/8        | 1.10       | 0.88        | 0.06       | 0.65       | •        | •   |
| 14 TL***                  | 7/8        |            | 1.22       | 0.88        | 0.06       | 0.55       | •        | •   |
| 16 TL                     | 1          |            | 1.35       | 1.01        | 0.06       | 0.61       | •        | •   |
| 16-8 TL                   | 1          | 1/2        | 1.35       | 0.51        | 0.28       | 0.61       | •        | •   |
| 16-10 TL                  | 1          | 5/8        | 1.35       | 0.63        | 0.26       | 0.61       | •        | •   |
| 16-12 TL                  | 1          | 3/4        | 1.35       | 0.76        | 0.18       | 0.67       | •        | •   |
| 16-14 TL                  | 1          | 7/8        | 1.35       | 0.88        | 0.18       | 0.67       | •        | •   |
| 20 TL                     | 1 1/4      |            | 1.60       | 1.26        | 0.06       | 0.61       | •        | •   |
| 20-12 TL                  | 1 1/4      | 3/4        | 1.60       | 0.76        | 0.28       | 0.77       | •        | •   |
| 20-16 TL                  | 1 1/4      | 1          | 1.60       | 1.01        | 0.28       | 0.83       | •        | •   |
| 24 TL                     | 1 1/2      |            | 1.91       | 1.51        | 0.06       | 0.61       | •        | •   |
| 24-16 TL                  | 1 1/2      | 1          | 1.91       | 1.01        | 0.28       | 0.83       | •        | •   |
| 24-20 TL                  | 1 1/2      | 1 1/4      | 1.91       | 1.26        | 0.28       | 0.83       | •        | •   |
| 32 TL***                  | 2          |            | 2.41       | 2.01        | 0.06       | 0.65       | •        | •   |

Unplated part, oil dipped for corrosion protection.

\* D is for silver brazing.

\*\* 12-14 TL must be assembled with 12-14 BL.

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

• Uses SBR silver braze rings

| TUBE<br>FITTING<br>PART # | USED<br>WITH<br>FITTING<br>SIZE | D*<br>END<br>SIZE<br>(mm) | D8<br>DIA<br>(mm) | L<br>(mm) | L2<br>(mm) | Material |    |
|---------------------------|---------------------------------|---------------------------|-------------------|-----------|------------|----------|----|
|                           |                                 |                           |                   |           |            | S        | SS |
| TLS6                      | -4                              | 6                         | 12.8              | 9.5       | 1.0        | •        | •  |
| TLS8                      | -6                              | 8                         | 15.8              | 9.5       | 1.0        | •        | •  |
| TLS10                     | -6                              | 10                        | 15.8              | 9.5       | 1.0        | •        | •  |
| TLS12                     | -8                              | 12                        | 18.9              | 9.5       | 1.0        | •        | •  |
| TLS16                     | -10                             | 16                        | 23.5              | 10.5      | 1.5        | •        | •  |
| TLS20                     | -12                             | 20                        | 27.9              | 14.0      | 1.5        | •        | •  |
| TLS25                     | -16                             | 25                        | 34.2              | 15.5      | 1.5        | •        | •  |
| TLS30                     | -20                             | 30                        | 40.6              | 15.5      | 1.5        | •        | •  |
| TLS38                     | -24                             | 38                        | 48.5              | 15.5      | 1.5        | •        | •  |

Unplated part, oil dipped for corrosion protection.

\* D is for silver brazing.

• Uses SBR (metric) silver braze rings

• Stainless steel part number example: TLSS10

Dimensions and pressures for reference only, subject to change.

**SBR (Inch)**

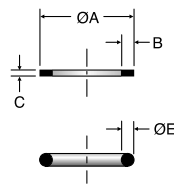
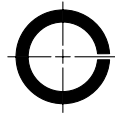
Silver Braze Ring for Inch Tubing

| TUBE FITTING PART # | END SIZE (in.) | A DIA (in.) | B (in.) | C (in.) | E (in.) |
|---------------------|----------------|-------------|---------|---------|---------|
| 4 SBR               | 1/4            | 0.260       | —       | —       | 0.05    |
| 6 SBR               | 3/8            | 0.390       | 0.07    | 0.03    | —       |
| 8 SBR               | 1/2            | 0.515       | 0.07    | 0.03    | —       |
| 10 SBR              | 5/8            | 0.640       | 0.07    | 0.03    | —       |
| 12 SBR              | 3/4            | 0.765       | 0.08    | 0.04    | —       |
| 14 SBR              | 7/8            | 0.890       | —       | —       | 0.06    |
| 16 SBR              | 1              | 1.015       | 0.08    | 0.04    | —       |
| 20 SBR              | 1 1/4          | 1.265       | 0.08    | 0.04    | —       |
| 24 SBR              | 1 1/2          | 1.515       | 0.08    | 0.04    | —       |
| 32 SBR              | 2              | 2.015       | —       | —       | 0.09    |

SBR recommended for steel or copper tubing. -S not required.

SBR-SS recommended for stainless tubing, but can be used on steel tubing.

Contact the Tube Fittings Division for braze rings used in marine or special applications.

**SBR (Metric)**

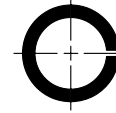
Silver Braze Ring for Metric Tubing

| TUBE FITTING PART # | END SIZE (mm) | A DIA (mm) | E (mm) |
|---------------------|---------------|------------|--------|
| SBR 6mm             | 6             | 6.4        | 1.2    |
| SBR 8mm             | 8             | 8.4        | 1.2    |
| SBR 10mm            | 10            | 10.4       | 1.2    |
| SBR 12mm            | 12            | 12.4       | 1.2    |
| SBR 16mm            | 16            | 16.4       | 1.2    |
| SBR 20mm            | 20            | 20.4       | 1.6    |
| SBR 25mm            | 25            | 25.4       | 1.6    |
| SBR 30mm            | 30            | 30.4       | 1.6    |
| SBR 38mm            | 38            | 38.4       | 1.6    |

SBR recommended for steel or copper tubing.

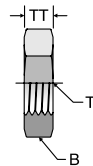
SBR-SS recommended for stainless tubing, but can be used on steel tubing.

Contact the Tube Fittings Division for braze rings used in marine or special applications.

**WLNL**

Bulkhead Locknut

SAE 520118

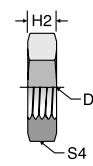


| TUBE FITTING PART # | END SIZE (in.) | T TUBE END UN/UNF-2A | B HEX (in.) | TT (in.) | Material -S |
|---------------------|----------------|----------------------|-------------|----------|-------------|
| 4 WLNL              | 1/4            | 9/16 - 18            | 13/16       | 0.27     | •           |
| 6 WLNL              | 3/8            | 11/16 - 16           | 1           | 0.31     | •           |
| 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.

**WLNML**

Bulkhead Locknut – mm Hex

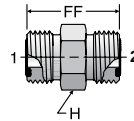
ISO 8434-3 BHLN  
SAE 52M0118

| TUBE FITTING PART # | END SIZE |       | D TUBE END UN/UNF-2B | H2 (mm) | S4 HEX (mm) | Material S |
|---------------------|----------|-------|----------------------|---------|-------------|------------|
|                     | (mm)     | (in.) |                      |         |             |            |
| 4 WLNML             | 6        | 1/4   | 9/16 - 18            | 7.0     | 22          | •          |
| 6 WLNML             | 8,10     | 3/8   | 11/16 - 16           | 8.0     | 27          | •          |
| 8 WLNML             | 12       | 1/2   | 13/16 - 16           | 9.0     | 30          | •          |
| 10 WLNML            | 14,15,16 | 5/8   | 1 - 14               | 10.5    | 36          | •          |
| 12 WLNML            | 18,20    | 3/4   | 1 3/16 - 12          | 10.5    | 41          | •          |
| 16 WLNML            | 22,25    | 1     | 1 7/16 - 12          | 10.5    | 46          | •          |
| 20 WLNML            | 28,30,32 | 1 1/4 | 1 11/16 - 12         | 10.5    | 50          | •          |
| 24 WLNML            | 35,38    | 1 1/2 | 2 - 12               | 10.5    | 60          | •          |

Dimensions and pressures for reference only, subject to change.

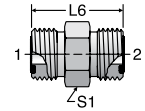
**HLO**Union  
ORFS / ORFS

SAE 520101

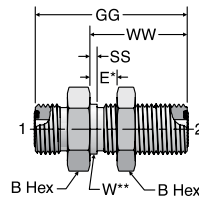


| TUBE<br>FITTING<br>PART # | END SIZE |       | FF<br>(in.) | H<br>HEX<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |     |
|---------------------------|----------|-------|-------------|-------------------|--------------------------------------|-----|-----|
|                           | 1        | 2     |             |                   | -S                                   | -SS | D   |
|                           | (in.)    | (in.) |             |                   |                                      |     |     |
| 4 HLO                     | 1/4      | 1/4   | 1.08        | 5/8               | 9.2                                  | 9.2 | 4.0 |
| 6 HLO                     | 3/8      | 3/8   | 1.22        | 3/4               | 9.2                                  | 9.2 | 4.0 |
| 6-4 HLO                   | 3/8      | 1/4   | 1.18        | 3/4               | 9.2                                  | 9.2 | 4.0 |
| 8 HLO                     | 1/2      | 1/2   | 1.40        | 7/8               | 9.2                                  | 9.2 | 4.0 |
| 8-6 HLO                   | 1/2      | 3/8   | 1.32        | 7/8               | 9.2                                  | 9.2 | 4.0 |
| 10 HLO                    | 5/8      | 5/8   | 1.67        | 1 1/16            | 6.0                                  | 6.0 | 3.0 |
| 10-8 HLO                  | 5/8      | 1/2   | 1.57        | 1 1/16            | 6.0                                  | 6.0 | 3.0 |
| 12 HLO                    | 3/4      | 3/4   | 1.85        | 1 1/4             | 6.0                                  | 6.0 | 3.0 |
| 12-8 HLO                  | 3/4      | 1/2   | 1.69        | 1 1/4             | 6.0                                  | 6.0 | 3.0 |
| 12-10 HLO                 | 3/4      | 5/8   | 1.79        | 1 1/4             | 6.0                                  | 6.0 | 3.0 |
| 16 HLO                    | 1        | 1     | 1.95        | 1 1/2             | 6.0                                  | 6.0 | 3.0 |
| 16-12 HLO                 | 1        | 3/4   | 1.93        | 1 1/2             | 6.0                                  | 6.0 | 3.0 |
| 20 HLO                    | 1 1/4    | 1 1/4 | 2.03        | 1 3/4             | 6.0                                  | 6.0 | 3.0 |
| 20-16 HLO                 | 1 1/4    | 1     | 2.03        | 1 3/4             | 6.0                                  | 6.0 | 3.0 |
| 24 HLO                    | 1 1/2    | 1 1/2 | 2.09        | 2 1/8             | 5.0                                  | 5.0 | 2.5 |
| 32 HLO*                   | 2        | 2     | 2.48        | 2 3/4             | 3.0                                  | 3.0 | 1.5 |

\* Size 32 is not included in SAE J1453.

**HMLO**Union – mm Hex  
ORFS / ORFSISO 8434-3 S  
SAE 52M0101

| TUBE<br>FITTING<br>PART # | END SIZE<br>1 & 2 |       | L6<br>(mm) | S1<br>HEX<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|-------------------|-------|------------|-------------------|--------------------------------------|-----|
|                           | (mm)              | (in.) |            |                   | S                                    | SS  |
|                           |                   |       |            |                   |                                      |     |
| 4HMLO                     | 6                 | 1/4   | 27.5       | 17                | 9.2                                  | 9.2 |
| 6HMLO                     | 8,10              | 3/8   | 31.0       | 19                | 9.2                                  | 9.2 |
| 8HMLO                     | 12                | 1/2   | 35.5       | 22                | 9.2                                  | 9.2 |
| 10HMLO                    | 14,15,16          | 5/8   | 42.5       | 27                | 6.0                                  | 6.0 |
| 12HMLO                    | 18,20             | 3/4   | 47.0       | 32                | 6.0                                  | 6.0 |
| 16HMLO                    | 22,25             | 1     | 49.5       | 41                | 6.0                                  | 6.0 |
| 20HMLO                    | 28,30,32          | 1 1/4 | 51.5       | 46                | 6.0                                  | 6.0 |
| 24HMLO                    | 35,38             | 1 1/2 | 53.0       | 55                | 5.0                                  | 5.0 |

**WLO**Bulkhead Union  
ORFS / ORFSSAE 520601  
WLO-WLNL Body with Locknut  
(See page A11 for WLNL)

| TUBE<br>FITTING<br>PART # | END<br>SIZE<br>(in.) | B<br>HEX<br>(in.) | E<br>MAX<br>(in.) | GG<br>(in.) | SS   | W<br>DIA<br>(in.) | WW<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------------------|-------------------|-------------------|-------------|------|-------------------|-------------|--------------------------------------|-----|
|                           |                      |                   |                   |             |      |                   |             | -S                                   | -SS |
|                           |                      |                   |                   |             |      |                   |             |                                      |     |
| 4 WLO                     | 1/4                  | 13/16             | 0.55              | 1.90        | 0.06 | 0.56              | 1.24        | 9.2                                  | 9.2 |
| 6 WLO                     | 3/8                  | 1                 | 0.55              | 2.09        | 0.06 | 0.69              | 1.34        | 9.2                                  | 9.2 |
| 8 WLO                     | 1/2                  | 1 1/8             | 0.55              | 2.30        | 0.06 | 0.81              | 1.44        | 9.2                                  | 9.2 |
| 10 WLO                    | 5/8                  | 1 5/16            | 0.55              | 2.62        | 0.06 | 1.00              | 1.59        | 6.0                                  | 6.0 |
| 12 WLO                    | 3/4                  | 1 1/2             | 0.55              | 2.72        | 0.06 | 1.19              | 1.63        | 6.0                                  | 6.0 |
| 16 WLO                    | 1                    | 1 3/4             | 0.55              | 2.76        | 0.06 | 1.44              | 1.65        | 6.0                                  | 6.0 |
| 20 WLO                    | 1 1/4                | 2                 | 0.55              | 2.76        | 0.06 | 1.69              | 1.65        | 6.0                                  | 6.0 |
| 24 WLO                    | 1 1/2                | 2 3/8             | 0.55              | 2.76        | 0.06 | 2.00              | 1.65        | 5.0                                  | 5.0 |

\*\* W – Bulkhead pilot diameter. Recommended clearance hole is  
W + 0.015".

Dimensions and pressures for reference only, subject to change.

## WMLO

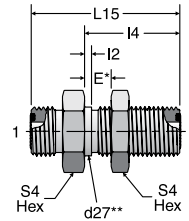
Bulkhead Union – mm Hex  
ORFS / ORFS

ISO 8434-3 BHS

SAE 52M0601

WMLO-WLNML - Body with Locknut

(See page A11 for WLNML)



| TUBE<br>FITTING<br>PART # | END SIZE |       | d27**<br>(mm) | E<br>(mm) | I4<br>(mm) | I2<br>(mm) | L15<br>(mm) | S4<br>HEX<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|---------------|-----------|------------|------------|-------------|-------------------|--------------------------------------|-----|
|                           | 1 & 2    |       |               |           |            |            |             |                   | S                                    | SS  |
|                           | (mm)     | (in.) |               |           |            |            |             |                   |                                      |     |
| 4WMLO                     | 6        | 1/4   | 14.3          | 14        | 31.5       | 1.5        | 48.0        | 22                | 9.2                                  | 9.2 |
| 6WMLO                     | 8,10     | 3/8   | 17.5          | 14        | 34.0       | 1.5        | 53.0        | 27                | 9.2                                  | 9.2 |
| 8WMLO                     | 12       | 1/2   | 20.6          | 14        | 36.5       | 1.5        | 58.5        | 30                | 9.2                                  | 9.2 |
| 10WMLO                    | 14,15,16 | 5/8   | 25.4          | 14        | 40.5       | 1.5        | 66.5        | 36                | 6.0                                  | 6.0 |
| 12WMLO                    | 18,20    | 3/4   | 30.2          | 14        | 41.5       | 1.5        | 69.0        | 41                | 6.0                                  | 6.0 |
| 16WMLO                    | 22,25    | 1     | 36.5          | 14        | 42.0       | 1.5        | 70.0        | 46                | 6.0                                  | 6.0 |
| 20WMLO                    | 28,30,32 | 1 1/4 | 42.9          | 14        | 42.0       | 1.5        | 70.0        | 50                | 6.0                                  | 6.0 |
| 24WMLO                    | 35,38    | 1 1/2 | 50.8          | 14        | 42.0       | 1.5        | 70.0        | 60                | 5.0                                  | 5.0 |

\* E – Maximum bulkhead thickness.

\*\*d27 – Bulkhead pilot diameter. Recommended clearance hole is d27 + 0.4 mm

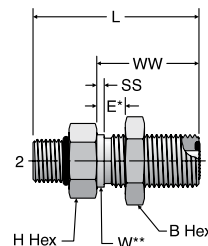
## WF5OLO

Straight Thread Bulkhead  
Connector

ORFS / SAE-ORB

WF5OLO-WLNL - Body with Locknut

(See page A11 for WLNL)



| TUBE<br>FITTING<br>PART # | END SIZE   |                | B<br>HEX<br>(in.) | E<br>MAX<br>(in.) | H<br>HEX<br>(in.) | L<br>(in.) | SS<br>(in.) | W<br>DIA<br>(in.) | WW<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|------------|----------------|-------------------|-------------------|-------------------|------------|-------------|-------------------|-------------|--------------------------------------|-----|
|                           | 1<br>(in.) | 2<br>UN/UNF-2A |                   |                   |                   |            |             |                   |             | -S                                   | -SS |
|                           | (in.)      | (in.)          |                   |                   |                   |            |             |                   |             |                                      |     |
| 4 WF5OLO                  | 1/4        | 7/16 - 20      | 13/16             | 0.55              | 13/16             | 2.14       | 0.06        | 0.56              | 1.24        | 9.2                                  | 9.2 |
| 6 WF5OLO                  | 3/8        | 9/16 - 18      | 1                 | 0.55              | 1                 | 2.31       | 0.06        | 0.69              | 1.34        | 9.2                                  | 9.2 |
| 8 WF5OLO                  | 1/2        | 3/4 - 16       | 1 1/8             | 0.55              | 1 1/8             | 2.60       | 0.06        | 0.81              | 1.44        | 9.2                                  | 9.2 |
| 10 WF5OLO                 | 5/8        | 7/8 - 14       | 1 5/16            | 0.55              | 1 5/16            | 2.69       | 0.06        | 1.00              | 1.60        | 6.0                                  | 6.0 |
| 12 WF5OLO                 | 3/4        | 1 1/16 - 12    | 1 1/2             | 0.55              | 1 1/2             | 2.89       | 0.06        | 1.19              | 1.64        | 6.0                                  | 6.0 |
| 16 WF5OLO                 | 1          | 1 5/16 - 12    | 1 3/4             | 0.55              | 1 3/4             | 2.95       | 0.20        | 1.58              | 1.66        | 6.0                                  | 6.0 |

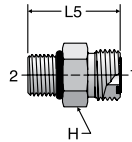
\* E – Maximum bulkhead thickness.

\*\* W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Dimensions and pressures for reference only, subject to change.

**F5OLO**Straight Thread Connector  
ORFS / SAE-ORB

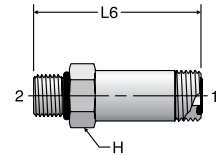
SAE 520120



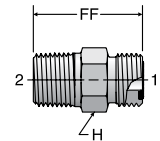
| TUBE<br>FITTING<br>PART # | END SIZE |             | H<br>HEX<br>(in.) | L5<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |     |
|---------------------------|----------|-------------|-------------------|-------------|--------------------------------------|-----|-----|
|                           | 1        | 2           |                   |             | -S                                   | -SS | D   |
|                           | (in.)    | UN/UNF-2A   |                   |             |                                      |     |     |
| 4 F5OLO                   | 1/4      | 7/16 - 20   | 5/8               | 1.13        | 9.2                                  | 9.2 | 4.0 |
| 4-5 F5OLO                 | 1/4      | 1/2 - 20    | 5/8               | 1.16        | 9.2                                  | 9.2 | 4.0 |
| 4-6 F5OLO                 | 1/4      | 9/16 - 18   | 3/4               | 1.20        | 9.2                                  | 9.2 | 4.0 |
| 4-8 F5OLO                 | 1/4      | 3/4 - 16    | 7/8               | 1.32        | 9.2                                  | 9.2 | 4.0 |
| 6 F5OLO                   | 3/8      | 9/16 - 18   | 3/4               | 1.26        | 9.2                                  | 9.2 | 4.0 |
| 6-4 F5OLO                 | 3/8      | 7/16 - 20   | 3/4               | 1.34        | 9.2                                  | 9.2 | 4.0 |
| 6-5 F5OLO                 | 3/8      | 1/2 - 20    | 3/4               | 1.22        | 9.2                                  | 9.2 | 4.0 |
| 6-8 F5OLO                 | 3/8      | 3/4 - 16    | 7/8               | 1.38        | 9.2                                  | 9.2 | 4.0 |
| 6-10 F5OLO                | 3/8      | 7/8 - 14    | 1                 | 1.52        | 9.2                                  | 9.2 | 4.0 |
| 6-12 F5OLO                | 3/8      | 1 1/16 - 12 | 1 1/4             | 1.67        | 9.2                                  | 9.2 | 4.0 |
| 8 F5OLO                   | 1/2      | 3/4 - 16    | 7/8               | 1.44        | 9.2                                  | 9.2 | 4.0 |
| 8-4 F5OLO                 | 1/2      | 7/16 - 20   | 7/8               | 1.44        | 9.2                                  | 9.2 | 4.0 |
| 8-6 F5OLO                 | 1/2      | 9/16 - 18   | 7/8               | 1.48        | 6.0                                  | 6.0 | 3.0 |
| 8-10 F5OLO                | 1/2      | 7/8 - 14    | 1                 | 1.59        | 6.0                                  | 6.0 | 3.0 |
| 8-12 F5OLO                | 1/2      | 1 1/16 - 12 | 1 1/4             | 1.75        | 6.0                                  | 6.0 | 3.0 |
| 8-16 F5OLO                | 1/2      | 1 5/16 - 12 | 1 1/2             | 1.79        | 6.0                                  | 6.0 | 3.0 |
| 10 F5OLO                  | 5/8      | 7/8 - 14    | 1 1/16            | 1.69        | 6.0                                  | 6.0 | 3.0 |
| 10-6 F5OLO                | 5/8      | 9/16 - 18   | 1 1/16            | 1.63        | 6.0                                  | 6.0 | 3.0 |
| 10-8 F5OLO                | 5/8      | 3/4 - 16    | 1 1/16            | 1.77        | 6.0                                  | 6.0 | 3.0 |
| 10-12 F5OLO               | 5/8      | 1 1/16 - 12 | 1 1/4             | 1.85        | 6.0                                  | 6.0 | 3.0 |
| 10-16 F5OLO               | 5/8      | 1 5/16 - 12 | 1 1/2             | 1.89        | 6.0                                  | 6.0 | 3.0 |
| 12 F5OLO                  | 3/4      | 1 1/16 - 12 | 1 1/4             | 1.91        | 6.0                                  | 6.0 | 3.0 |
| 12-6 F5OLO                | 3/4      | 9/16 - 16   | 1 1/4             | 1.77        | 6.0                                  | 6.0 | 3.0 |
| 12-8 F5OLO                | 3/4      | 3/4 - 16    | 1 1/4             | 1.91        | 6.0                                  | 6.0 | 3.0 |
| 12-10 F5OLO               | 3/4      | 7/8 - 14    | 1 1/4             | 1.99        | 6.0                                  | 6.0 | 3.0 |
| 12-16 F5OLO               | 3/4      | 1 5/16 - 12 | 1 1/2             | 1.95        | 6.0                                  | 6.0 | 3.0 |
| 14 F5OLO                  | 7/8      | 1 3/16 - 12 | 1 3/8             | 1.91        | 6.0                                  | 6.0 | 6.0 |
| 16 F5OLO                  | 1        | 1 5/16 - 12 | 1 1/2             | 1.97        | 6.0                                  | 6.0 | 3.0 |
| 16-8 F5OLO                | 1        | 3/4 - 16    | 1 1/2             | 1.96        | 6.0                                  | 6.0 | 3.0 |
| 16-10 F5OLO               | 1        | 7/8 - 14    | 1 1/2             | 2.05        | 6.0                                  | 6.0 | 3.0 |
| 16-12 F5OLO               | 1        | 1 1/16 - 12 | 1 1/2             | 2.15        | 6.0                                  | 6.0 | 3.0 |
| 16-20 F5OLO               | 1        | 1 5/8 - 12  | 1 7/8             | 2.07        | 6.0                                  | 6.0 | 3.0 |
| 16-24 F5OLO               | 1        | 1 7/8 - 12  | 2 1/8             | 2.13        | 6.0                                  | 6.0 | 3.0 |
| 20 F5OLO                  | 1 1/4    | 1 5/8 - 12  | 1 7/8             | 2.07        | 6.0                                  | 6.0 | 3.0 |
| 20-16 F5OLO               | 1 1/4    | 1 5/16 - 12 | 1 7/8             | 2.28        | 6.0                                  | 6.0 | 3.0 |
| 20-24 F5OLO               | 1 1/4    | 1 7/8 - 12  | 2 1/8             | 2.13        | 5.0                                  | 5.0 | 2.5 |
| 24 F5OLO                  | 1 1/2    | 1 7/8 - 12  | 2 1/8             | 2.13        | 5.0                                  | 5.0 | 2.5 |
| 24-20 F5OLO               | 1 1/2    | 1 5/8 - 12  | 2 1/8             | 2.34        | 5.0                                  | 5.0 | 2.5 |
| 32 F5OLO*                 | 2        | 2 1/2 - 12  | 2 3/4             | 2.32        | 3.0                                  | 3.0 | 1.5 |

**FF5OLO**Long Straight Thread Connector  
ORFS-Long / SAE-ORB

SAE 521720 (previously 520122)

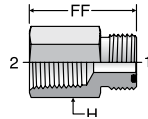


| TUBE<br>FITTING<br>PART # | END SIZE |             | H<br>HEX<br>(in.) | L6<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |   |
|---------------------------|----------|-------------|-------------------|-------------|--------------------------------------|-----|---|
|                           | 1        | 2           |                   |             | -S                                   | -SS | D |
|                           | (in.)    | UN/UNF-2A   |                   |             |                                      |     |   |
| 4 FF5OLO                  | 1/4      | 7/16 - 20   | 5/8               | 2.07        | 9.2                                  | 9.2 |   |
| 6 FF5OLO                  | 3/8      | 9/16 - 18   | 3/4               | 2.27        | 9.2                                  | 9.2 |   |
| 6-4 FF5OLO                | 3/8      | 7/16 - 20   | 3/4               | 2.39        | 9.2                                  | 9.2 |   |
| 8 FF5OLO                  | 1/2      | 3/4 - 16    | 7/8               | 2.67        | 9.2                                  | 9.2 |   |
| 10 FF5OLO                 | 5/8      | 7/8 - 14    | 1 1/16            | 3.14        | 6.0                                  | 6.0 |   |
| 12 FF5OLO                 | 3/4      | 1 1/16 - 12 | 1 1/4             | 3.76        | 6.0                                  | 6.0 |   |
| 16 FF5OLO                 | 1        | 1 5/16 - 12 | 1 1/2             | 4.14        | 6.0                                  | 6.0 |   |
| 20 FF5OLO                 | 1 1/4    | 1 5/8 - 12  | 1 7/8             | 4.76        | 6.0                                  | 6.0 |   |
| 24 FF5OLO                 | 1 1/2    | 1 7/8 - 12  | 2 1/8             | 5.26        | 5.0                                  | 5.0 |   |

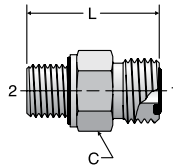
**FLO**Male Pipe Connector  
ORFS / NPTF

| TUBE<br>FITTING<br>PART # | END SIZE |               | FF<br>(in.) | H<br>HEX<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |     |
|---------------------------|----------|---------------|-------------|-------------------|--------------------------------------|-----|-----|
|                           | 1        | 2             |             |                   | -S                                   | -SS | D   |
|                           | (in.)    | NPTF          |             |                   |                                      |     |     |
| 4 FLO                     | 1/4      | 1/8 - 27      | 1.07        | 5/8               | 6.0                                  | 6.0 | 3.0 |
| 4-4 FLO                   | 1/4      | 1/4 - 18      | 1.26        | 5/8               | 6.0                                  | 6.0 | 3.0 |
| 4-6 FLO                   | 1/4      | 3/8 - 18      | 1.32        | 3/4               | 6.0                                  | 6.0 | 3.0 |
| 4-8 FLO                   | 1/4      | 1/2 - 14      | 1.52        | 7/8               | 6.0                                  | 6.0 | 3.0 |
| 6 FLO                     | 3/8      | 1/4 - 18      | 1.25        | 3/4               | 6.0                                  | 6.0 | 3.0 |
| 6-2 FLO                   | 3/8      | 1/8 - 27      | 1.16        | 3/4               | 6.0                                  | 6.0 | 3.0 |
| 6-6 FLO                   | 3/8      | 3/8 - 18      | 1.34        | 3/4               | 6.0                                  | 6.0 | 3.0 |
| 6-8 FLO                   | 3/8      | 1/2 - 14      | 1.55        | 7/8               | 6.0                                  | 6.0 | 3.0 |
| 8 FLO                     | 1/2      | 3/8 - 18      | 1.48        | 7/8               | 6.0                                  | 6.0 | 3.0 |
| 8-4 FLO                   | 1/2      | 1/4 - 18      | 1.48        | 7/8               | 6.0                                  | 6.0 | 3.0 |
| 8-8 FLO                   | 1/2      | 1/2 - 14      | 1.64        | 7/8               | 6.0                                  | 6.0 | 3.0 |
| 8-12 FLO                  | 1/2      | 3/4 - 14      | 1.69        | 1 1/8             | 6.0                                  | 6.0 | 3.0 |
| 10 FLO                    | 5/8      | 1/2 - 14      | 1.82        | 1 1/16            | 6.0                                  | 6.0 | 3.0 |
| 10-12 FLO                 | 5/8      | 3/4 - 14      | 1.82        | 1 1/8             | 5.5                                  | 5.5 | 2.8 |
| 12 FLO                    | 3/4      | 3/4 - 14      | 1.93        | 1 1/4             | 5.5                                  | 6.0 | 2.8 |
| 12-8 FLO                  | 3/4      | 1/2 - 14      | 1.93        | 1 1/4             | 6.0                                  | 6.0 | 3.0 |
| 12-16 FLO                 | 3/4      | 1 - 1 1/2     | 2.13        | 1 3/8             | 4.5                                  | 4.5 | 2.3 |
| 16 FLO                    | 1        | 1 - 1 1/2     | 2.19        | 1 1/2             | 4.5                                  | 4.5 | 2.3 |
| 16-12 FLO                 | 1        | 3/4 - 14      | 2.00        | 1 1/2             | 5.5                                  | 5.5 | 2.3 |
| 16-20 FLO                 | 1        | 1 1/4 - 1 1/2 | 2.30        | 1 3/4             | 3.0                                  | 3.0 | 1.5 |
| 20 FLO                    | 1 1/4    | 1 1/4 - 1 1/2 | 2.30        | 1 7/8             | 3.0                                  | 4.0 | 1.5 |
| 20-12 FLO                 | 1 1/4    | 3/4 - 14      | 2.02        | 7/8               | 4.5                                  | 4.5 | 2.9 |
| 20-16 FLO                 | 1 1/4    | 1 - 1 1/2     | 2.27        | 1 7/8             | 4.5                                  | 4.5 | 2.3 |
| 24 FLO                    | 1 1/2    | 1 1/2 - 1 1/2 | 2.40        | 2 1/8             | 3.0                                  | 3.0 | 1.5 |

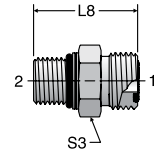
Dimensions and pressures for reference only, subject to change.

**GLO**Female Pipe Connector  
ORFS / Female Pipe

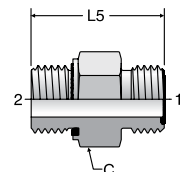
| TUBE<br>FITTING<br>PART # | END SIZE |          | FF<br>(in.) | H<br>HEX<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|----------|-------------|-------------------|--------------------------------------|-----|
|                           | 1        | 2        |             |                   | -S                                   | -SS |
|                           | (in.)    | NPTF     |             |                   |                                      |     |
| 4 GLO                     | 1/4      | 1/8 - 27 | 1.03        | 5/8               | 6.0                                  | 6.0 |
| 4-4 GLO-S                 | 1/4      | 1/4 - 18 | 1.25        | 3/4               | 6.0                                  | 6.0 |
| 6 GLO                     | 3/8      | 1/4 - 18 | 1.30        | 3/4               | 6.0                                  | 6.0 |
| 6-6 GLO-S                 | 3/8      | 3/8 - 18 | 1.34        | 7/8               | 6.0                                  | 6.0 |
| 8 GLO                     | 1/2      | 3/8 - 18 | 1.34        | 7/8               | 6.0                                  | 6.0 |

**F42EDMLO**Male Connector – BSPP  
(for ISO 1179-1 Port)  
ORFS / BSPP-ED

| TUBE<br>FITTING<br>PART # | END SIZE |       |            | C<br>HEX<br>(mm) | L<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|------------|------------------|-----------|--------------------------------------|-----|
|                           | 1        |       | 2          |                  |           | S                                    | SS  |
|                           | (mm)     | (in.) | BSPP       |                  |           |                                      |     |
| 4F42EDMLO                 | 6        | 1/4   | 1/8 - 28   | 17               | 25.7      | 9.2                                  | 9.2 |
| 4-4F42EDMLO               | 6        | 1/4   | 1/4 - 19   | 19               | 30.5      | 9.2                                  | 9.2 |
| 4-6F42EDMLO               | 6        | 1/4   | 3/8 - 19   | 22               | 31.6      | 9.2                                  | 9.2 |
| 4-8F42EDMLO               | 6        | 1/4   | 1/2 - 14   | 27               | 35.4      | 6.0                                  | 6.0 |
| 6F42EDMLO                 | 8,10     | 3/8   | 1/4 - 19   | 19               | 31.9      | 9.2                                  | 9.2 |
| 6-2F42EDMLO               | 8,10     | 3/8   | 1/8 - 28   | 19               | 31.1      | 9.2                                  | 9.2 |
| 6-6F42EDMLO               | 8,10     | 3/8   | 3/8 - 19   | 22               | 33.0      | 9.2                                  | 9.2 |
| 6-8F42EDMLO               | 8,10     | 3/8   | 1/2 - 14   | 27               | 36.5      | 6.0                                  | 6.0 |
| 6-12F42EDMLO              | 8,10     | 3/8   | 3/4 - 14   | 32               | 40.3      | 6.0                                  | 6.0 |
| 8F42EDMLO                 | 12       | 1/2   | 3/8 - 19   | 22               | 34.6      | 9.2                                  | 9.2 |
| 8-4F42EDMLO               | 12       | 1/2   | 1/4 - 19   | 22               | 37.5      | 9.2                                  | 9.2 |
| 8-8F42EDMLO               | 12       | 1/2   | 1/2 - 14   | 27               | 38.4      | 6.0                                  | 6.0 |
| 8-12F42EDMLO              | 12       | 1/2   | 3/4 - 14   | 32               | 41.9      | 6.0                                  | 6.0 |
| 10F42EDMLO                | 14,15,16 | 5/8   | 1/2 - 14   | 27               | 41.1      | 6.0                                  | 6.0 |
| 10-6F42EDMLO              | 14,15,16 | 5/8   | 3/8 - 19   | 27               | 42.4      | 9.2                                  | 9.2 |
| 10-12F42EDMLO             | 14,15,16 | 5/8   | 3/4 - 14   | 32               | 44.3      | 6.0                                  | 6.0 |
| 12F42EDMLO                | 18,20    | 3/4   | 3/4 - 14   | 32               | 46.1      | 6.0                                  | 6.0 |
| 12-8F42EDMLO              | 18,20    | 3/4   | 1/2 - 14   | 32               | 48.5      | 6.0                                  | 6.0 |
| 12-16F42EDMLO             | 18,20    | 3/4   | 1 - 11     | 41               | 47.5      | 6.0                                  | 6.0 |
| 12-20F42EDMLO             | 18,19,20 | 3/4   | 1 1/4 - 11 | 50               | 53.0      | 6.0                                  | 6.0 |
| 16F42EDMLO                | 22,25    | 1     | 1 - 11     | 41               | 49.8      | 6.0                                  | 6.0 |
| 16-12F42EDMLO             | 22,25    | 1     | 3/4 - 14   | 38               | 50.3      | 6.0                                  | 6.0 |
| 16-20F42EDMLO             | 22,25    | 1     | 1 1/4 - 11 | 50               | 53.8      | 6.0                                  | 6.0 |
| 16-24F42EDMLO             | 22,25    | 1     | 1 1/2 - 11 | 55               | 57.5      | 5.0                                  | 5.0 |
| 20F42EDMLO                | 28,30,32 | 1 1/4 | 1 1/4 - 11 | 50               | 53.8      | 6.0                                  | 6.0 |
| 20-16F42EDMLO             | 28,30,32 | 1 1/4 | 1 - 11     | 48               | 55.9      | 6.0                                  | 6.0 |
| 20-24F42EDMLO             | 28,30,32 | 1 1/4 | 1 1/2 - 11 | 55               | 57.6      | 5.0                                  | 5.0 |
| 24F42EDMLO                | 38       | 1 1/2 | 1 1/2 - 11 | 55               | 57.6      | 5.0                                  | 5.0 |

**F87OMLO**Metric Straight Thread Connector  
ORFS / ISO 6149ISO 8434-3 SDS  
SAE 52M0187

| TUBE<br>FITTING<br>PART # | END SIZE |       |         | L8<br>(mm) | S3<br>HEX<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|---------|------------|-------------------|--------------------------------------|-----|
|                           | 1        |       | 2       |            |                   | S                                    | SS  |
|                           | (mm)     | (in.) | ISO 261 |            |                   |                                      |     |
|                           |          |       |         |            |                   |                                      |     |
| 4M12F87OMLO               | 6        | 1/4   | M12X1.5 | 28.5       | 17                | 9.2                                  | 9.2 |
| 4M14F87OMLO               | 6        | 1/4   | M14X1.5 | 29.5       | 19                | 9.2                                  | 9.2 |
| 6M12F87OMLO               | 8,10     | 3/8   | M12X1.5 | 32.0       | 22                | 9.2                                  | 9.2 |
| 6M14F87OMLO               | 8,10     | 3/8   | M14X1.5 | 32.0       | 22                | 9.2                                  | 9.2 |
| 6M16F87OMLO               | 8,10     | 3/8   | M16X1.5 | 33.5       | 22                | 9.2                                  | 9.2 |
| 6M18F87OMLO               | 8,10     | 3/8   | M18X1.5 | 36.1       | 24                | 9.2                                  | 9.2 |
| 8M14F87OMLO               | 12       | 1/2   | M14X1.5 | 35.1       | 24                | 9.2                                  | 9.2 |
| 8M16F87OMLO               | 12       | 1/2   | M16X1.5 | 36.6       | 24                | 9.2                                  | 9.2 |
| 8M18F87OMLO               | 12       | 1/2   | M18X1.5 | 38.1       | 24                | 9.2                                  | 9.2 |
| 8M22F87OMLO               | 12       | 1/2   | M22X1.5 | 39.6       | 27                | 6.0                                  | 6.0 |
| 8M27F87OMLO               | 12       | 1/2   | M27X2.0 | 44.2       | 32                | 6.0                                  | 6.0 |
| 10M18F87OMLO              | 14,15,16 | 5/8   | M18X1.5 | 41.0       | 27                | 6.0                                  | 6.0 |
| 10M22F87OMLO              | 14,15,16 | 5/8   | M22X1.5 | 42.0       | 27                | 6.0                                  | 6.0 |
| 10M27F87OMLO              | 14,15,16 | 5/8   | M27x2.0 | 47.0       | 32                | 6.0                                  | 6.0 |
| 12M22F87OMLO              | 18,20    | 3/4   | M22X1.5 | 45.0       | 32                | 6.0                                  | 6.0 |
| 12M27F87OMLO              | 18,20    | 3/4   | M27X2.0 | 48.5       | 32                | 6.0                                  | 6.0 |
| 12M33F87OMLO              | 18,20    | 3/4   | M33X2.0 | 51.5       | 41                | 6.0                                  | 6.0 |
| 16M27F87OMLO              | 22,26    | 1     | M27X2.0 | 33.6       | 41                | 6.0                                  | 6.0 |
| 16M33F87OMLO              | 22,25    | 1     | M33X2.0 | 52.0       | 41                | 6.0                                  | 6.0 |
| 20M33F87OMLO              | 28,30,32 | 1 1/4 | M33x2.0 | 35.1       | 46                | 5.0                                  | 5.0 |
| 20M42F87OMLO              | 28,30,32 | 1 1/4 | M42X2.0 | 54.5       | 50                | 5.0                                  | 5.0 |
| 24M48F87OMLO              | 35,38    | 1 1/2 | M48X2.0 | 57.0       | 55                | 5.0                                  | 5.0 |

**F82EDMLO**Male Connector – Metric  
(for ISO 9974-1 Port)  
ORFS / Metric-ED

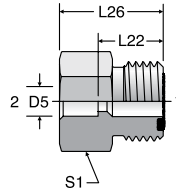
| TUBE<br>FITTING<br>PART # | END SIZE |       |         | C<br>HEX<br>(mm) | L5<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|---------|------------------|------------|--------------------------------------|-----|
|                           | 1        |       | 2       |                  |            | S                                    | SS  |
|                           | (mm)     | (in.) | Metric  |                  |            |                                      |     |
| 4M12F82EDMLO              | 6        | 1/4   | M12X1.5 | 17               | 29.7       | 9.2                                  | 9.2 |
| 4M14F82EDMLO              | 6        | 1/4   | M14X1.5 | 19               | 30.5       | 9.2                                  | 9.2 |
| 6M14F82EDMLO              | 8,10     | 3/8   | M14X1.5 | 22               | 31.9       | 9.2                                  | 9.2 |
| 6M16F82EDMLO              | 8,10     | 3/8   | M16X1.5 | 22               | 31.9       | 9.2                                  | 9.2 |
| 8M16F82EDMLO              | 12       | 1/2   | M16X1.5 | 22               | 32.0       | 9.2                                  | 9.2 |
| 8M18F82EDMLO              | 12       | 1/2   | M18X1.5 | 24               | 34.6       | 9.2                                  | 9.2 |
| 10M22F82EDMLO             | 14,15,16 | 5/8   | M22X1.5 | 27               | 41.1       | 6.0                                  | 6.0 |
| 12M22F82EDMLO             | 18,20    | 3/4   | M22X1.5 | 32               | 42.7       | 6.0                                  | 6.0 |
| 12M27F82EDMLO             | 18,20    | 3/4   | M27X2   | 32               | 46.1       | 6.0                                  | 6.0 |
| 16M33F82EDMLO             | 22,25    | 1     | M33X2   | 41               | 49.8       | 6.0                                  | 6.0 |
| 20M42F82EDMLO             | 28,30,32 | 1 1/4 | M42X2   | 50               | 54.0       | 5.0                                  | 5.0 |

Dimensions and pressures for reference only, subject to change.

## MMLOHB3

Braze Connector  
ORFS / Braze Socket

ISO 8434-3 BRS  
SAE 52M0104



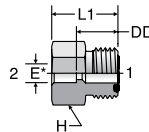
| TUBE<br>FITTING<br>PART # | END SIZE   |       |      | D5*<br>DIA<br>TUBE<br>SOCKET | L22<br>(mm) | L26<br>(mm) | S1<br>HEX | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|------------|-------|------|------------------------------|-------------|-------------|-----------|--------------------------------------|-----|
|                           | 1          |       | 2    |                              |             |             |           | S                                    | SS  |
|                           | (mm)       | (in.) | (mm) |                              |             |             |           |                                      |     |
| 4-6MMLOHB3                | 6          | 1/4   | 6    | 6.15                         | 13.5        | 22.0        | 17        | 9.2                                  | 9.2 |
| 4-8MMLOHB3                | 6          | 1/4   | 8    | 8.15                         | 13.5        | 22.0        | 17        | 9.2                                  | 9.2 |
| 6-10MMLOHB3               | 8, 10      | 3/8   | 10   | 10.15                        | 14.5        | 23.0        | 19        | 9.2                                  | 9.2 |
| 8-12MMLOHB3               | 12         | 1/2   | 12   | 12.15                        | 16.0        | 24.5        | 22        | 9.2                                  | 9.2 |
| 10-16MMLOHB3              | 14, 15, 16 | 5/8   | 16   | 16.15                        | 19.0        | 27.5        | 27        | 6.0                                  | 6.0 |
| 12-20MMLOHB3              | 18, 20     | 3/4   | 20   | 20.18                        | 21.0        | 33.5        | 32        | 6.0                                  | 6.0 |
| 16-25MMLOHB3              | 22, 25     | 1     | 25   | 25.18                        | 24.5        | 38.5        | 41        | 6.0                                  | 6.0 |
| 20-30MMLOHB3              | 28, 30, 32 | 1 1/4 | 30   | 30.20                        | 24.5        | 38.5        | 46        | 6.0                                  | 6.0 |
| 24-38MMLOHB3              | 35, 38     | 1 1/2 | 38   | 38.20                        | 24.5        | 38.5        | 55        | 5.0                                  | 5.0 |

\* D5 is for silver brazing. Standard steel parts are not recommended for welding.

## LOHB3

Braze Connector  
ORFS / Braze Socket

SAE 520104



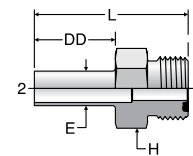
| TUBE<br>FITTING<br>PART # | END SIZE |       | DD<br>(in.) | E*<br>DIA<br>(in.) | H<br>HEX<br>(in.) | L1<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|-------------|--------------------|-------------------|-------------|--------------------------------------|-----|
|                           | 1        | 2     |             |                    |                   |             | -S                                   | -SS |
|                           | (in.)    | (in.) |             |                    |                   |             |                                      |     |
| 4 LOHB3                   | 1/4      | 1/4   | 0.53        | 0.26               | 5/8               | 0.86        | 9.2                                  | 9.2 |
| 4-6 LOHB3                 | 1/4      | 3/8   | 0.53        | 0.38               | 5/8               | 0.86        | 9.2                                  | 9.2 |
| 6 LOHB3                   | 3/8      | 3/8   | 0.57        | 0.38               | 3/4               | 0.90        | 9.2                                  | 9.2 |
| 6-4 LOHB3                 | 3/8      | 1/4   | 0.57        | 0.26               | 3/4               | 0.90        | 9.2                                  | 9.2 |
| 6-8 LOHB3                 | 3/8      | 1/2   | 0.57        | 0.51               | 3/4               | 0.90        | 9.2                                  | 9.2 |
| 8 LOHB3                   | 1/2      | 1/2   | 0.63        | 0.51               | 7/8               | 0.97        | 9.2                                  | 9.2 |
| 8-4 LOHB3**               | 1/2      | 1/4   | 0.64        | 0.26               | 7/8               | 0.97        | 9.2                                  | 9.2 |
| 8-6 LOHB3                 | 1/2      | 3/8   | 0.63        | 0.38               | 7/8               | 0.97        | 9.2                                  | 9.2 |
| 8-10 LOHB3                | 1/2      | 5/8   | 0.63        | 0.63               | 7/8               | 0.97        | 6.0                                  | 6.0 |
| 8-12 LOHB3**              | 1/2      | 3/4   | 0.67        | 0.76               | 1 1/16            | 1.16        | 6.0                                  | 6.0 |
| 10 LOHB3                  | 5/8      | 5/8   | 0.74        | 0.63               | 1 1/16            | 1.07        | 6.0                                  | 6.0 |
| 10-6 LOHB3                | 5/8      | 3/8   | 0.74        | 0.38               | 1 1/16            | 1.07        | 6.0                                  | 6.0 |
| 10-8 LOHB3                | 5/8      | 1/2   | 0.74        | 0.51               | 1 1/16            | 1.07        | 6.0                                  | 6.0 |
| 10-12 LOHB3               | 5/8      | 3/4   | 0.74        | 0.76               | 1 1/16            | 1.23        | 6.0                                  | 6.0 |
| 12 LOHB3                  | 3/4      | 3/4   | 0.83        | 0.76               | 1 1/4             | 1.32        | 6.0                                  | 6.0 |
| 12-8 LOHB3                | 3/4      | 1/2   | 0.83        | 0.51               | 1 1/4             | 1.16        | 6.0                                  | 6.0 |
| 12-10 LOHB3               | 3/4      | 5/8   | 0.83        | 0.63               | 1 1/4             | 1.16        | 6.0                                  | 6.0 |
| 12-16 LOHB3               | 3/4      | 1     | 0.83        | 1.01               | 1 1/2             | 1.38        | 6.0                                  | 6.0 |
| 16 LOHB3                  | 1        | 1     | 0.97        | 1.01               | 1 1/2             | 1.52        | 6.0                                  | 6.0 |
| 16-8 LOHB3**              | 1        | 1/2   | 0.97        | 0.51               | 1 1/2             | 1.30        | 6.0                                  | 6.0 |
| 16-12 LOHB3               | 1        | 3/4   | 0.97        | 0.76               | 1 1/2             | 1.46        | 6.0                                  | 6.0 |
| 16-20 LOHB3               | 1        | 1 1/4 | 0.96        | 1.26               | 1 3/4             | 1.52        | 6.0                                  | 6.0 |
| 20 LOHB3                  | 1 1/4    | 1 1/4 | 0.97        | 1.26               | 1 3/4             | 1.52        | 6.0                                  | 6.0 |
| 20-16 LOHB3               | 1 1/4    | 1     | 0.97        | 1.01               | 1 3/4             | 1.52        | 6.0                                  | 6.0 |
| 20-24 LOHB3               | 1 1/4    | 1 1/2 | 0.97        | 1.51               | 2 1/8             | 1.52        | 5.0                                  | 5.0 |
| 24 LOHB3                  | 1 1/2    | 1 1/2 | 0.97        | 1.51               | 2 1/8             | 1.52        | 5.0                                  | 5.0 |
| 24-20 LOHB3               | 1 1/2    | 1 1/4 | 0.97        | 1.26               | 2 1/8             | 1.52        | 5.0                                  | 5.0 |

\* E is for silver brazing. Standard steel parts are not recommended for welding.

\*\* Size 14 is not included in SAE J1453.

## LOHT3

Tube Stub Connector  
ORFS / Tube Weld



| TUBE<br>FITTING<br>PART # | END<br>SIZE    | DD<br>(in.) | E<br>DIA<br>(in.) | H<br>HEX<br>(in.) | L<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |
|---------------------------|----------------|-------------|-------------------|-------------------|------------|--------------------------------------|
|                           | 1 & 2<br>(in.) |             |                   |                   |            |                                      |
| 4-4X035 LOHT3             | 1/4            | 0.88        | 0.25              | 5/8               | 1.58       | 5.9                                  |
| 6-6X035 LOHT3             | 3/8            | 0.88        | 0.38              | 3/4               | 1.67       | 3.8                                  |
| 8-8X065 LOHT3             | 1/2            | 1.00        | 0.50              | 7/8               | 1.89       | 5.5                                  |
| 12-12X065 LOHT3           | 3/4            | 1.16        | 0.75              | 1 1/4             | 2.35       | 3/5                                  |
| 12-16X065 LOHT3           | 1              | 1.13        | 1.00              | 1 1/4             | 2.32       | 2.6                                  |
| 16-16X065 LOHT3           | 1              | 1.13        | 1.00              | 1 1/2             | 2.40       | 2.6                                  |

\* Contact Tube Fittings Division for pressure ratings.

Dimensions and pressures for reference only, subject to change.

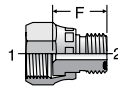
## TRLON

Tube End Reducer

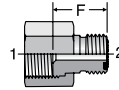
ORFS Swivel / ORFS Tube End

SAE 520123 (body only)

SAE 520123A (body with large nut)



\* Assembled  
with  
Crimp Nut



\*\* Assembled  
with Large  
BL Nut

| TUBE FITTING PART #                   |                                           |                                                | END SIZE   |            | F<br>(in.) | Dynamic Pressure<br>(x 1,000 PSI) |     |
|---------------------------------------|-------------------------------------------|------------------------------------------------|------------|------------|------------|-----------------------------------|-----|
| TRLON                                 | TRLON                                     | TRLO                                           |            |            |            |                                   |     |
| *One Piece Design<br>(With Crimp Nut) | **Two Piece<br>Design (With<br>Large Nut) | ***Body Only<br>(For Two-Piece<br>Design Only) | 1<br>(in.) | 2<br>(in.) | F<br>(in.) | -S                                | -SS |
| 6-4 TRLON                             | —                                         | —                                              | 3/8        | 1/4        | 0.77       | 9.2                               | 9.2 |
| —                                     | 8-4 TRLON                                 | 8-4 TRLO                                       | 1/2        | 1/4        | 0.87       | 9.2                               | 9.2 |
| 8-6 TRLON                             | —                                         | —                                              | 1/2        | 3/8        | 0.89       | 9.2                               | 9.2 |
| —                                     | 10-4 TRLON                                | 10-4 TRLO                                      | 5/8        | 1/4        | 0.91       | 6.0                               | 6.0 |
| —                                     | 10-6 TRLON                                | 10-6 TRLO                                      | 5/8        | 3/8        | 0.94       | 6.0                               | 6.0 |
| —                                     | 10-8 TRLON                                | 10-8 TRLO                                      | 5/8        | 1/2        | 1.00       | 6.0                               | 6.0 |
| —                                     | 12-4 TRLON                                | 12-4 TRLO                                      | 3/4        | 1/4        | 0.98       | 6.0                               | 6.0 |
| —                                     | 12-6 TRLON                                | 12-6 TRLO                                      | 3/4        | 3/8        | 1.02       | 6.0                               | 6.0 |
| —                                     | 12-8 TRLON                                | 12-8 TRLO                                      | 3/4        | 1/2        | 1.08       | 6.0                               | 6.0 |
| 12-10 TRLON                           | —                                         | —                                              | 3/4        | 5/8        | 1.16       | 6.0                               | 6.0 |
| —                                     | 16-8 TRLON                                | 16-8 TRLO                                      | 1          | 1/2        | 1.14       | 6.0                               | 6.0 |
| —                                     | 16-10 TRLON                               | 16-10 TRLO                                     | 1          | 5/8        | 1.26       | 6.0                               | 6.0 |
| 16-12 TRLON                           | —                                         | —                                              | 1          | 3/4        | 1.30       | 6.0                               | 6.0 |
| —                                     | 20-12 TRLON                               | 20-12 TRLO                                     | 1 1/4      | 3/4        | 1.32       | 5.0                               | 5.0 |
| 20-16 TRLON                           | —                                         | —                                              | 1 1/4      | 1          | 1.34       | 5.0                               | 5.0 |
| —                                     | 24-12 TRLON-S                             | —                                              | 1 1/2      | 3/4        | 1.32       | 4.0                               | 4.0 |
| —                                     | 24-16 TRLON                               | 24-16 TRLO                                     | 1 1/2      | 1          | 1.34       | 4.0                               | 4.0 |
| —                                     | 24-20 TRLON                               | 24-20 TRLO                                     | 1 1/2      | 1 1/4      | 1.34       | 4.0                               | 4.0 |
| —                                     | 32-20 TRLON**                             | 32-20 TRLO**                                   | 2          | 1 1/4      | 1.42       | 3.0                               | 3.0 |
| —                                     | 32-24 TRLON**                             | 32-24 TRLO**                                   | 2          | 1 1/2      | 1.42       | 3.0                               | 3.0 |

\* Assembled with crimp nut.

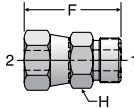
\*\* Assembled with large BL nut.

\*\*\*To order reducer without large nut (body only) remove the "N" from the part number (i.e., TRLO).

## LOHL6

Tube End Extender / Expander

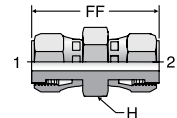
ORFS / ORFS Swivel



## HL6

Swivel Nut Union

ORFS Swivel / ORFS Swivel



| TUBE FITTING PART # | END SIZE   |            | F<br>(in.) | H<br>HEX<br>(in.) | Dynamic Pressure<br>(x 1,000 PSI) |     |
|---------------------|------------|------------|------------|-------------------|-----------------------------------|-----|
|                     | 1<br>(in.) | 2<br>(in.) |            |                   |                                   |     |
| 4 LOHL6             | 1/4        | 1/4        | 1.33       | 5/8               | 9.2                               | 9.2 |
| 6 LOHL6             | 3/8        | 3/8        | 1.44       | 3/4               | 9.2                               | 9.2 |
| 6-4 LOHL6           | 3/8        | 1/4        | 1.37       | 3/4               | 9.2                               | 9.2 |
| 8 LOHL6             | 1/2        | 1/2        | 1.67       | 7/8               | 9.2                               | 9.2 |
| 8-6 LOHL6           | 1/2        | 3/8        | 1.62       | 7/8               | 9.2                               | 9.2 |
| 10-8 LOHL6          | 5/8        | 1/2        | 1.81       | 1 1/16            | 6.0                               | 6.0 |
| 12-10 LOHL6         | 3/4        | 5/8        | 1.99       | 1 1/4             | 6.0                               | 6.0 |
| 16-12 LOHL6         | 1          | 3/4        | 2.16       | 1 1/2             | 6.0                               | 6.0 |
| 20-16 LOHL6         | 1 1/4      | 1          | 2.28       | 1 3/4             | 5.0                               | 5.0 |
| 24-20 LOHL6         | 1 1/2      | 1 1/4      | 2.35       | 2 1/8             | 4.0                               | 4.0 |

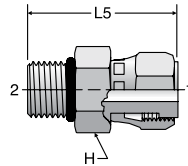
| TUBE FITTING PART # | END SIZE   |            | FF<br>(in.) | H<br>HEX<br>(in.) | Dynamic Pressure<br>(x 1,000 PSI) |     |
|---------------------|------------|------------|-------------|-------------------|-----------------------------------|-----|
|                     | 1<br>(in.) | 2<br>(in.) |             |                   |                                   |     |
| 4 HL6               | 1/4        | 1/4        | 1.59        | 5/8               | 9.2                               | 9.2 |
| 6 HL6               | 3/8        | 3/8        | 1.77        | 3/4               | 9.2                               | 9.2 |
| 8 HL6               | 1/2        | 1/2        | 2.12        | 7/8               | 9.2                               | 9.2 |
| 10 HL6              | 5/8        | 5/8        | 2.42        | 1 1/16            | 6.0                               | 6.0 |
| 12 HL6              | 3/4        | 3/4        | 2.74        | 1 1/4             | 6.0                               | 6.0 |
| 16 HL6              | 1          | 1          | 2.95        | 1 7/16            | 6.0                               | 6.0 |

Dimensions and pressures for reference only, subject to change.

## F650L

Straight Thread Swivel Connector  
ORFS Swivel / SAE-ORB

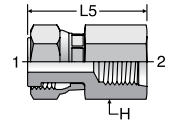
SAE 520181



| TUBE<br>FITTING<br>PART # | END SIZE |             | H<br>HEX<br>(in.) | L5<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------------|-------------------|-------------|--------------------------------------|-----|
|                           | 1        | 2           |                   |             | -S                                   | -SS |
|                           | (in.)    | UN/UNF-2A   |                   |             |                                      |     |
| 4 F65OL                   | 1/4      | 7/16 - 20   | 5/8               | 1.46        | 9.2                                  | 9.2 |
| 6 F65OL                   | 3/8      | 9/16 - 18   | 3/4               | 1.57        | 9.2                                  | 9.2 |
| 8 F65OL                   | 1/2      | 3/4 - 16    | 7/8               | 1.95        | 9.2                                  | 9.2 |
| 10 F65OL                  | 5/8      | 7/8 - 14    | 1 1/16            | 2.13        | 6.0                                  | 6.0 |
| 12 F65OL                  | 3/4      | 1 1/16 - 12 | 1 1/4             | 2.34        | 6.0                                  | 6.0 |
| 16 F65OL                  | 1        | 1 5/16 - 12 | 1 1/2             | 2.66        | 6.0                                  | 6.0 |
| 20 F65OL                  | 1 1/4    | 1 5/8 - 12  | 1 7/8             | 2.66        | 5.0                                  | 5.0 |

## G65L

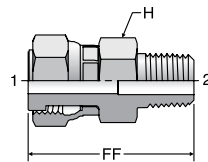
Straight Thread Swivel  
Female Connector  
ORFS Swivel / SAE-ORB



| TUBE<br>FITTING<br>PART # | END SIZE |           | H<br>HEX<br>(in.) | L5<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-----------|-------------------|-------------|--------------------------------------|-----|
|                           | 1        | 2         |                   |             | -S                                   | -SS |
|                           | (in.)    | UN/UNF-2B |                   |             |                                      |     |
| 4 G65L                    | 1/4      | 7/16 - 20 | 3/4               | 1.38        | 6.0                                  | 6.0 |
| 4-6 G65L                  | 1/4      | 9/16 - 18 | 13/16             | 1.45        | 6.0                                  | 6.0 |
| 6-4 G65L                  | 3/8      | 7/16 - 20 | 3/4               | 1.51        | 6.0                                  | 6.0 |
| 8-4 G65L                  | 1/2      | 7/16 - 20 | 7/8               | 1.57        | 6.0                                  | 6.0 |

## F6L

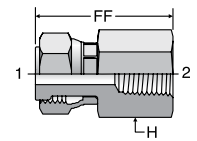
Pipe Thread Swivel  
Connector  
ORFS Swivel / NPTF



| TUBE<br>FITTING<br>PART # | END SIZE |            | FF<br>(in.) | H<br>HEX<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|------------|-------------|-------------------|--------------------------------------|-----|
|                           | 1        | 2          |             |                   | -S                                   | -SS |
|                           | (in.)    | NPTF       |             |                   |                                      |     |
| 4 F6L                     | 1/4      | 1/8 - 27   | 1.33        | 5/8               | 6.0                                  | 6.0 |
| 4-4 F6L                   | 1/4      | 1/4 - 18   | 1.52        | 5/8               | 6.0                                  | 6.0 |
| 6 F6L                     | 3/8      | 1/4 - 18   | 1.69        | 3/4               | 6.0                                  | 6.0 |
| 6-6 F6L                   | 3/8      | 3/8 - 18   | 1.67        | 3/4               | 6.0                                  | 6.0 |
| 8 F6L                     | 1/2      | 3/8 - 18   | 1.95        | 3/4               | 6.0                                  | 6.0 |
| 8-8 F6L                   | 1/2      | 1/2 - 14   | 2.14        | 7/8               | 6.0                                  | 6.0 |
| 10 F6L                    | 5/8      | 1/2 - 14   | 2.29        | 1 1/16            | 6.0                                  | 6.0 |
| 12 F6L                    | 3/4      | 3/4 - 14   | 2.37        | 1 1/4             | 5.5                                  | 5.5 |
| 16 F6L                    | 1        | 1 - 11 1/2 | 2.87        | 1 1/2             | 4.5                                  | 4.5 |

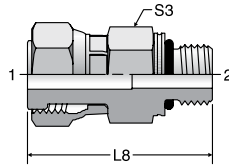
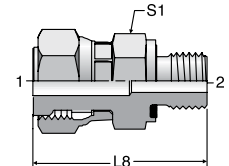
## G6L

Female Pipe Thread Swivel  
Connector  
ORFS Swivel / NPTF



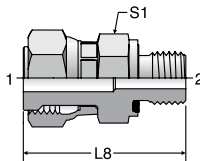
| TUBE<br>FITTING<br>PART # | END SIZE |          | FF<br>(in.) | H<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|----------|-------------|------------|--------------------------------------|-----|
|                           | 1        | 2        |             |            | -S                                   | -SS |
|                           | (in.)    | NPTF     |             |            |                                      |     |
| 4-4 G6L                   | 1/4      | 1/4 - 18 | 1.48        | 3/4        | 6.0                                  | 6.0 |
| 6 G6L                     | 3/8      | 1/4 - 18 | 1.60        | 7/8        | 6.0                                  | 6.0 |
| 8-4 G6L                   | 1/2      | 1/4 - 18 | 1.75        | 7/8        | 6.0                                  | 6.0 |

Dimensions and pressures for reference only, subject to change.

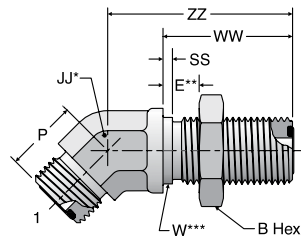
**F687OML**Swivel ISO 6149 Connector  
ORFS Swivel / ISO 6149**F682EDML**Swivel Metric Connector  
ORFS Swivel / Metric-ED

| TUBE<br>FITTING<br>PART # | END SIZE   |       |         | L8<br>(mm) | S3<br>HEX<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|------------|-------|---------|------------|-------------------|--------------------------------------|-----|
|                           | 1          |       | 2       |            |                   | S                                    | SS  |
|                           | (mm)       | (in.) | ISO 261 |            |                   |                                      |     |
| 4M12F687OML               | 6          | 1/4   | M12x1.5 | 37.0       | 17                | 9.2                                  | 9.2 |
| 6M12F687OML               | 8, 10      | 3/8   | M12x1.5 | 39.0       | 17                | 9.2                                  | 9.2 |
| 6M14F687OML               | 8, 10      | 3/8   | M14x1.5 | 38.0       | 19                | 9.2                                  | 9.2 |
| 6M16F687OML               | 8, 10      | 3/8   | M16x1.5 | 43.5       | 22                | 9.2                                  | 9.2 |
| 8M16F687OML               | 12         | 1/2   | M16x1.5 | 48.0       | 22                | 9.2                                  | 9.2 |
| 10M22F687OML              | 14, 15, 16 | 5/8   | M22x1.5 | 53.0       | 27                | 6.0                                  | 6.0 |
| 10M27F687OML              | 14, 15, 16 | 5/8   | M27x2   | 57.0       | 32                | 6.0                                  | 6.0 |
| 12M27F687OML              | 18, 20     | 3/4   | M27x2   | 59.5       | 32                | 6.0                                  | 6.0 |
| 16M33F687OML              | 22, 25     | 1     | M33x2   | 67.5       | 41                | 6.0                                  | 6.0 |

| TUBE<br>FITTING<br>PART # | END SIZE   |       |         | L8<br>(mm) | S1<br>HEX<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|------------|-------|---------|------------|-------------------|--------------------------------------|-----|
|                           | 1          |       | 2       |            |                   | S                                    | SS  |
|                           | (mm)       | (in.) | Metric  |            |                   |                                      |     |
|                           |            |       |         |            |                   |                                      |     |
| 4M12F682EDML              | 6          | 1/4   | M12x1.5 | 38.2       | 17                | 9.2                                  | 9.2 |
| 6M14F682EDML              | 8, 10      | 3/8   | M14x1.5 | 40.2       | 19                | 9.2                                  | 9.2 |
| 8M16F682EDML              | 12         | 1/2   | M16x1.5 | 47.3       | 22                | 9.2                                  | 9.2 |
| 10M22F682EDML             | 14, 15, 16 | 5/8   | M22X1.5 | 51.8       | 27                | 6.0                                  | 6.0 |
| 12M27F682EDML             | 18, 20     | 3/4   | M27x2   | 57.2       | 32                | 6.0                                  | 6.0 |
| 16M33F682EDML             | 22, 25     | 1     | M33X2   | 67.0       | 41                | 6.0                                  | 6.0 |

**F642EDML**Swivel BSPP Connector  
ORFS Swivel / BSPP-ED

| TUBE<br>FITTING<br>PART # | END SIZE   |       |     | L8<br>(mm) | S1<br>HEX<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|------------|-------|-----|------------|-------------------|--------------------------------------|-----|
|                           | 1          |       | 2   |            |                   | S                                    | SS  |
|                           | (mm)       | (in.) | BSP |            |                   |                                      |     |
| 4F642EDML                 | 6          | 1/4   | 1/8 | 34.0       | 14                | 7.2                                  | 7.2 |
| 6F642EDML                 | 8, 10      | 3/8   | 1/4 | 40.2       | 19                | 9.2                                  | 9.2 |
| 8F642EDML                 | 12         | 1/2   | 3/8 | 47.3       | 22                | 9.2                                  | 9.2 |
| 10F642EDML                | 14, 15, 16 | 5/8   | 1/2 | 51.8       | 27                | 6.0                                  | 6.0 |
| 12F642EDML                | 18, 20     | 3/4   | 3/4 | 57.2       | 32                | 6.0                                  | 6.0 |
| 16F642EDML                | 22, 25     | 1     | 1   | 67.0       | 46                | 6.0                                  | 6.0 |

**WNLO**45° Bulkhead Union Elbow  
ORFS / ORFSSAE 520801  
WNLO-WLNL - Body with Locknut  
(See page A11 for WLNL)

| TUBE<br>FITTING<br>PART # | END SIZE |       | B<br>HEX<br>(in.) | E<br>MAX<br>(in.) | JJ<br>(in.) | P<br>(in.) | SS<br>(in.) | W<br>DIA<br>(in.) | WW<br>(in.) | ZZ<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|-------------------|-------------------|-------------|------------|-------------|-------------------|-------------|-------------|--------------------------------------|-----|
|                           | 1        | 2     |                   |                   |             |            |             |                   |             |             | -S                                   | -SS |
|                           | (in.)    | (in.) |                   |                   |             |            |             |                   |             |             |                                      |     |
| 4 WNLO                    | 1/4      | 1/4   | 13/16             | 0.55              | 9/16        | 0.63       | 0.06        | 0.56              | 1.24        | 1.73        | 9.2                                  | 9.2 |
| 6 WNLO                    | 3/8      | 3/8   | 1                 | 0.55              | 3/4         | 0.75       | 0.06        | 0.69              | 1.34        | 1.91        | 9.2                                  | 9.2 |
| 8 WNLO                    | 1/2      | 1/2   | 1 1/8             | 0.55              | 3/4         | 0.81       | 0.06        | 0.81              | 1.44        | 2.01        | 9.2                                  | 9.2 |
| 10 WNLO                   | 5/8      | 5/8   | 1 5/16            | 0.55              | 1 1/16      | 0.93       | 0.06        | 1.00              | 1.59        | 2.22        | 6.0                                  | 6.0 |
| 12 WNLO                   | 3/4      | 3/4   | 1 1/2             | 0.55              | 1 3/16      | 1.02       | 0.06        | 1.19              | 1.63        | 2.38        | 6.0                                  | 6.0 |
| 16 WNLO                   | 1        | 1     | 1 3/4             | 0.55              | 1 7/16      | 1.18       | 0.06        | 1.44              | 1.65        | 2.56        | 6.0                                  | 6.0 |
| 20 WNLO                   | 1 1/4    | 1 1/4 | 2                 | 0.55              | 1 5/8       | 1.26       | 0.06        | 1.69              | 1.65        | 2.64        | 5.0                                  | 5.0 |
| 24 WNLO                   | 1 1/2    | 1 1/2 | 2 3/8             | 0.55              | 1 7/8       | 1.46       | 0.06        | 2.00              | 1.65        | 2.64        | 4.0                                  | 4.0 |

\* JJ – Across wrench flats.

\*\* E – Maximum bulkhead thickness.

\*\*\* W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Dimensions and pressures for reference only, subject to change.

## WNMLO

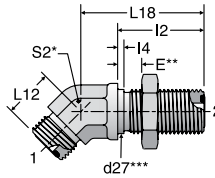
45° Bulkhead Union Elbow – mm Hex  
ORFS / ORFS

ISO 8434-3 BHE45

SAE 52M0801

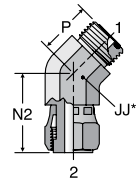
WNMLO-WLNML - Body with Locknut

(See page A11 for WLNML)



## V6LO

45° Swivel Nut Elbow  
ORFS / ORFS Swivel



\* JJ – Across Wrench Flats

| TUBE<br>FITTING<br>PART # | END SIZE |       | d27***<br>(mm) | E<br>(mm) | I2<br>(mm) | I4<br>(mm) | L12<br>(mm) | L18<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|----------------|-----------|------------|------------|-------------|-------------|------------|--------------------------------------|-----|
|                           | 1 & 2    |       |                |           |            |            |             |             |            | S                                    | SS  |
|                           | (mm)     | (in.) |                |           |            |            |             |             |            |                                      |     |
| 4WNMLO                    | 6        | 1/4   | 14.3           | 14        | 31.5       | 1.5        | 16.0        | 44.0        | 14         | 9.2                                  | 9.2 |
| 6WNMLO                    | 8,10     | 3/8   | 17.5           | 14        | 34.0       | 1.5        | 19.0        | 48.5        | 19         | 9.2                                  | 9.2 |
| 8WNMLO                    | 12       | 1/2   | 20.6           | 14        | 36.5       | 1.5        | 20.5        | 51.0        | 19         | 9.2                                  | 9.2 |
| 10WNMLO                   | 14,15,16 | 5/8   | 25.4           | 14        | 40.5       | 1.5        | 23.5        | 56.5        | 27         | 6.0                                  | 6.0 |
| 12WNMLO                   | 18,20    | 3/4   | 30.2           | 14        | 41.5       | 1.5        | 26.0        | 60.5        | 30         | 6.0                                  | 6.0 |
| 16WNMLO                   | 22,25    | 1     | 36.5           | 14        | 42.0       | 1.5        | 30.0        | 65.0        | 36         | 6.0                                  | 6.0 |
| 20WNMLO                   | 28,30,32 | 1 1/4 | 42.9           | 14        | 42.0       | 1.5        | 32.0        | 67.0        | 41         | 5.0                                  | 5.0 |
| 24WNMLO                   | 35,38    | 1 1/2 | 50.8           | 14        | 42.0       | 1.5        | 37.0        | 67.0        | 50         | 4.0                                  | 4.0 |

\* S2 – Across Wrench Flats.

\*\* E – Maximum bulkhead thickness.

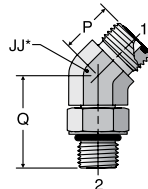
\*\*\*d27 – Bulkhead pilot diameter. Recommended clearance hole is d27 + 0.4 mm.

| TUBE<br>FITTING<br>PART # | END<br>SIZE | JJ<br>(in.) | N2<br>(in.) | P<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|-------------|-------------|-------------|------------|--------------------------------------|-----|
|                           | 1 & 2       |             |             |            | -S                                   | -SS |
|                           | (in.)       |             |             |            |                                      |     |
| 4 V6LO                    | 1/4         | 9/16        | 0.99        | 0.63       | 9.2                                  | 9.2 |
| 6 V6LO                    | 3/8         | 3/4         | 1.12        | 0.74       | 9.2                                  | 9.2 |
| 8 V6LO                    | 1/2         | 3/4         | 1.49        | 0.80       | 9.2                                  | 9.2 |
| 10 V6LO                   | 5/8         | 1 1/16      | 1.53        | 0.92       | 6.0                                  | 6.0 |
| 12 V6LO                   | 3/4         | 1 3/16      | 1.73        | 1.02       | 6.0                                  | 6.0 |
| 16 V6LO                   | 1           | 1 7/16      | 1.87        | 1.18       | 6.0                                  | 6.0 |
| 20 V6LO                   | 1 1/4       | 1 5/8       | 1.98        | 1.26       | 5.0                                  | 5.0 |
| 24 V6LO                   | 1 1/2       | 1 7/8       | 2.06        | 1.45       | 4.0                                  | 4.0 |

## V5OLO

45° Straight Thread Elbow  
ORFS / SAE-ORB

SAE 520320



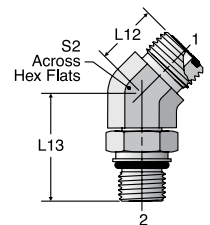
\* JJ – Across Hex Flats

## V87OMLO

45° Metric Straight Thread Elbow  
ORFS / ISO 6149

ISO 8434-3 SDE45

SAE 52M0387

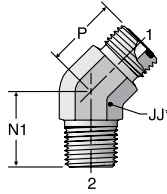


\* S2 – Across Hex Flats

| TUBE<br>FITTING<br>PART # | END SIZE |             | JJ<br>(in.) | P<br>(in.) | Q<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------------|-------------|------------|------------|--------------------------------------|-----|
|                           | 1        | 2           |             |            |            | -S                                   | -SS |
|                           | (in.)    | UNUNF-2A    |             |            |            |                                      |     |
| 4 V5OLO                   | 1/4      | 7/16 - 20   | 9/16        | 0.63       | 1.18       | 6.0                                  | 6.0 |
| 4-6 V5OLO                 | 1/4      | 9/16 - 18   | 3/4         | 0.69       | 1.30       | 6.0                                  | 6.0 |
| 6 V5OLO                   | 3/8      | 9/16 - 18   | 3/4         | 0.75       | 1.30       | 6.0                                  | 6.0 |
| 6-4 V5OLO                 | 3/8      | 7/16 - 20   | 3/4         | 0.75       | 1.22       | 6.0                                  | 6.0 |
| 6-8 V5OLO                 | 3/8      | 3/4 - 16    | 3/4         | 0.75       | 1.44       | 6.0                                  | 6.0 |
| 8 V5OLO                   | 1/2      | 3/4 - 16    | 3/4         | 0.81       | 1.44       | 6.0                                  | 6.0 |
| 8-6 V5OLO                 | 1/2      | 9/16 - 18   | 3/4         | 0.81       | 1.28       | 6.0                                  | 6.0 |
| 8-10 V5OLO                | 1/2      | 7/8 - 14    | 3/4         | 0.85       | 1.75       | 6.0                                  | 6.0 |
| 10 V5OLO                  | 5/8      | 7/8 - 14    | 1 1/16      | 0.93       | 1.75       | 6.0                                  | 6.0 |
| 10-8 V5OLO                | 5/8      | 3/4 - 16    | 1 1/16      | 0.93       | 1.57       | 6.0                                  | 6.0 |
| 10-12 V5OLO               | 5/8      | 1 1/16 - 12 | 1 3/16      | 0.96       | 1.97       | 6.0                                  | 6.0 |
| 12 V5OLO                  | 3/4      | 1 1/16 - 12 | 1 3/16      | 1.02       | 1.97       | 6.0                                  | 6.0 |
| 12-10 V5OLO               | 3/4      | 7/8 - 14    | 1 3/16      | 1.02       | 1.81       | 6.0                                  | 6.0 |
| 12-16 V5OLO               | 3/4      | 1 5/16 - 12 | 1 7/16      | 1.16       | 2.07       | 5.5                                  | 5.5 |
| 16 V5OLO                  | 1        | 1 5/16 - 12 | 1 7/16      | 1.18       | 2.07       | 5.5                                  | 5.5 |
| 16-10 V5OLO               | 1        | 7/8 - 14    | 1 7/16      | 1.18       | 2.03       | 6.0                                  | 6.0 |
| 16-12 V5OLO               | 1        | 1 1/16 - 12 | 1 7/16      | 1.18       | 2.03       | 6.0                                  | 6.0 |
| 16-20 V5OLO               | 1        | 1 5/8 - 12  | 1 5/8       | 1.26       | 2.11       | 4.0                                  | 4.0 |
| 20 V5OLO                  | 1 1/4    | 1 5/8 - 12  | 1 5/8       | 1.26       | 2.11       | 4.0                                  | 4.0 |
| 24 V5OLO                  | 1 1/2    | 1 7/8 - 12  | 1 7/8       | 1.46       | 2.11       | 4.0                                  | 4.0 |

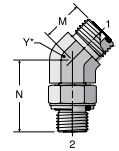
| TUBE<br>FITTING<br>PART # | END SIZE |               | L12<br>(mm) | L13<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|---------------|-------------|-------------|------------|--------------------------------------|-----|
|                           | 1        | 2             |             |             |            | S                                    | SS  |
|                           | (mm)     | (in.) ISO 261 |             |             |            |                                      |     |
| 4M12V87OMLO               | 6        | 1/4           | M12X1.5     | 16.0        | 30.0       | 14                                   | 6.0 |
| 4M14V87OMLO               | 6        | 1/4           | M14X1.5     | 17.5        | 31.5       | 17                                   | 6.0 |
| 6M16V87OMLO               | 8,10     | 3/8           | M16X1.5     | 19.0        | 33.5       | 17                                   | 6.0 |
| 8M18V87OMLO               | 12       | 1/2           | M18X1.5     | 20.5        | 37.0       | 19                                   | 6.0 |
| 10M22V87OMLO              | 14,15,16 | 5/8           | M22X1.5     | 23.5        | 44.0       | 27                                   | 6.0 |
| 12M27V87OMLO              | 18,20    | 3/4           | M27X2       | 26.0        | 50.5       | 27                                   | 6.0 |
| 16M33V87OMLO              | 22,25    | 1             | M33X2       | 30.0        | 52.5       | 36                                   | 5.0 |
| 20M42V87OMLO              | 28,30,32 | 1 1/4         | M42X2       | 32.0        | 54.0       | 41                                   | 4.0 |
| 24M48V87OMLO              | 35,38    | 1 1/2         | M48X2       | 37.0        | 56.5       | 50                                   | 4.0 |

Dimensions and pressures for reference only, subject to change.

**VLO**45° Male Elbow  
ORFS / NPTF

\* JJ – Across Wrench Flats

| TUBE<br>FITTING<br>PART # | END SIZE |                | JJ<br>(in.) | N1<br>(in.) | P<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|----------------|-------------|-------------|------------|--------------------------------------|-----|
|                           | 1        | 2              |             |             |            | -S                                   | -SS |
|                           | (in.)    | NPTF           |             |             |            |                                      |     |
| 4 VLO                     | 1/4      | 1/8 - 27       | 9/16        | 0.64        | 0.63       | 6.0                                  | 6.0 |
| 4-4 VLO                   | 1/4      | 1/4 - 18       | 9/16        | 0.86        | 0.68       | 6.0                                  | 6.0 |
| 6 VLO                     | 3/8      | 1/4 - 18       | 3/4         | 0.87        | 0.74       | 6.0                                  | 6.0 |
| 6-6 VLO                   | 3/8      | 3/8 - 18       | 3/4         | 0.87        | 0.74       | 6.0                                  | 6.0 |
| 8 VLO                     | 1/2      | 3/8 - 18       | 3/4         | 0.95        | 0.80       | 6.0                                  | 6.0 |
| 8-8 VLO                   | 1/2      | 1/2 - 14       | 7/8         | 1.17        | 0.86       | 6.0                                  | 6.0 |
| 10 VLO                    | 5/8      | 1/2 - 14       | 1 1/16      | 1.17        | 0.92       | 6.0                                  | 6.0 |
| 12 VLO                    | 3/4      | 3/4 - 14       | 1 5/16      | 1.30        | 1.02       | 4.0                                  | 4.0 |
| 16 VLO                    | 1        | 1 - 11 1/2     | 1 7/16      | 1.48        | 1.18       | 3.0                                  | 3.0 |
| 20 VLO                    | 1 1/4    | 1 1/4 - 11 1/2 | 1 5/8       | 1.67        | 1.26       | 2.5                                  | 2.5 |

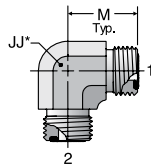
**V40MLO**Male 45° Elbow – BSPP  
(for ISO 1179-1 Port)  
ORFS / BSPP-ORR

\* Y – Across Hex Flats

| TUBE<br>FITTING<br>PART # | END SIZE |       |          | M<br>(mm) | N<br>(mm) | Y<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|----------|-----------|-----------|-----------|--------------------------------------|-----|
|                           | 1        |       | 2        |           |           |           | S                                    | SS  |
|                           | (mm)     | (in.) | BSPP     |           |           |           |                                      |     |
|                           |          |       |          |           |           |           |                                      |     |
| 4V4OMLO                   | 6        | 1/4   | 1/8 - 28 | 16.0      | 27.5      | 14        | 4.0                                  | 4.0 |
| 4-4V4OMLO                 | 6        | 1/4   | 1/4 - 19 | 17.5      | 32.0      | 19        | 4.0                                  | 4.0 |
| 6V4OMLO                   | 8,10     | 3/8   | 1/4 - 19 | 19.0      | 32.0      | 19        | 4.0                                  | 4.0 |
| 6-6V4OMLO                 | 8,10     | 3/8   | 3/8 - 19 | 19.0      | 33.5      | 19        | 4.0                                  | 4.0 |
| 6-8V4OMLO                 | 8,10     | 3/8   | 1/2 - 14 | 19.5      | 43.5      | 27        | 4.0                                  | 4.0 |
| 8V4OMLO                   | 12       | 1/2   | 3/8 - 19 | 20.5      | 33.5      | 19        | 4.0                                  | 4.0 |
| 8-8V4OMLO                 | 12       | 1/2   | 1/2 - 14 | 21.0      | 43.5      | 27        | 4.0                                  | 4.0 |
| 10V4OMLO                  | 14,15,16 | 5/8   | 1/2 - 14 | 23.5      | 43.5      | 27        | 4.0                                  | 4.0 |
| 10-12V4OMLO               | 14,15,16 | 5/8   | 3/4 - 14 | 24.5      | 46.5      | 30        | 4.0                                  | 4.0 |
| 12V4OMLO                  | 18,20    | 3/4   | 3/4 - 14 | 26.0      | 46.5      | 30        | 4.0                                  | 4.0 |
| 12-16V4OMLO               | 18,20    | 3/4   | 1 - 11   | 26.0      | 51.0      | 37        | 4.0                                  | 4.0 |
| 16V4OMLO                  | 22,25    | 1     | 1 - 11   | 30.0      | 51.0      | 37        | 4.0                                  | 4.0 |

**ELO**Union Elbow  
ORFS / ORFS

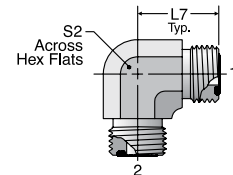
SAE 520201



\* JJ – Across Wrench Flats

| TUBE<br>FITTING<br>PART # | END SIZE |       | JJ<br>(in.) | M<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|-------------|------------|--------------------------------------|-----|
|                           | 1        | 2     |             |            | -S                                   | -SS |
|                           | (in.)    | (in.) |             |            |                                      |     |
| 4 ELO                     | 1/4      | 1/4   | 9/16        | 0.85       | 9.2                                  | 9.2 |
| 6 ELO                     | 3/8      | 3/8   | 3/4         | 0.98       | 9.2                                  | 9.2 |
| 8 ELO                     | 1/2      | 1/2   | 3/4         | 1.10       | 9.2                                  | 9.2 |
| 10 ELO                    | 5/8      | 5/8   | 1 1/16      | 1.32       | 6.0                                  | 6.0 |
| 12 ELO                    | 3/4      | 3/4   | 1 3/16      | 1.48       | 6.0                                  | 6.0 |
| 16 ELO                    | 1        | 1     | 1 7/16      | 1.63       | 6.0                                  | 6.0 |
| 20 ELO                    | 1 1/4    | 1 1/4 | 1 5/8       | 1.75       | 5.0                                  | 5.0 |
| 24 ELO                    | 1 1/2    | 1 1/2 | 1 7/8       | 1.93       | 4.0                                  | 4.0 |
| 32 ELO*                   | 2        | 2     | 2 1/2       | 2.76       | 3.0                                  | 3.0 |

\*\* Size 32 is not included in SAE J1453.

**EMLO**Union Elbow – mm Hex  
ORFS / ORFSISO 8434-3 E  
SAE 52M0201

| TUBE<br>FITTING<br>PART # | END SIZE |       | L7<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|------------|------------|--------------------------------------|-----|
|                           | 1 & 2    |       |            |            | S                                    | SS  |
|                           | (mm)     | (in.) |            |            |                                      |     |
| 4EMLO                     | 6        | 1/4   | 21.5       | 14         | 9.2                                  | 9.2 |
| 6EMLO                     | 8,10     | 3/8   | 25.0       | 19         | 9.2                                  | 9.2 |
| 8EMLO                     | 12       | 1/2   | 28.0       | 19         | 9.2                                  | 9.2 |
| 10EMLO                    | 14,15,16 | 5/8   | 33.5       | 27         | 6.0                                  | 6.0 |
| 12EMLO                    | 18,20    | 3/4   | 37.5       | 30         | 6.0                                  | 6.0 |
| 16EMLO                    | 22,25    | 1     | 41.5       | 36         | 6.0                                  | 6.0 |
| 20EMLO                    | 28,30,32 | 1 1/4 | 44.5       | 41         | 5.0                                  | 5.0 |
| 24EMLO                    | 35,38    | 1 1/2 | 49.0       | 50         | 4.0                                  | 4.0 |

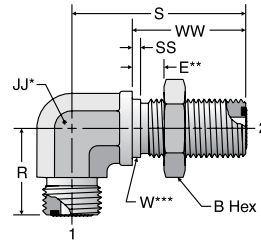
Dimensions and pressures for reference only, subject to change.

**WELO**Bulkhead Union Elbow  
ORFS / ORFS

SAE 520701

WELO-WLNL - Body with Locknut

(See page A11 for WLNL)



| TUBE<br>FITTING<br>PART # | END SIZE   |            | B<br>HEX<br>(in.) | E<br>MAX<br>(in.) | JJ<br>(in.) | R<br>(in.) | S<br>(in.) | SS<br>(in.) | W<br>(in.) | WW<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|------------|------------|-------------------|-------------------|-------------|------------|------------|-------------|------------|-------------|--------------------------------------|-----|
|                           | 1<br>(in.) | 2<br>(in.) |                   |                   |             |            |            |             |            |             | -S                                   | -SS |
| 4 WELO                    | 1/4        | 1/4        | 13/16             | 0.55              | 9/16        | 0.89       | 1.85       | 0.06        | 0.56       | 1.24        | 9.2                                  | 9.2 |
| 6 WELO                    | 3/8        | 3/8        | 1                 | 0.55              | 3/4         | 1.02       | 2.05       | 0.06        | 0.69       | 1.34        | 9.2                                  | 9.2 |
| 8 WELO                    | 1/2        | 1/2        | 1 1/8             | 0.55              | 3/4         | 1.14       | 2.19       | 0.06        | 0.81       | 1.44        | 9.2                                  | 9.2 |
| 10 WELO                   | 5/8        | 5/8        | 1 5/16            | 0.55              | 1 1/16      | 1.36       | 2.48       | 0.06        | 1.00       | 1.59        | 6.0                                  | 6.0 |
| 12 WELO                   | 3/4        | 3/4        | 1 1/2             | 0.55              | 1 3/16      | 1.52       | 2.64       | 0.06        | 1.19       | 1.63        | 6.0                                  | 6.0 |
| 16 WELO                   | 1          | 1          | 1 3/4             | 0.55              | 1 7/16      | 1.67       | 2.80       | 0.06        | 1.44       | 1.65        | 6.0                                  | 6.0 |
| 20 WELO                   | 1 1/4      | 1 1/4      | 2                 | 0.55              | 1 5/8       | 1.79       | 2.97       | 0.06        | 1.69       | 1.65        | 5.0                                  | 5.0 |
| 24 WELO                   | 1 1/2      | 1 1/2      | 2 3/8             | 0.55              | 1 7/8       | 1.95       | 3.13       | 0.06        | 2.00       | 1.65        | 4.0                                  | 4.0 |

\* JJ – Across wrench flats.

\*\* E – Maximum bulkhead thickness.

\*\*\* W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

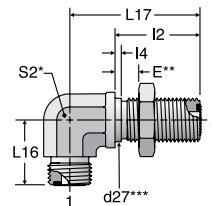
**WEMLO**Bulkhead Union Elbow – mm Hex  
ORFS / ORFS

ISO 8434-3 BHE

SAE 52M0701

WEMLOWLNL - Body with Locknut

(See page A11 for WLNL)



| TUBE<br>FITTING<br>PART # | END SIZE |       | d27***<br>(mm) | E<br>(mm) | I2<br>(mm) | I4<br>(mm) | L16<br>(mm) | L17<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|----------------|-----------|------------|------------|-------------|-------------|------------|--------------------------------------|-----|
|                           | 1 & 2    |       |                |           |            |            |             |             |            | S                                    | SS  |
|                           | (mm)     | (in.) |                |           |            |            |             |             |            |                                      |     |
|                           |          |       |                |           |            |            |             |             |            |                                      |     |
| 4WEMLO                    | 6        | 1/4   | 14.3           | 14        | 31.5       | 1.5        | 22.5        | 47.0        | 14         | 9.2                                  | 9.2 |
| 6WEMLO                    | 8,10     | 3/8   | 17.5           | 14        | 34.0       | 1.5        | 26.0        | 52.0        | 19         | 9.2                                  | 9.2 |
| 8WEMLO                    | 12       | 1/2   | 20.6           | 14        | 36.5       | 2.5        | 29.0        | 55.5        | 19         | 9.2                                  | 9.2 |
| 10WEMLO                   | 14,15,16 | 5/8   | 25.4           | 14        | 40.5       | 2.5        | 34.5        | 63.0        | 27         | 6.0                                  | 6.0 |
| 12WEMLO                   | 18,20    | 3/4   | 30.2           | 14        | 41.5       | 3.0        | 38.5        | 67.0        | 30         | 6.0                                  | 6.0 |
| 16WEMLO                   | 22,25    | 1     | 36.5           | 14        | 42.0       | 3.0        | 42.5        | 71.0        | 36         | 6.0                                  | 6.0 |
| 20WEMLO                   | 28,30,32 | 1 1/4 | 42.9           | 14        | 42.0       | 3.0        | 45.5        | 75.5        | 41         | 5.0                                  | 5.0 |
| 24WEMLO                   | 35,38    | 1 1/2 | 50.8           | 14        | 42.0       | 3.0        | 49.5        | 79.5        | 50         | 4.0                                  | 4.0 |

\* S2 – Across wrench flats.

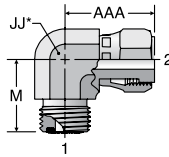
\*\* E – Maximum bulkhead thickness.

\*\*\*d27 - Bulkhead pilot diameter. Recommended clearance is d27 + 0.4 mm.

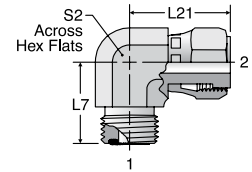
Dimensions and pressures for reference only, subject to change.

**C6LO**Swivel Nut Elbow  
ORFS / ORFS Swivel

SAE 520221

\* JJ – Across  
Wrench Flats

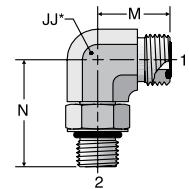
| TUBE<br>FITTING<br>PART # | END SIZE |       | AAA<br>(in.) | JJ<br>(in.) | M<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |     |
|---------------------------|----------|-------|--------------|-------------|------------|--------------------------------------|-----|-----|
|                           | 1        | 2     |              |             |            | -S                                   | -SS | D   |
|                           | (in.)    | (in.) |              |             |            |                                      |     |     |
| 4 C6LO                    | 1/4      | 1/4   | 1.07         | 9/16        | 0.85       | 9.2                                  | 9.2 | 4.0 |
| 6 C6LO                    | 3/8      | 3/8   | 1.17         | 3/4         | 0.98       | 9.2                                  | 9.2 | 4.0 |
| 8 C6LO                    | 1/2      | 1/2   | 1.50         | 3/4         | 1.10       | 9.2                                  | 9.2 | 4.0 |
| 10 C6LO                   | 5/8      | 5/8   | 1.61         | 1 1/16      | 1.32       | 6.0                                  | 6.0 | 3.0 |
| 12 C6LO                   | 3/4      | 3/4   | 1.83         | 1 3/16      | 1.48       | 6.0                                  | 6.0 | 3.0 |
| 16 C6LO                   | 1        | 1     | 2.11         | 1 7/16      | 1.64       | 6.0                                  | 6.0 | 3.0 |
| 20 C6LO                   | 1 1/4    | 1 1/4 | 2.28         | 1 5/8       | 1.75       | 5.0                                  | 5.0 | 2.5 |
| 24 C6LO                   | 1 1/2    | 1 1/2 | 2.41         | 1 7/8       | 1.92       | 4.0                                  | 4.0 | 2.0 |

**C6MLO**Swivel Nut Elbow – mm Hex  
ORFS / ORFS SwivelISO 8434-3 SWE  
SAE 52M0221\* S2 – Across  
Hex Flats

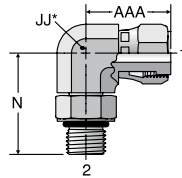
| TUBE<br>FITTING<br>PART # | END SIZE |       | L7<br>(mm) | L21<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |   |
|---------------------------|----------|-------|------------|-------------|------------|--------------------------------------|-----|---|
|                           | 1        | 2     |            |             |            | S                                    | SS  | D |
|                           | (mm)     | (in.) |            |             |            |                                      |     |   |
| 4C6MLO                    | 6        | 1/4   | 21.5       | 27.2        | 14         | 9.2                                  | 9.2 |   |
| 6C6MLO                    | 8,10     | 3/8   | 25.0       | 29.7        | 19         | 9.2                                  | 9.2 |   |
| 8C6MLO                    | 12       | 1/2   | 28.0       | 38.0        | 19         | 9.2                                  | 9.2 |   |
| 10C6MLO                   | 14,15,16 | 5/8   | 33.5       | 41.0        | 27         | 6.0                                  | 6.0 |   |
| 12C6MLO                   | 18,20    | 3/4   | 37.5       | 46.5        | 30         | 6.0                                  | 6.0 |   |
| 16C6MLO                   | 22,25    | 1     | 41.6       | 53.5        | 36         | 6.0                                  | 6.0 |   |
| 20C6MLO                   | 28,30,32 | 1 1/4 | 44.5       | 58.0        | 41         | 4.0                                  | 4.0 |   |
| 24C6MLO                   | 35,38    | 1 1/2 | 48.8       | 61.0        | 50         | 4.0                                  | 4.0 |   |

**C5OLO**Straight Thread Elbow  
ORFS / SAE-ORB

SAE 520220

\* JJ – Across  
Wrench Flats**AOEL6**Straight Thread Swivel Elbow  
ORFS Swivel / SAE-ORB

SAE 520281

\* JJ – Across  
Wrench Flats

| TUBE<br>FITTING<br>PART # | END SIZE |             | AAA<br>(in.) | JJ<br>(in.) | N<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |     |
|---------------------------|----------|-------------|--------------|-------------|------------|--------------------------------------|-----|-----|
|                           | 1        | 2           |              |             |            | -S                                   | -SS | D   |
|                           | (in.)    | UN/UNF-2A   |              |             |            |                                      |     |     |
| 4 AOEL6                   | 1/4      | 7/16 - 20   | 1.04         | 9/16        | 1.30       | 6.0                                  | 6.0 | 3.0 |
| 6 AOEL6                   | 3/8      | 9/16 - 18   | 1.17         | 3/4         | 1.46       | 6.0                                  | 6.0 | 3.0 |
| 8 AOEL6                   | 1/2      | 3/4 - 16    | 1.50         | 3/4         | 1.59       | 6.0                                  | 6.0 | 3.0 |
| 10 AOEL6                  | 5/8      | 7/8 - 14    | 1.65         | 1 1/16      | 1.97       | 6.0                                  | 6.0 | 3.0 |
| 12 AOEL6                  | 3/4      | 1 1/16 - 12 | 1.79         | 1 1/16      | 2.17       | 6.0                                  | 6.0 | 3.0 |
| 16 AOEL6                  | 1        | 1 5/16 - 12 | 2.07         | 1 5/16      | 2.34       | 5.5                                  | 5.5 | 2.8 |
| 20 AOEL6                  | 1 1/4    | 1 5/8 - 12  | 2.28         | 1 5/8       | 2.44       | 4.0                                  | 4.0 | 2.0 |
| 24 AOEL6                  | 1 1/2    | 1 7/8 - 12  | 2.40         | 1 7/8       | 2.60       | 4.0                                  | 4.0 | 2.0 |

| TUBE<br>FITTING<br>PART # | END SIZE |             | JJ<br>(in.) | M<br>(in.) | N<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |     |
|---------------------------|----------|-------------|-------------|------------|------------|--------------------------------------|-----|-----|
|                           | 1        | 2           |             |            |            | -S                                   | -SS | D   |
|                           | (in.)    | UN/UNF-2A   |             |            |            |                                      |     |     |
| 4 C5OLO                   | 1/4      | 7/16 - 20   | 9/16        | 0.85       | 1.30       | 6.0                                  | 6.0 | 3.0 |
| 4-6 C5OLO***              | 1/4      | 9/16 - 18   | 9/16        | 0.93       | 1.46       | 6.0                                  | 6.0 | 3.0 |
| 4-8 C5OLO                 | 1/4      | 3/4 - 16    | 3/4         | 0.98       | 1.59       | 6.0                                  | 6.0 | 3.0 |
| 6 C5OLO                   | 3/8      | 9/16 - 18   | 3/4         | 0.98       | 1.46       | 6.0                                  | 6.0 | 3.0 |
| 6-4 C5OLO                 | 3/8      | 7/16 - 20   | 3/4         | 0.98       | 1.38       | 6.0                                  | 6.0 | 3.0 |
| 6-5 C5OLO                 | 3/8      | 1/2 - 20    | 3/4         | 0.98       | 1.38       | 6.0                                  | 6.0 | 3.0 |
| 6-8 C5OLO                 | 3/8      | 3/4 - 16    | 3/4         | 1.04       | 1.59       | 6.0                                  | 6.0 | 3.0 |
| 6-10 C5OLO***             | 3/8      | 7/8 - 14    | 7/8         | 1.15       | 1.97       | 6.0                                  | 6.0 | 3.0 |
| 6-12 C5OLO                | 3/8      | 1 1/16 - 12 | 1 1/16      | 1.28       | 2.17       | 6.0                                  | 6.0 | 3.0 |
| 8 C5OLO                   | 1/2      | 3/4 - 16    | 3/4         | 1.10       | 1.59       | 6.0                                  | 6.0 | 3.0 |
| 8-6 C5OLO                 | 1/2      | 9/16 - 18   | 3/4         | 1.10       | 1.44       | 6.0                                  | 6.0 | 3.0 |
| 8-10 C5OLO***             | 1/2      | 7/8 - 14    | 7/8         | 1.21       | 1.97       | 6.0                                  | 6.0 | 3.0 |
| 8-12 C5OLO                | 1/2      | 1 1/16 - 12 | 1 3/16      | 1.32       | 2.17       | 6.0                                  | 6.0 | 3.0 |
| 10 C5OLO                  | 5/8      | 7/8 - 14    | 1 1/16      | 1.32       | 1.97       | 6.0                                  | 6.0 | 3.0 |
| 10-8 C5OLO                | 5/8      | 3/4 - 16    | 1 1/16      | 1.32       | 1.81       | 6.0                                  | 6.0 | 3.0 |
| 10-12 C5OLO               | 5/8      | 1 1/16 - 12 | 1 3/16      | 1.42       | 2.17       | 6.0                                  | 6.0 | 3.0 |
| 12 C5OLO                  | 3/4      | 1 1/16 - 12 | 1 3/16      | 1.48       | 2.17       | 6.0                                  | 6.0 | 3.0 |
| 12-8 C5OLO                | 3/4      | 3/4 - 16    | 1 3/16      | 1.48       | 1.83       | 6.0                                  | 6.0 | 3.0 |
| 12-10 C5OLO               | 3/4      | 7/8 - 14    | 1 3/16      | 1.48       | 2.01       | 6.0                                  | 6.0 | 3.0 |
| 12-16 C5OLO               | 3/4      | 1 5/16 - 12 | 1 7/16      | 1.61       | 2.34       | 5.5                                  | 5.5 | 2.8 |
| 16 C5OLO                  | 1        | 1 5/16 - 12 | 1 7/16      | 1.63       | 2.34       | 5.5                                  | 5.5 | 2.8 |
| 16-12 C5OLO               | 1        | 1 1/16 - 12 | 1 7/16      | 1.63       | 2.30       | 6.0                                  | 6.0 | 3.0 |
| 16-20 C5OLO               | 1        | 1 5/8 - 12  | 1 5/8       | 1.75       | 2.44       | 4.0                                  | 4.0 | 2.0 |
| 20 C5OLO                  | 1 1/4    | 1 5/8 - 12  | 1 5/8       | 1.75       | 2.44       | 4.0                                  | 4.0 | 2.0 |
| 20-16 C5OLO               | 1 1/4    | 1 5/16 - 12 | 1 5/8       | 1.75       | 2.44       | 4.0                                  | 4.0 | 2.0 |
| 20-24 C5OLO               | 1 1/4    | 1 7/8 - 12  | 1 7/8       | 1.93       | 2.60       | 4.0                                  | 4.0 | 2.0 |
| 24 C5OLO                  | 1 1/2    | 1 7/8 - 12  | 1 7/8       | 1.93       | 2.60       | 4.0                                  | 4.0 | 2.0 |
| 24-20 C5OLO               | 1 1/2    | 1 5/8 - 12  | 1 7/8       | 1.93       | 2.60       | 4.0                                  | 4.0 | 2.0 |
| 32 C5OLO**                | 2        | 2 1/2 - 12  | 2 1/2       | 2.76       | 3.07       | 2.5                                  | 2.5 | 1.3 |

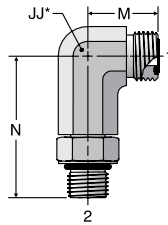
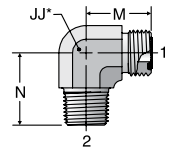
\*\* Size 32 is not included in SAE J1453.

\*\*\* JJ for these parts does not conform to SAE.

Dimensions and pressures for reference only, subject to change.

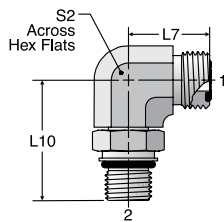
**CC5OLO**Long Straight Thread Elbow  
ORFS-Long / SAE-ORB

SAE 521520

\* JJ – Across  
Wrench Flats**CLO**Male Pipe Elbow  
ORFS / NPTF\* JJ – Across  
Wrench Flats

| TUBE<br>FITTING<br>PART # | END SIZE |             | JJ<br>(in.) | M<br>(in.) | N<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------------|-------------|------------|------------|--------------------------------------|-----|
|                           | 1        | 2           |             |            |            | -S                                   | -SS |
|                           | (in.)    | UN-UNF-2A   |             |            |            |                                      |     |
| 4 CC5OLO                  | 1/4      | 7/16 - 20   | 9/16        | 0.85       | 2.22       | 6.0                                  | 6.0 |
| 6 CC5OLO                  | 3/8      | 9/16 - 18   | 3/4         | 0.98       | 2.62       | 6.0                                  | 6.0 |
| 8 CC5OLO                  | 1/2      | 3/4 - 16    | 3/4         | 1.10       | 2.95       | 6.0                                  | 6.0 |
| 10 CC5OLO                 | 5/8      | 7/8 - 14    | 1 1/16      | 1.32       | 3.50       | 6.0                                  | 6.0 |
| 12 CC5OLO                 | 3/4      | 1 1/16 - 12 | 1 3/16      | 1.48       | 3.98       | 6.0                                  | 6.0 |
| 16 CC5OLO                 | 1        | 1 5/16 - 12 | 1 5/8       | 1.63       | 4.49       | 5.5                                  | 5.5 |

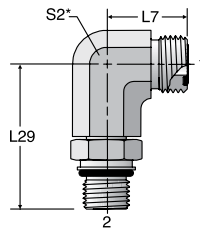
| TUBE<br>FITTING<br>PART # | END SIZE |                | JJ<br>(in.) | M<br>(in.) | N<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |     |
|---------------------------|----------|----------------|-------------|------------|------------|--------------------------------------|-----|-----|
|                           | 1        | 2              |             |            |            | -S                                   | -SS | D   |
|                           | (in.)    | NPTF           |             |            |            |                                      |     |     |
| 4 CLO                     | 1/4      | 1/8 - 27       | 9/16        | 0.85       | 0.80       | 6.0                                  | 6.0 | 3.0 |
| 4-4 CLO                   | 1/4      | 1/4 - 18       | 9/16        | 0.85       | 1.12       | 6.0                                  | 6.0 | 3.0 |
| 4-6 CLO                   | 1/4      | 3/8 - 18       | 3/4         | 0.97       | 1.22       | 6.0                                  | 6.0 | 3.0 |
| 4-8 CLO                   | 1/4      | 1/2 - 14       | 7/8         | 1.07       | 1.47       | 6.0                                  | 6.0 | 3.0 |
| 6 CLO                     | 3/8      | 1/4 - 18       | 3/4         | 0.98       | 1.09       | 6.0                                  | 6.0 | 3.0 |
| 6-6 CLO                   | 3/8      | 3/8 - 18       | 3/4         | 0.98       | 1.22       | 6.0                                  | 6.0 | 3.0 |
| 6-8 CLO                   | 3/8      | 1/2 - 14       | 7/8         | 1.15       | 1.47       | 6.0                                  | 6.0 | 3.0 |
| 8 CLO                     | 1/2      | 3/8 - 18       | 3/4         | 1.10       | 1.22       | 6.0                                  | 6.0 | 3.0 |
| 8-4 CLO                   | 1/2      | 1/4 - 18       | 3/4         | 1.10       | 1.22       | 6.0                                  | 6.0 | 3.0 |
| 8-8 CLO                   | 1/2      | 1/2 - 14       | 7/8         | 1.10       | 1.47       | 6.0                                  | 6.0 | 3.0 |
| 8-12 CLO                  | 1/2      | 3/4 - 14       | 1 1/16      | 1.32       | 1.59       | 4.0                                  | 4.0 | 2.0 |
| 10 CLO                    | 5/8      | 1/2 - 14       | 1 1/16      | 1.31       | 1.47       | 6.0                                  | 6.0 | 3.0 |
| 10-6 CLO                  | 5/8      | 3/8 - 18       | 1 1/16      | 1.31       | 1.28       | 6.0                                  | 6.0 | 3.0 |
| 10-12 CLO                 | 5/8      | 3/4 - 14       | 1 3/16      | 1.41       | 1.59       | 4.0                                  | 4.0 | 2.0 |
| 12 CLO                    | 3/4      | 3/4 - 14       | 1 3/16      | 1.47       | 1.59       | 4.0                                  | 4.0 | 2.0 |
| 12-8 CLO                  | 3/4      | 1/2 - 14       | 1 3/16      | 1.47       | 1.59       | 6.0                                  | 6.0 | 3.0 |
| 12-16 CLO                 | 3/4      | 1 - 11 1/2     | 1 5/16      | 1.62       | 1.97       | 3.0                                  | 3.0 | 1.5 |
| 16 CLO                    | 1        | 1 - 11 1/2     | 1 7/16      | 1.64       | 1.97       | 3.0                                  | 3.0 | 1.5 |
| 16-12 CLO                 | 1        | 3/4 - 14       | 1 7/16      | 1.64       | 1.78       | 4.0                                  | 4.0 | 2.0 |
| 20 CLO                    | 1 1/4    | 1 1/4 - 11 1/2 | 1 5/8       | 1.76       | 2.38       | 2.5                                  | 2.5 | 1.3 |
| 24 CLO                    | 1 1/2    | 1 1/2 - 11 1/2 | 1 7/8       | 1.92       | 2.64       | 2.5                                  | 2.5 | 1.3 |
| 24-20 CLO                 | 1 1/2    | 1 1/4 - 11 1/2 | 1 7/8       | 1.92       | 2.61       | 2.5                                  | 2.5 | 1.3 |

**C87OMLO**90° Metric Straight Thread Elbow  
ORFS / ISO 6149ISO 8434-3 SDE  
SAE 52M0287

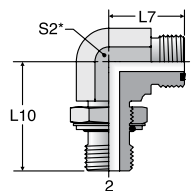
| TUBE<br>FITTING<br>PART # | END SIZE |       |         | L7<br>(mm) | L10<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|---------|------------|-------------|------------|--------------------------------------|-----|
|                           | 1        |       | 2       |            |             |            | S                                    | SS  |
|                           | (mm)     | (in.) | ISO 261 |            |             |            |                                      |     |
| 4M12C87OMLO               | 6        | 1/4   | M12X1.5 | 21.5       | 33.0        | 14         | 6.0                                  | 6.0 |
| 4M14C87OMLO               | 6        | 1/4   | M14X1.5 | 23.5       | 35.5        | 17         | 6.0                                  | 6.0 |
| 6M12C87OMLO               | 8,10     | 3/8   | M12X1.5 | 25.0       | 35.5        | 17         | 6.0                                  | 6.0 |
| 6M14C87OMLO               | 8,10     | 3/8   | M14X1.5 | 25.0       | 35.5        | 17         | 6.0                                  | 6.0 |
| 6M16C87OMLO               | 8,10     | 3/8   | M16X1.5 | 25.0       | 37.5        | 17         | 6.0                                  | 6.0 |
| 8M14C87OMLO               | 12       | 1/2   | M14X1.5 | 28.0       | 36.0        | 19         | 6.0                                  | 6.0 |
| 8M18C87OMLO               | 12       | 1/2   | M18X1.5 | 28.0       | 41.0        | 19         | 6.0                                  | 6.0 |
| 8M22C87OMLO               | 12       | 1/2   | M22X1.5 | 31.0       | 49.0        | 27         | 6.0                                  | 6.0 |
| 10M18C87OMLO              | 14,15,16 | 5/8   | M18X1.5 | 33.5       | 47.5        | 27         | 6.0                                  | 6.0 |
| 10M22C87OMLO              | 14,15,16 | 5/8   | M22X1.5 | 33.5       | 49.0        | 27         | 6.0                                  | 6.0 |
| 12M22C87OMLO              | 18,20    | 3/4   | M22X1.5 | 37.5       | 49.0        | 27         | 6.0                                  | 6.0 |
| 12M27C87OMLO              | 18,20    | 3/4   | M27X2   | 37.5       | 55.5        | 27         | 6.0                                  | 6.0 |
| 16M33C87OMLO              | 22,25    | 1     | M33X2   | 41.5       | 59.5        | 36         | 5.0                                  | 5.0 |
| 20M38C87OMLO*             | 28,30,32 | 1 1/4 | M38X2   | 44.5       | 62.0        | 41         | 4.0                                  | 4.0 |
| 20M42C87OMLO              | 28,30,32 | 1 1/4 | M42X2   | 44.5       | 63.0        | 41         | 4.0                                  | 4.0 |
| 24M48C87OMLO              | 35,38    | 1 1/2 | M48X2   | 49.0       | 71.5        | 50         | 4.0                                  | 4.0 |

\* For special M38x2 (ISO 6149-1 style) port. The current ISO 6149 does not include the M38 size.

Dimensions and pressures for reference only, subject to change.

**CC87OMLO**Long 90° Metric Straight Thread Elbow  
ORFS-Long / ISO 6149ISO 8434-3 SDEL  
SAE 52M1587\* S2 – Across  
Hex Flats

| TUBE<br>FITTING<br>PART # | END SIZE |       |         | L7<br>(mm) | L29<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|---------|------------|-------------|------------|--------------------------------------|-----|
|                           | 1        |       | 2       |            |             |            | S                                    | SS  |
|                           | (mm)     | (in.) | ISO 261 |            |             |            |                                      |     |
| 4M12CC87OMLO              | 6        | 1/4   | M12X1.5 | 21.5       | 56.5        | 14         | 6.0                                  | 6.0 |
| 6M14CC87OMLO              | 8,10     | 3/8   | M14X1.5 | 25.0       | 56.5        | 17         | 6.0                                  | 6.0 |
| 6M16CC87OMLO              | 8,10     | 3/8   | M16X1.5 | 25.0       | 66.5        | 17         | 6.0                                  | 6.0 |
| 8M18CC87OMLO              | 12       | 1/2   | M18X1.5 | 28.0       | 75.0        | 19         | 6.0                                  | 6.0 |
| 8M22CC87OMLO              | 12       | 1/2   | M22X1.5 | 31.5       | 88.0        | 27         | 6.0                                  | 6.0 |
| 10M22CC87OMLO             | 14,15,16 | 5/8   | M22X1.5 | 33.5       | 88.0        | 27         | 6.0                                  | 6.0 |
| 12M27CC87OMLO             | 18,20    | 3/4   | M27X2   | 37.5       | 100.5       | 27         | 6.0                                  | 6.0 |
| 16M33CC87OMLO             | 22,25    | 1     | M33X2   | 41.5       | 114.5       | 36         | 5.0                                  | 5.0 |
| 20M42CC87OMLO             | 28,30,32 | 1 1/4 | M42X2   | 44.5       | 126.5       | 41         | 4.0                                  | 4.0 |

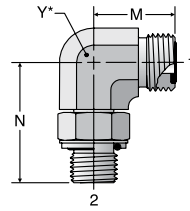
**C8OMLO**Metric Straight Thread Elbow  
ORFS / Metric-ORR\* S2 – Across  
Hex Flats

| TUBE<br>FITTING<br>PART # | END SIZE   |       |         | L7<br>(mm) | L10<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|------------|-------|---------|------------|-------------|------------|--------------------------------------|-----|
|                           | 1          |       | 2       |            |             |            | S                                    | SS  |
|                           | (mm)       | (in.) | ISO 261 |            |             |            |                                      |     |
|                           |            |       |         |            |             |            |                                      |     |
| 4M12C8OMLO                | 6          | 1/4   | M12X1.5 | 21.5       | 33.0        | 14         | 3.6                                  | 3.6 |
| 6M12C8OMLO                | 8, 10      | 3/8   | M12X1.5 | 25.0       | 35.5        | 17         | 3.6                                  | 3.6 |
| 6M14C8OMLO                | 8, 10      | 3/8   | M14X1.5 | 25.0       | 35.5        | 17         | 3.6                                  | 3.6 |
| 6M16C8OMLO                | 8, 10      | 3/8   | M16X1.5 | 25.0       | 37.5        | 17         | 3.6                                  | 3.6 |
| 8M14C8OMLO                | 12         | 1/2   | M14X1.5 | 28.0       | 36.0        | 19         | 3.6                                  | 3.6 |
| 8M18C8OMLO                | 12         | 1/2   | M18X1.5 | 28.0       | 41.0        | 19         | 3.6                                  | 3.6 |
| 8M22C8OMLO                | 12         | 1/2   | M22X1.5 | 31.5       | 49.0        | 27         | 3.6                                  | 3.6 |
| 10M22C8OMLO               | 14, 15, 16 | 5/8   | M22X1.5 | 33.5       | 49.0        | 27         | 3.6                                  | 3.6 |
| 12M27C8OMLO               | 18, 20     | 3/4   | M27X2   | 37.5       | 55.5        | 30         | 3.6                                  | 3.6 |
| 16M33C8OMLO               | 22, 25     | 1     | M33X2   | 41.5       | 59.5        | 36         | 2.5                                  | 2.5 |
| 20M38C8OMLO               | 28, 30, 32 | 1 1/4 | M38X2   | 44.5       | 62.0        | 41         | 2.5                                  | 2.5 |
| 20M42C8OMLO               | 28, 30, 32 | 1 1/4 | M42X2   | 44.5       | 63.0        | 41         | 2.5                                  | 2.5 |

Dimensions and pressures for reference only, subject to change.

**C4OMLO**

Male Elbow – BSPP  
(for ISO 1179-1 Port)  
ORFS / BSPP-ORR

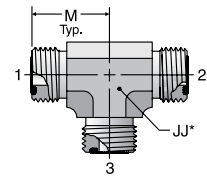


\* Y – Across  
Wrench Flats

**JLO**

Union Tee  
ORFS (all three ends)

SAE 520401



\* JJ – Across  
Wrench Flats

| TUBE<br>FITTING<br>PART # | END SIZE |       |            | M<br>(mm) | N<br>(mm) | Y<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|------------|-----------|-----------|-----------|--------------------------------------|-----|
|                           | 1        |       | 2          |           |           |           |                                      |     |
|                           | (mm)     | (in.) | BSPP       |           |           |           |                                      |     |
|                           |          |       |            |           |           |           |                                      |     |
| 4C4OMLO                   | 6        | 1/4   | 1/8 - 28   | 21.5      | 30.0      | 14        | 4.0                                  | 4.0 |
| 4-4C4OMLO                 | 6        | 1/4   | 1/4 - 19   | 23.5      | 36.0      | 19        | 4.0                                  | 4.0 |
| 4-6C4OMLO                 | 6        | 1/4   | 3/8 - 19   | 24.5      | 38.0      | 19        | 4.0                                  | 4.0 |
| 6C4OMLO                   | 8,10     | 3/8   | 1/4 - 19   | 25.0      | 36.0      | 19        | 4.0                                  | 4.0 |
| 6-6C4OMLO                 | 8,10     | 3/8   | 3/8 - 19   | 26.5      | 38.0      | 19        | 4.0                                  | 4.0 |
| 8-4C4OMLO                 | 12       | 1/2   | 1/4 - 19   | 28.0      | 35.5      | 19        | 4.0                                  | 4.0 |
| 8C4OMLO                   | 12       | 1/2   | 3/8 - 19   | 28.0      | 38.0      | 19        | 4.0                                  | 4.0 |
| 8-8C4OMLO                 | 12       | 1/2   | 1/2 - 14   | 31.0      | 48.5      | 27        | 4.0                                  | 4.0 |
| 8-12C4OMLO                | 12       | 1/2   | 3/4 - 14   | 33.5      | 51.5      | 30        | 4.0                                  | 4.0 |
| 10-6C4OMLO                | 14,15,16 | 5/8   | 3/8 - 19   | 33.5      | 40.5      | 27        | 4.0                                  | 4.0 |
| 10C4OMLO                  | 14,15,16 | 5/8   | 1/2 - 14   | 33.5      | 48.5      | 27        | 4.0                                  | 4.0 |
| 10-12C4OMLO               | 14,15,16 | 5/8   | 3/4 - 14   | 36.0      | 51.5      | 30        | 4.0                                  | 4.0 |
| 10-16C4OMLO               | 14,15,16 | 5/8   | 1 - 11     | 39.5      | 58.5      | 36        | 4.0                                  | 4.0 |
| 12-8C4OMLO                | 18,20    | 3/4   | 1/2 - 14   | 37.5      | 49.5      | 30        | 4.0                                  | 4.0 |
| 12C4OMLO                  | 18,20    | 3/4   | 3/4 - 14   | 37.5      | 51.5      | 30        | 4.0                                  | 4.0 |
| 12-16C4OMLO               | 18,20    | 3/4   | 1 - 11     | 41.0      | 58.5      | 36        | 4.0                                  | 4.0 |
| 16-12C4OMLO               | 22,25    | 1     | 3/4 - 14   | 41.5      | 56.0      | 36        | 4.0                                  | 4.0 |
| 16C4OMLO                  | 22,25    | 1     | 1 - 11     | 41.5      | 58.5      | 36        | 4.0                                  | 4.0 |
| 16-20C4OMLO               | 22,25    | 1     | 1 1/4 - 11 | 44.5      | 61.0      | 41        | 3.0                                  | 3.0 |
| 20-16C4OMLO               | 28,30,32 | 1 1/4 | 1 - 11     | 44.5      | 61.0      | 41        | 4.0                                  | 4.0 |
| 20C4OMLO                  | 28,30,32 | 1 1/4 | 1 1/4 - 11 | 44.5      | 61.0      | 41        | 2.0                                  | 2.0 |
| 20-24C4OMLO               | 28,30,32 | 1 1/4 | 1 1/2 - 11 | 49.0      | 64.5      | 50        | 2.0                                  | 2.0 |
| 24C4OMLO                  | 35,38    | 1 1/2 | 1 1/2 - 11 | 49.0      | 64.5      | 50        | 2.0                                  | 2.0 |

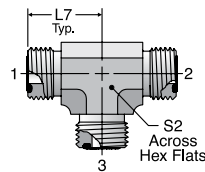
| TUBE<br>FITTING<br>PART # | END SIZE     |             | JJ<br>(in.) | M<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |    |     |
|---------------------------|--------------|-------------|-------------|------------|--------------------------------------|----|-----|
|                           | 1-3<br>(in.) | JJ<br>(in.) |             |            | M<br>(in.)                           | -S | -SS |
|                           |              |             |             |            |                                      |    |     |
| 4 JLO                     | 1/4          | 9/16        | 0.85        | 9.2        | 9.2                                  |    |     |
| 6 JLO                     | 3/8          | 3/4         | 0.98        | 9.2        | 9.2                                  |    |     |
| 8 JLO                     | 1/2          | 3/4         | 1.10        | 9.2        | 9.2                                  |    |     |
| 10 JLO                    | 5/8          | 1 1/16      | 1.32        | 6.0        | 6.0                                  |    |     |
| 12 JLO                    | 3/4          | 1 3/16      | 1.48        | 6.0        | 6.0                                  |    |     |
| 16 JLO                    | 1            | 1 7/16      | 1.63        | 6.0        | 6.0                                  |    |     |
| 20 JLO                    | 1 1/4        | 1 5/8       | 1.75        | 5.0        | 5.0                                  |    |     |
| 24 JLO                    | 1 1/2        | 1 7/8       | 1.93        | 4.0        | 4.0                                  |    |     |
| 32 JLO*                   | 2            | 2 1/2       | 2.76        | 3.0        | 3.0                                  |    |     |

\* Size 32 is not included in SAE J1453.

**JMLO**

Union Tee – mm Hex  
ORFS (all three ends)

ISO 8434-3 T  
SAE 52M0401



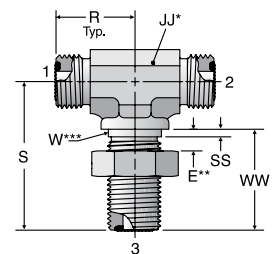
\* S2 – Across  
Hex Flats

**WJLO**

Bulkhead Branch Tee  
ORFS (all three ends)

SAE 520959

WJLO-WLNL - Body with Locknut  
(See page A11 for WLNL)



| TUBE<br>FITTING<br>PART # | END SIZE |       | L7<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |    |
|---------------------------|----------|-------|------------|------------|--------------------------------------|-----|----|
|                           |          |       |            |            | 1-3                                  | S   | SS |
|                           | (mm)     | (in.) |            |            |                                      |     |    |
|                           |          |       |            |            |                                      |     |    |
| 4JMLO                     | 6        | 1/4   | 21.5       | 14         | 9.2                                  | 9.2 |    |
| 6JMLO                     | 8,10     | 3/8   | 25.0       | 19         | 9.2                                  | 9.2 |    |
| 8JMLO                     | 12       | 1/2   | 28.0       | 19         | 9.2                                  | 9.2 |    |
| 10JMLO                    | 14,15,16 | 5/8   | 33.5       | 27         | 6.0                                  | 6.0 |    |
| 12JMLO                    | 18,20    | 3/4   | 37.5       | 30         | 6.0                                  | 6.0 |    |
| 16JMLO                    | 22,25    | 1     | 41.5       | 36         | 6.0                                  | 6.0 |    |
| 20JMLO                    | 28,30,32 | 1 1/4 | 44.5       | 41         | 5.0                                  | 5.0 |    |
| 24JMLO                    | 35,38    | 1 1/2 | 49.0       | 50         | 4.0                                  | 4.0 |    |

| TUBE<br>FITTING<br>PART # | END<br>SIZE | E     | JJ     | R     | S     | SS    | W<br>DIA | WW    | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|-------------|-------|--------|-------|-------|-------|----------|-------|--------------------------------------|-----|
|                           | 1-3         | MAX   |        |       |       |       |          |       | -S                                   | -SS |
|                           | (in.)       | (in.) | (in.)  | (in.) | (in.) | (in.) | (in.)    | (in.) |                                      |     |
| 4 WJLO                    | 1/4         | 0.55  | 9/16   | 0.89  | 1.85  | 0.06  | 0.56     | 1.24  | 9.2                                  | 9.2 |
| 6 WJLO                    | 3/8         | 0.55  | 3/4    | 1.02  | 2.05  | 0.06  | 0.69     | 1.34  | 9.2                                  | 9.2 |
| 8 WJLO                    | 1/2         | 0.55  | 3/4    | 1.14  | 2.19  | 0.06  | 0.81     | 1.44  | 9.2                                  | 9.2 |
| 10 WJLO                   | 5/8         | 0.55  | 1 1/16 | 1.36  | 2.48  | 0.06  | 1.00     | 1.59  | 6.0                                  | 6.0 |
| 12 WJLO                   | 3/4         | 0.55  | 1 3/16 | 1.52  | 2.64  | 0.06  | 1.19     | 1.63  | 6.0                                  | 6.0 |
| 16 WJLO                   | 1           | 0.55  | 1 7/16 | 1.67  | 2.80  | 0.06  | 1.44     | 1.65  | 6.0                                  | 6.0 |

\* JJ – Across wrench flats.

\*\* E – Maximum bulkhead thickness.

\*\*\* W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Dimensions and pressures for reference only, subject to change.

## WJMLO

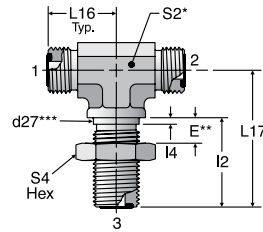
Bulkhead Union Tee – mm Hex  
ORFS (all three ends)

ISO 8434-3 BHBT

SAE 52M0959

WJMLOWLNML - Body with Locknut

(See page A11 for WLNML)



| TUBE<br>FITTING<br>PART # | END SIZE |       | d27***<br>(mm) | E<br>(mm) | I2<br>(mm) | I4<br>(mm) | L16<br>(mm) | L17<br>(mm) | S2<br>(mm) | S4<br>HEX<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|----------------|-----------|------------|------------|-------------|-------------|------------|-------------------|--------------------------------------|-----|
|                           | 1-3      |       |                |           |            |            |             |             |            |                   | S                                    | SS  |
|                           | (mm)     | (in.) |                |           |            |            |             |             |            |                   |                                      |     |
| 4WJMLO                    | 6        | 1/4   | 14.3           | 14        | 31.5       | 1.5        | 22.5        | 47.0        | 14         | 22                | 9.2                                  | 9.2 |
| 6WJMLO                    | 8,10     | 3/8   | 17.5           | 14        | 34.0       | 1.5        | 26.0        | 52.0        | 19         | 27                | 9.2                                  | 9.2 |
| 8WJMLO                    | 12       | 1/2   | 20.6           | 14        | 36.5       | 2.5        | 29.0        | 55.5        | 19         | 30                | 9.2                                  | 9.2 |
| 10WJMLO                   | 14,15,16 | 5/8   | 25.4           | 14        | 40.5       | 2.5        | 34.5        | 63.0        | 27         | 36                | 6.0                                  | 6.0 |
| 12WJMLO                   | 18,20    | 3/4   | 30.2           | 14        | 41.5       | 3.0        | 38.5        | 67.0        | 30         | 41                | 6.0                                  | 6.0 |
| 16WJMLO                   | 22,25    | 1     | 36.5           | 14        | 42.0       | 3.0        | 42.5        | 71.0        | 36         | 46                | 6.0                                  | 6.0 |
| 20WJMLO                   | 28,30,32 | 1 1/4 | 42.9           | 14        | 42.0       | 3.0        | 45.5        | 75.5        | 41         | 50                | 5.0                                  | 5.0 |
| 24WJMLO                   | 35,38    | 1 1/2 | 50.8           | 14        | 42.0       | 3.0        | 49.5        | 79.5        | 50         | 60                | 4.0                                  | 4.0 |

\* S2 – Across wrench flats.

\*\* E – Maximum bulkhead thickness.

\*\*\*d27 - Bulkhead pilot diameter. Recommended clearance hole is d27 + 0.4 mm.

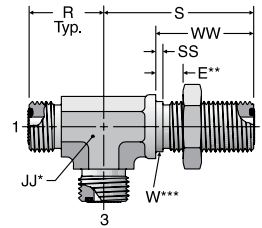
## WJJLO

Bulkhead Run Tee  
ORFS (all three ends)

SAE 520958

WJJLOWLNML - Body with Locknut

(See page A11 for WLNML)



| TUBE<br>FITTING<br>PART # | END<br>SIZE  | E<br>MAX<br>(in.) | JJ<br>(in.) | R<br>(in.) | S<br>(in.) | SS<br>(in.) | W<br>DIA<br>(in.) | WW<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|--------------|-------------------|-------------|------------|------------|-------------|-------------------|-------------|--------------------------------------|-----|
|                           | 1-3<br>(in.) |                   |             |            |            |             |                   |             | -S                                   | -SS |
|                           |              |                   |             |            |            |             |                   |             |                                      |     |
| 4 WJJLO                   | 1/4          | 0.55              | 9/16        | 0.89       | 1.85       | 0.06        | 0.56              | 1.24        | 9.2                                  | 9.2 |
| 6 WJJLO                   | 3/8          | 0.55              | 3/4         | 1.02       | 2.05       | 0.06        | 0.69              | 1.34        | 9.2                                  | 9.2 |
| 8 WJJLO                   | 1/2          | 0.55              | 3/4         | 1.14       | 2.19       | 0.06        | 0.81              | 1.44        | 9.2                                  | 9.2 |
| 10 WJJLO                  | 5/8          | 0.55              | 1 1/16      | 1.36       | 2.48       | 0.06        | 1.00              | 1.59        | 6.0                                  | 6.0 |
| 12 WJJLO                  | 3/4          | 0.55              | 1 3/16      | 1.52       | 2.64       | 0.06        | 1.19              | 1.63        | 6.0                                  | 6.0 |
| 16 WJJLO                  | 1            | 0.55              | 1 7/16      | 1.67       | 2.80       | 0.06        | 1.44              | 1.65        | 6.0                                  | 6.0 |
| 20 WJJLO                  | 1 1/4        | 0.55              | 1 5/8       | 1.79       | 2.79       | 0.06        | 1.69              | 1.65        | 5.0                                  | 5.0 |
| 24 WJJLO                  | 1 1/2        | 0.55              | 1 7/8       | 1.95       | 3.13       | 0.06        | 2.00              | 1.65        | 4.0                                  | 4.0 |

\* JJ – Across wrench flats.

\*\* E – Maximum bulkhead thickness.

\*\*\* W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Dimensions and pressures for reference only, subject to change.

## WJJMLO

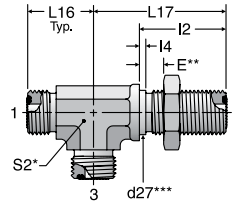
Bulkhead Run Tee – mm Hex  
ORFS (all three ends)

ISO 8434-3 BHRT

SAE 52M0958

WJJMLOWLNML - Body with Locknut

(See page A11 for WLNML)



| TUBE<br>FITTING<br>PART # | END SIZE |       | d27***<br>(mm) | E<br>(mm) | I2<br>(mm) | I4<br>(mm) | L16<br>(mm) | L17<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|----------------|-----------|------------|------------|-------------|-------------|------------|--------------------------------------|-----|
|                           |          |       |                |           |            |            |             |             |            | 1-3                                  |     |
|                           | (mm)     | (in.) |                |           |            |            |             |             |            |                                      |     |
|                           |          |       |                |           |            |            |             |             |            |                                      |     |
| 4WJJMLO                   | 6        | 1/4   | 14.3           | 14        | 31.5       | 1.5        | 22.5        | 47.0        | 14         | 9.2                                  | 9.2 |
| 6WJJMLO                   | 8,10     | 3/8   | 17.5           | 14        | 34.0       | 1.5        | 26.0        | 52.0        | 19         | 9.2                                  | 9.2 |
| 8WJJMLO                   | 12       | 1/2   | 20.6           | 14        | 36.5       | 2.5        | 29.0        | 55.5        | 19         | 9.2                                  | 9.2 |
| 10WJJMLO                  | 14,15,16 | 5/8   | 25.4           | 14        | 40.5       | 2.5        | 34.5        | 63.0        | 27         | 6.0                                  | 6.0 |
| 12WJJMLO                  | 18,20    | 3/4   | 30.2           | 14        | 41.5       | 3.0        | 38.5        | 67.0        | 30         | 6.0                                  | 6.0 |
| 16WJJMLO                  | 22,25    | 1     | 36.5           | 14        | 42.0       | 3.0        | 42.5        | 71.0        | 36         | 6.0                                  | 6.0 |
| 20WJJMLO                  | 28,30,32 | 1 1/4 | 42.9           | 14        | 42.0       | 3.0        | 45.5        | 71.0        | 41         | 5.0                                  | 5.0 |
| 24WJJMLO                  | 35,38    | 1 1/2 | 50.8           | 14        | 42.0       | 3.0        | 49.5        | 79.5        | 50         | 4.0                                  | 4.0 |

\* S2 – Across wrench flats.

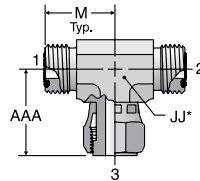
\*\* E – Maximum bulkhead thickness.

\*\*\*d27 - Bulkhead pilot diameter. Recommended clearance hole is d27 + 0.4 mm.

## S6LO

Swivel Nut Branch Tee  
ORFS / ORFS / ORFS Swivel

SAE 520433



\* JJ – Across  
Wrench Flats

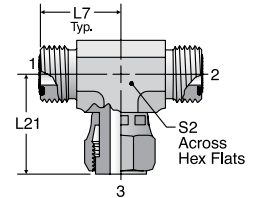
| TUBE<br>FITTING<br>PART # | END SIZE     | AAA<br>(in.) | JJ<br>(in.) | M<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|--------------|--------------|-------------|------------|--------------------------------------|-----|
|                           | 1-3<br>(in.) |              |             |            | -S                                   | -SS |
|                           |              |              |             |            |                                      |     |
| 4 S6LO                    | 1/4          | 1.07         | 9/16        | 0.85       | 9.2                                  | 9.2 |
| 6 S6LO                    | 3/8          | 1.17         | 3/4         | 0.98       | 9.2                                  | 9.2 |
| 8 S6LO                    | 1/2          | 1.50         | 3/4         | 1.10       | 9.2                                  | 9.2 |
| 10 S6LO                   | 5/8          | 1.61         | 1 1/16      | 1.32       | 6.0                                  | 6.0 |
| 12 S6LO                   | 3/4          | 1.83         | 1 3/16      | 1.48       | 6.0                                  | 6.0 |
| 16 S6LO                   | 1            | 2.11         | 1 7/16      | 1.63       | 6.0                                  | 6.0 |
| 20 S6LO                   | 1 1/4        | 2.28         | 1 5/8       | 1.75       | 5.0                                  | 5.0 |
| 24 S6LO                   | 1 1/2        | 2.40         | 1 7/8       | 1.93       | 4.0                                  | 4.0 |

## S6MLO

Swivel Nut Branch Tee – mm Hex  
ORFS / ORFS / ORFS Swivel

ISO 8434-3 SWBT

SAE 52M0433



\* S2 – Across  
Wrench Flats

| TUBE<br>FITTING<br>PART # | END SIZE |       | L7<br>(mm) | L21<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|------------|-------------|------------|--------------------------------------|-----|
|                           | 1-3      |       |            |             |            | S                                    | SS  |
|                           | (mm)     | (in.) |            |             |            |                                      |     |
| 4S6MLO                    | 6        | 1/4   | 21.5       | 27.2        | 14         |                                      |     |
| 6S6MLO                    | 8,10     | 3/8   | 25.0       | 29.7        | 19         | 9.2                                  | 9.2 |
| 8S6MLO                    | 12       | 1/2   | 28.0       | 38.0        | 19         | 9.2                                  | 9.2 |
| 10S6MLO                   | 14,15,16 | 5/8   | 33.5       | 41.0        | 27         | 6.0                                  | 6.0 |
| 12S6MLO                   | 18,20    | 3/4   | 37.5       | 46.5        | 30         | 6.0                                  | 6.0 |
| 16S6MLO                   | 22,25    | 1     | 41.5       | 53.5        | 36         | 6.0                                  | 6.0 |
| 20S6MLO                   | 28,30,32 | 1 1/4 | 44.5       | 58.0        | 41         | 4.0                                  | 4.0 |
| 24S6MLO                   | 35,38    | 1 1/2 | 49.0       | 61.0        | 50         | 4.0                                  | 4.0 |

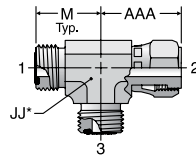
Dimensions and pressures for reference only, subject to change.

**R6LO**

Swivel Nut Run Tee

ORFS / ORFS Swivel / ORFS

SAE 520432

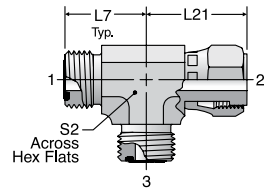
\* JJ – Across  
Wrench Flats**R6MLO**

Swivel Nut Run Tee – mm Hex

ORFS / ORFS Swivel / ORFS

ISO 8434-3 SWRT

SAE 52M0432



| TUBE<br>FITTING<br>PART # | END SIZE     | AAA<br>(in.) | JJ<br>(in.) | M<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|--------------|--------------|-------------|------------|--------------------------------------|-----|
|                           | 1-3<br>(in.) |              |             |            | -S                                   | -SS |
|                           |              |              |             |            |                                      |     |
| 4 R6LO                    | 1/4          | 1.07         | 9/16        | 0.85       | 9.2                                  | 9.2 |
| 6 R6LO                    | 3/8          | 1.17         | 3/4         | 0.98       | 9.2                                  | 9.2 |
| 8 R6LO                    | 1/2          | 1.50         | 3/4         | 1.10       | 9.2                                  | 9.2 |
| 10 R6LO                   | 5/8          | 1.61         | 1 1/16      | 1.32       | 6.0                                  | 6.0 |
| 12 R6LO                   | 3/4          | 1.83         | 1 3/16      | 1.48       | 6.0                                  | 6.0 |
| 16 R6LO                   | 1            | 2.11         | 1 7/16      | 1.63       | 6.0                                  | 6.0 |
| 20 R6LO                   | 1 1/4        | 2.28         | 1 5/8       | 1.75       | 5.0                                  | 5.0 |
| 24 R6LO                   | 1 1/2        | 2.40         | 1 7/8       | 1.93       | 4.0                                  | 4.0 |

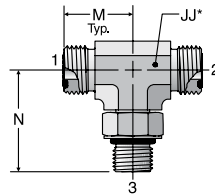
| TUBE<br>FITTING<br>PART # | END SIZE |       | L7<br>(mm) | L21<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|------------|-------------|------------|--------------------------------------|-----|
|                           | 1-3      |       |            |             |            | S                                    | SS  |
|                           | (mm)     | (in.) |            |             |            |                                      |     |
| 4R6MLO                    | 6        | 1/4   | 21.5       | 27.2        | 14         | 9.2                                  | 9.2 |
| 6R6MLO                    | 8,10     | 3/8   | 25.0       | 29.7        | 19         | 9.2                                  | 9.2 |
| 8R6MLO                    | 12       | 1/2   | 28.0       | 38.0        | 19         | 9.2                                  | 9.2 |
| 10R6MLO                   | 14,15,16 | 5/8   | 33.5       | 41.0        | 27         | 6.0                                  | 6.0 |
| 12R6MLO                   | 18,20    | 3/4   | 37.5       | 46.5        | 30         | 6.0                                  | 6.0 |
| 16R6MLO                   | 22,25    | 1     | 41.5       | 53.5        | 36         | 6.0                                  | 6.0 |
| 20R6MLO                   | 28,30,32 | 1 1/4 | 44.5       | 58.0        | 41         | 4.0                                  | 4.0 |
| 24R6MLO                   | 35,38    | 1 1/2 | 49.0       | 61.0        | 50         | 4.0                                  | 4.0 |

**S5OLO**

Straight Thread Branch Tee

ORFS / ORFS / SAE-ORB

SAE 520429

\* JJ – Across  
Wrench Flats

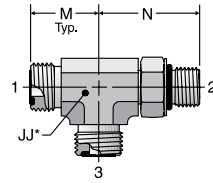
| TUBE<br>FITTING<br>PART # | END SIZE |       |             | JJ<br>(in.) | M<br>(in.) | N<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|-------------|-------------|------------|------------|--------------------------------------|-----|
|                           | 1        | 2     | 3           |             |            |            | -S                                   | -SS |
|                           | (in.)    | (in.) | UN/UNF-2A   |             |            |            |                                      |     |
| 4 S5OLO                   | 1/4      | 1/4   | 7/16 - 20   | 9/16        | 0.85       | 1.30       | 6.0                                  | 6.0 |
| 4-4-6 S5OLO               | 1/4      | 1/4   | 9/16 - 18   | 9/16        | 0.93       | 1.46       | 6.0                                  | 6.0 |
| 6 S5OLO                   | 3/8      | 3/8   | 9/16 - 18   | 3/4         | 0.98       | 1.46       | 6.0                                  | 6.0 |
| 6-6-4 S5OLO               | 3/8      | 3/8   | 7/16 - 20   | 3/4         | 0.98       | 1.38       | 6.0                                  | 6.0 |
| 6-6-8 S5OLO               | 3/8      | 3/8   | 3/4 - 16    | 3/4         | 1.04       | 1.59       | 6.0                                  | 6.0 |
| 8 S5OLO                   | 1/2      | 1/2   | 3/4 - 16    | 3/4         | 1.10       | 1.59       | 6.0                                  | 6.0 |
| 8-8-10 S5OLO              | 1/2      | 1/2   | 7/8 - 14    | 1 1/16      | 1.24       | 1.97       | 6.0                                  | 6.0 |
| 8-8-12 S5OLO              | 1/2      | 1/2   | 1 1/16 - 12 | 1 3/16      | 1.34       | 2.17       | 6.0                                  | 6.0 |
| 10 S5OLO                  | 5/8      | 5/8   | 7/8 - 14    | 1 1/16      | 1.32       | 1.97       | 6.0                                  | 6.0 |
| 10-10-12 S5OLO            | 5/8      | 5/8   | 1 1/16 - 12 | 1 3/16      | 1.42       | 2.17       | 6.0                                  | 6.0 |
| 12 S5OLO                  | 3/4      | 3/4   | 1 1/16 - 12 | 1 3/16      | 1.48       | 2.17       | 6.0                                  | 6.0 |
| 12-12-16 S5OLO            | 3/4      | 3/4   | 1 5/16 - 12 | 1 7/16      | 1.61       | 2.34       | 5.5                                  | 5.5 |
| 16 S5OLO                  | 1        | 1     | 1 5/16 - 12 | 1 7/16      | 1.63       | 2.34       | 5.5                                  | 5.5 |
| 16-16-20 S5OLO            | 1        | 1     | 1 5/8 - 12  | 1 5/8       | 1.75       | 2.44       | 4.0                                  | 4.0 |
| 20 S5OLO                  | 1 1/4    | 1 1/4 | 1 5/8 - 12  | 1 5/8       | 1.75       | 2.44       | 4.0                                  | 4.0 |
| 24 S5OLO                  | 1 1/2    | 1 1/2 | 1 7/8 - 12  | 1 7/8       | 1.93       | 2.60       | 4.0                                  | 4.0 |

Dimensions and pressures for reference only, subject to change.

## R5OLO

Straight Thread Run Tee  
ORFS / SAE-ORB / ORFS

SAE 520428

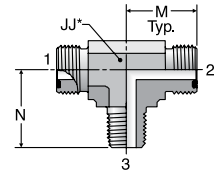


\* JJ – Across  
Wrench Flats

## SLO

Male Pipe Tee  
ORFS / ORFS / NPTF

SAE 520425



\* JJ – Across  
Wrench Flats

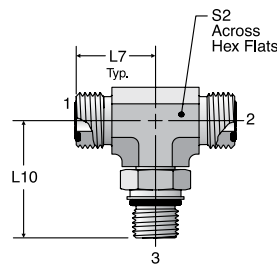
| TUBE<br>FITTING<br>PART # | END SIZE |             |       | JJ<br>(in.) | M<br>(in.) | N<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------------|-------|-------------|------------|------------|--------------------------------------|-----|
|                           | 1        | 2           | 3     |             |            |            | -S                                   | -SS |
|                           | (in.)    | UN/UNF-2A   | (in.) |             |            |            |                                      |     |
| 4 R5OLO                   | 1/4      | 7/16 - 20   | 1/4   | 9/16        | 0.85       | 1.30       | 6.0                                  | 6.0 |
| 4-6-4 R5OLO               | 1/4      | 9/16 - 18   | 1/4   | 3/4         | 0.92       | 1.46       | 6.0                                  | 6.0 |
| 6 R5OLO                   | 3/8      | 9/16 - 18   | 3/8   | 3/4         | 0.98       | 1.46       | 6.0                                  | 6.0 |
| 6-8-6 R5OLO               | 3/8      | 3/4 - 16    | 3/8   | 3/4         | 1.04       | 1.59       | 6.0                                  | 6.0 |
| 8 R5OLO                   | 1/2      | 3/4 - 16    | 1/2   | 3/4         | 1.10       | 1.59       | 6.0                                  | 6.0 |
| 8-10 8 R5OLO              | 1/2      | 7/8 - 14    | 1/2   | 1 1/16      | 1.24       | 1.97       | 6.0                                  | 6.0 |
| 10 R5OLO                  | 5/8      | 7/8 - 14    | 5/8   | 1 1/16      | 1.32       | 1.97       | 6.0                                  | 6.0 |
| 10-12-10 R5OLO            | 5/8      | 1 1/16 - 12 | 5/8   | 1 3/16      | 1.42       | 2.17       | 6.0                                  | 6.0 |
| 12 R5OLO                  | 3/4      | 1 1/16 - 12 | 3/4   | 1 3/16      | 1.48       | 2.17       | 6.0                                  | 6.0 |
| 12-16-12 R5OLO            | 3/4      | 1 5/16 - 12 | 3/4   | 1 7/16      | 1.61       | 2.34       | 5.5                                  | 5.5 |
| 16 R5OLO                  | 1        | 1 5/16 - 12 | 1     | 1 7/16      | 1.63       | 2.34       | 5.5                                  | 5.5 |
| 16-20-16 R5OLO            | 1        | 1 5/8 - 12  | 1     | 1 5/8       | 1.75       | 2.44       | 4.0                                  | 4.0 |
| 20 R5OLO                  | 1 1/4    | 1 5/8 - 12  | 1 1/4 | 1 5/8       | 1.75       | 2.44       | 4.0                                  | 4.0 |
| 24 R5OLO                  | 1 1/2    | 1 7/8 - 12  | 1 1/2 | 1 7/8       | 1.93       | 2.60       | 4.0                                  | 4.0 |

| TUBE<br>FITTING<br>PART # | END SIZE |                | JJ<br>(in.) | M<br>(in.) | N<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|----------------|-------------|------------|------------|--------------------------------------|-----|
|                           | 1 & 2    | 3              |             |            |            | -S                                   | -SS |
|                           | (in.)    | NPTF           |             |            |            |                                      |     |
| 4-4-4 SLO                 | 1/4      | 1/4 - 18       | 9/16        | 0.85       | 1.12       | 6.0                                  | 6.0 |
| 6 SLO                     | 3/8      | 1/4 - 18       | 3/4         | 0.98       | 1.09       | 6.0                                  | 6.0 |
| 6-6-6 SLO                 | 3/8      | 3/8 - 18       | 3/4         | 0.98       | 1.22       | 6.0                                  | 6.0 |
| 8 SLO                     | 1/2      | 3/8 - 18       | 3/4         | 1.10       | 1.22       | 6.0                                  | 6.0 |
| 8-8-8 SLO                 | 1/2      | 1/2 - 14       | 7/8         | 1.10       | 1.47       | 6.0                                  | 6.0 |
| 10 SLO                    | 5/8      | 1/2 - 14       | 1 1/16      | 1.31       | 1.47       | 6.0                                  | 6.0 |
| 12 SLO                    | 3/4      | 3/4 - 14       | 1 3/16      | 1.47       | 1.59       | 4.0                                  | 4.0 |
| 16 SLO                    | 1        | 1 - 11 1/2     | 1 7/16      | 1.64       | 1.97       | 3.0                                  | 3.0 |
| 20 SLO                    | 1 1/4    | 1 1/4 - 11 1/2 | 1 5/8       | 1.76       | 2.38       | 2.5                                  | 2.5 |

## S87OMLO

Metric Straight Thread Branch Tee  
ORFS / ORFS / ISO 6149

ISO 8434-3 SDBT  
SAE 52M0489



\* S2 – Across  
Hex Flats

| TUBE<br>FITTING<br>PART # | END SIZE |       |         | L7<br>(mm) | L10<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|---------|------------|-------------|------------|--------------------------------------|-----|
|                           | 1 & 2    |       | 3       |            |             |            | S                                    | SS  |
|                           | (mm)     | (in.) | ISO 261 |            |             |            |                                      |     |
|                           |          |       |         |            |             |            |                                      |     |
| 4M12S87OMLO               | 6        | 1/4   | M12X1.5 | 21.5       | 33.0        | 14         | 6.0                                  | 6.0 |
| 4M14S87OMLO               | 6        | 1/4   | M14X1.5 | 23.5       | 35.5        | 19         | 6.0                                  | 6.0 |
| 6M14S87OMLO               | 8,10     | 3/8   | M14X1.5 | 25.0       | 35.5        | 19         | 6.0                                  | 6.0 |
| 6M16S87OMLO               | 8,10     | 3/8   | M16X1.5 | 25.0       | 37.5        | 19         | 6.0                                  | 6.0 |
| 8M14S87OMLO               | 12       | 1/2   | M14X1.5 | 28.0       | 36.0        | 19         | 6.0                                  | 6.0 |
| 8M18S87OMLO               | 12       | 1/2   | M18X1.5 | 28.0       | 41.0        | 19         | 6.0                                  | 6.0 |
| 8M22S87OMLO               | 12       | 1/2   | M22X1.5 | 31.0       | 49.0        | 27         | 6.0                                  | 6.0 |
| 10M22S87OMLO              | 14,15,16 | 5/8   | M22X1.5 | 33.5       | 49.0        | 27         | 6.0                                  | 6.0 |
| 12M27S87OMLO              | 18,20    | 3/4   | M27X2   | 37.5       | 55.5        | 30         | 6.0                                  | 6.0 |
| 16M33S87OMLO              | 22,25    | 1     | M33X2   | 41.5       | 59.5        | 36         | 5.1                                  | 5.1 |
| 20M42S87OMLO              | 28,30,32 | 1 1/4 | M42X2   | 44.5       | 63.0        | 41         | 4.0                                  | 4.0 |
| 24M48S87OMLO              | 35,38    | 1 1/2 | M48X2   | 49.0       | 71.5        | 50         | 4.0                                  | 4.0 |

Dimensions and pressures for reference only, subject to change.

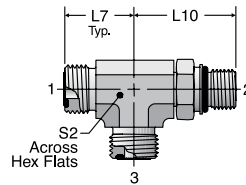
## R87OMLO

Metric Straight Thread Run Tee

ORFS / ISO 6149 / ORFS

ISO 8434-3 SDRT

SAE 52M0488



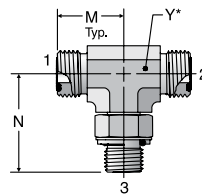
| TUBE<br>FITTING<br>PART # | END SIZE |       |         | L7<br>(mm) | L10<br>(mm) | S2<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|---------|------------|-------------|------------|--------------------------------------|-----|
|                           | 1 & 3    |       | 2       |            |             |            | S                                    | SS  |
|                           | (mm)     | (in.) | ISO 261 |            |             |            |                                      |     |
|                           |          |       |         |            |             |            |                                      |     |
| 4M12R87OMLO               | 6        | 1/4   | M12X1.5 | 21.5       | 33.0        | 14         | 6.0                                  | 6.0 |
| 4M14R87OMLO               | 6        | 1/4   | M14X1.5 | 23.5       | 35.5        | 19         | 6.0                                  | 6.0 |
| 6M14R87OMLO               | 8,10     | 3/8   | M14X1.5 | 25.0       | 35.5        | 19         | 6.0                                  | 6.0 |
| 6M16R87OMLO               | 8,10     | 3/8   | M16X1.5 | 25.0       | 37.5        | 19         | 6.0                                  | 6.0 |
| 8M14R87OMLO               | 12       | 1/2   | M14X1.5 | 28.0       | 36.0        | 19         | 6.0                                  | 6.0 |
| 8M18R87OMLO               | 12       | 1/2   | M18X1.5 | 28.0       | 41.0        | 19         | 6.0                                  | 6.0 |
| 8M22R87OMLO               | 12       | 1/2   | M22X1.5 | 31.0       | 49.0        | 27         | 6.0                                  | 6.0 |
| 10M22R87OMLO              | 14,15,16 | 5/8   | M22X1.5 | 33.5       | 49.0        | 27         | 6.0                                  | 6.0 |
| 12M27R87OMLO              | 18,20    | 3/4   | M27X2   | 37.5       | 55.5        | 30         | 6.0                                  | 6.0 |
| 16M33R87OMLO              | 22,25    | 1     | M33X2   | 41.5       | 59.5        | 36         | 4.0                                  | 4.0 |
| 20M42R87OMLO              | 28,30,32 | 1 1/4 | M42X2   | 44.5       | 63.0        | 41         | 4.0                                  | 4.0 |
| 24M48R87OMLO              | 35,38    | 1 1/2 | M48X2   | 49.0       | 71.5        | 50         | 4.0                                  | 4.0 |

## S4OMLO

Branch Tee – BSPP

(for ISO 1179-1 Port)

ORFS / ORFS / BSPP-ORR

\*Y – Across  
Wrench Flats

| TUBE<br>FITTING<br>PART # | END SIZE |       |          | M<br>(mm) | N<br>(mm) | Y<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|----------|-----------|-----------|-----------|--------------------------------------|-----|
|                           | 1 & 2    |       | 3        |           |           |           | S                                    | SS  |
|                           | (mm)     | (in.) | BSP      |           |           |           |                                      |     |
|                           |          |       |          |           |           |           |                                      |     |
| 4S4OMLO                   | 6        | 1/4   | 1/8 - 28 | 21.5      | 30.0      | 14        | 4.0                                  | 4.0 |
| 4-4-4S4OMLO               | 6        | 1/4   | 1/4 - 19 | 23.5      | 36.0      | 19        | 4.0                                  | 4.0 |
| 6S4OMLO                   | 8,10     | 3/8   | 1/4 - 19 | 25.0      | 36.0      | 19        | 4.0                                  | 4.0 |
| 6-6-6S4OMLO               | 8,10     | 3/8   | 3/8 - 19 | 26.5      | 38.0      | 19        | 4.0                                  | 4.0 |
| 8S4OMLO                   | 12       | 1/2   | 3/8 - 19 | 28.0      | 38.0      | 19        | 4.0                                  | 4.0 |
| 8-8-8S4OMLO               | 12       | 1/2   | 1/2 - 14 | 31.0      | 48.5      | 27        | 4.0                                  | 4.0 |
| 10S4OMLO                  | 14,15,16 | 5/8   | 1/2 - 14 | 33.5      | 48.5      | 27        | 4.0                                  | 4.0 |
| 12S4OMLO                  | 18,20    | 3/4   | 3/4 - 14 | 37.5      | 51.5      | 30        | 4.0                                  | 4.0 |
| 16S4OMLO                  | 22,25    | 1     | 1 - 11   | 41.5      | 58.5      | 36        | 4.0                                  | 4.0 |

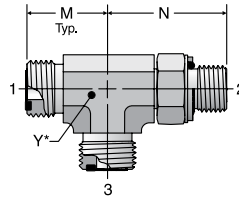
Dimensions and pressures for reference only, subject to change.

**R4OMLO**

Run Tee – BSPP

(for ISO 1179-1 Port)

ORFS / BSPP-ORR / ORFS



\* Y – Across  
Wrench Flats

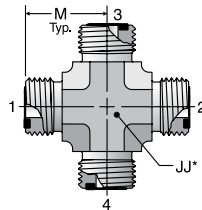
| TUBE<br>FITTING<br>PART # | END SIZE |       |          | M<br>(mm) | N<br>(mm) | Y<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|----------|-------|----------|-----------|-----------|-----------|--------------------------------------|-----|
|                           | 1 & 3    |       | 2        |           |           |           | S                                    | SS  |
|                           | (mm)     | (in.) | BSPP     |           |           |           |                                      |     |
| 4R4OMLO                   | 6        | 1/4   | 1/8 - 28 | 21.5      | 30.0      | 14        | 4.0                                  | 4.0 |
| 4-4-4R4OMLO               | 6        | 1/4   | 1/4 - 19 | 23.5      | 36.0      | 19        | 4.0                                  | 4.0 |
| 6R4OMLO                   | 8,10     | 3/8   | 1/4 - 19 | 25.0      | 36.0      | 19        | 4.0                                  | 4.0 |
| 6-6-6R4OMLO               | 8,10     | 3/8   | 3/8 - 19 | 26.5      | 38.0      | 19        | 4.0                                  | 4.0 |
| 8R4OMLO                   | 12       | 1/2   | 3/8 - 19 | 28.0      | 38.0      | 19        | 4.0                                  | 4.0 |
| 8-8-8R4OMLO               | 12       | 1/2   | 1/2 - 14 | 31.0      | 48.5      | 27        | 4.0                                  | 4.0 |
| 10R4OMLO                  | 14,15,16 | 5/8   | 1/2 - 14 | 33.5      | 45.2      | 27        | 4.0                                  | 4.0 |
| 12R4OMLO                  | 18,20    | 3/4   | 3/4 - 14 | 37.5      | 51.5      | 30        | 4.0                                  | 4.0 |
| 16R4OMLO                  | 22,25    | 1     | 1 - 11   | 41.5      | 58.5      | 37        | 4.0                                  | 4.0 |

**KLO**

Union Cross

ORFS (all four ends)

SAE 520501



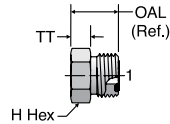
\* JJ – Across  
Wrench Flats

| TUBE<br>FITTING<br>PART # | END<br>SIZE  | JJ<br>(in.) | M<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|--------------|-------------|------------|--------------------------------------|-----|
|                           | 1-4<br>(in.) |             |            | -S                                   | -SS |
| 4 KLO                     | 1/4          | 9/16        | 0.85       | 9.2                                  | 9.2 |
| 6 KLO                     | 3/8          | 3/4         | 0.98       | 9.2                                  | 9.2 |
| 8 KLO                     | 1/2          | 3/4         | 1.10       | 9.2                                  | 9.2 |
| 10 KLO                    | 5/8          | 1 1/16      | 1.32       | 6.0                                  | 6.0 |
| 12 KLO                    | 3/4          | 1 3/16      | 1.48       | 6.0                                  | 6.0 |
| 16 KLO                    | 1            | 1 7/16      | 1.63       | 6.0                                  | 6.0 |
| 20 KLO                    | 1 1/4        | 1 5/8       | 1.75       | 5.0                                  | 5.0 |
| 24 KLO                    |              |             |            |                                      |     |

Dimensions and pressures for reference only, subject to change.

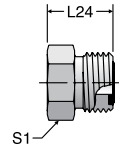
**PNLO**Plug  
ORFS

SAE 520109



| TUBE<br>FITTING<br>PART # | END<br>SIZE | H<br>HEX<br>(in.) | OAL<br>(REF)<br>(in.) | TT<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|-------------|-------------------|-----------------------|-------------|--------------------------------------|-----|
|                           | 1<br>(in.)  |                   |                       |             | -S                                   | -SS |
| 4 PNLO                    | 1/4         | 5/8               | 0.65                  | 0.20        | 9.2                                  | 9.2 |
| 6 PNLO                    | 3/8         | 3/4               | 0.75                  | 0.32        | 9.2                                  | 9.2 |
| 8 PNLO                    | 1/2         | 7/8               | 0.87                  | 0.35        | 9.2                                  | 9.2 |
| 10 PNLO                   | 5/8         | 1 1/16            | 1.02                  | 0.41        | 6.0                                  | 6.0 |
| 12 PNLO                   | 3/4         | 1 1/4             | 1.08                  | 0.41        | 6.0                                  | 6.0 |
| 14 PNLO*                  | 7/8         | 1 3/8             | 1.10                  | 0.49        | 6.0                                  | 6.0 |
| 16 PNLO                   | 1           | 1 1/2             | 1.10                  | 0.41        | 6.0                                  | 6.0 |
| 20 PNLO                   | 1 1/4       | 1 3/4             | 1.10                  | 0.41        | 6.0                                  | 6.0 |
| 24 PNLO                   | 1 1/2       | 2 1/8             | 1.10                  | 0.41        | 5.0                                  | 5.0 |
| 32 PNLO*                  | 2           | 2 3/4             | 1.40                  | 0.50        | 3.0                                  | 3.0 |

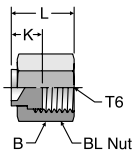
\* Sizes 14 and 32 are not included in SAE J1453.

**PNMLO**Plug – mm Hex  
ORFSISO 8434-3 PL  
SAE 52M0109

| TUBE<br>FITTING<br>PART # | ORFS<br>TUBE O.D. |       | L24<br>(mm) | S1<br>HEX<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|-------------------|-------|-------------|-------------------|--------------------------------------|-----|
|                           | (mm)              | (in.) |             |                   | S                                    | SS  |
| 4PNMLO                    | 6                 | 1/4   | 16.5        | 17                | 9.2                                  | 9.2 |
| 6PNMLO                    | 8,10              | 3/8   | 19.0        | 19                | 9.2                                  | 9.2 |
| 8PNMLO                    | 12                | 1/2   | 22.0        | 22                | 9.2                                  | 9.2 |
| 10PNMLO                   | 14,15,16          | 5/8   | 26.0        | 27                | 6.0                                  | 6.0 |
| 12PNMLO                   | 18,20             | 3/4   | 27.5        | 32                | 6.0                                  | 6.0 |
| 16PNMLO                   | 22,25             | 1     | 28.0        | 41                | 6.0                                  | 6.0 |
| 20PNMLO                   | 28,30,32          | 1 1/4 | 28.0        | 46                | 6.0                                  | 6.0 |
| 24PNMLO                   | 38                | 1 1/2 | 28.0        | 55                | 5.0                                  | 5.0 |

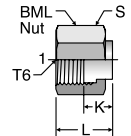
**FNL**Cap  
ORFS

SAE 520112



| TUBE<br>FITTING<br>PART # | TUBE<br>O.D.<br>(in.) | T6<br>SWIVEL<br>UN/UNF-2B | B<br>HEX<br>(in.) | K<br>(in.) | L<br>(in.) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|-----------------------|---------------------------|-------------------|------------|------------|--------------------------------------|-----|
|                           |                       |                           |                   |            |            | -S                                   | -SS |
| 4 FNL                     | 1/4                   | 9/16 - 18                 | 11/16             | 0.35       | 0.66       | 9.2                                  | 9.2 |
| 6 FNL                     | 3/8                   | 11/16 - 16                | 13/16             | 0.41       | 0.74       | 9.2                                  | 9.2 |
| 8 FNL                     | 1/2                   | 13/16 - 16                | 15/16             | 0.47       | 0.87       | 9.2                                  | 9.2 |
| 10 FNL                    | 5/8                   | 1 - 14                    | 1 1/8             | 0.53       | 1.02       | 6.0                                  | 6.0 |
| 12 FNL                    | 3/4                   | 1 3/16 - 12               | 1 3/8             | 0.59       | 1.12       | 6.0                                  | 6.0 |
| 14 FNL*                   | 7/8                   | 1 5/16 - 12               | 1 1/2             | 0.59       | 1.12       | 6.0                                  | 6.0 |
| 16 FNL                    | 1                     | 1 7/16 - 12               | 1 5/8             | 0.63       | 1.16       | 6.0                                  | 6.0 |
| 20 FNL                    | 1 1/4                 | 1 11/16 - 12              | 1 7/8             | 0.63       | 1.16       | 6.0                                  | 6.0 |
| 24 FNL                    | 1 1/2                 | 2 - 12                    | 2 1/4             | 0.63       | 1.16       | 5.0                                  | 5.0 |
| 32 FNL*                   | 2                     | 2 1/2 - 12                | 2 7/8             | 0.79       | 1.46       | 3.0                                  | 3.0 |

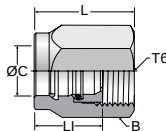
\* Sizes 14 and 32 are not included in SAE J1453.

**FNML**Cap  
ORFS

| TUBE<br>FITTING<br>PART # | TUBE<br>O.D. |       | T6<br>SWIVEL<br>UN/UNF-2B | K<br>(mm) | L<br>(mm) | S<br>HEX<br>(mm) | Dynamic<br>Pressure<br>(x 1,000 PSI) |     |
|---------------------------|--------------|-------|---------------------------|-----------|-----------|------------------|--------------------------------------|-----|
|                           | (mm)         | (in.) |                           |           |           |                  | S                                    | SS  |
| 4FNML                     | 6            | 1/4   | 9/16 - 18                 | 9.0       | 16.8      | 17               | 9.2                                  | 9.2 |
| 6FNML                     | 8, 10        | 3/8   | 11/16 - 16                | 10.5      | 18.8      | 22               | 9.2                                  | 9.2 |
| 8FNML                     | 12           | 1/2   | 13/16 - 16                | 12.0      | 22.0      | 24               | 9.2                                  | 9.2 |
| 10FNML                    | 14, 15, 16   | 5/8   | 1 - 14                    | 13.5      | 26.0      | 30               | 6.0                                  | 6.0 |
| 12FNML                    | 18, 20       | 3/4   | 1 3/16 - 12               | 15.0      | 28.6      | 36               | 6.0                                  | 6.0 |
| 16FNML                    | 22, 25       | 1     | 1 7/16 - 12               | 16.0      | 29.5      | 41               | 6.0                                  | 6.0 |
| 20FNML                    | 28, 30, 32   | 1 1/4 | 1 11/16 - 12              | 16.0      | 29.5      | 50               | 6.0                                  | 6.0 |
| 24FNML                    | 35, 38       | 1 1/2 | 2 - 12                    | 16.0      | 29.5      | 60               | 5.0                                  | 5.0 |

Dimensions and pressures for reference only, subject to change.

## UPTC Nut Assembly



| TUBE FITTING<br>PART # | END<br>SIZE<br>(in.) | T6<br>UN/UNF-2B | B<br>HEX<br>(in.) | L<br>(in.) | L1<br>(in.) | C                         |      |
|------------------------|----------------------|-----------------|-------------------|------------|-------------|---------------------------|------|
|                        |                      |                 |                   |            |             | Nominal<br>Nipple<br>Size |      |
|                        |                      |                 |                   |            |             | (in.)                     | (mm) |
| 4 UPTCL                | 1/4                  | 9/16-18         | 11/16             | 0.97       | 0.68        | 0.31                      | 8    |
| 6 UPTCL                | 3/8                  | 11/16-16        | 13/16             | 1.06       | 0.74        | 0.47                      | 12   |
| 8 UPTCL                | 1/2                  | 13/16-16        | 15/16             | 1.19       | 0.81        | 0.59                      | 15   |
| 10 UPTCL               | 5/8                  | 1-14            | 1 1/8             | 1.34       | 0.87        | 0.71                      | 18   |
| 12 UPTCL               | 3/4                  | 1 3/16-12       | 1 3/8             | 1.38       | 0.86        | 0.87                      | 22   |
| 16 UPTCL               | 1                    | 1 7/16-12       | 1 5/8             | 1.48       | 0.94        | 0.98                      | 25   |

To order as pre-torqued assembly on standard Seal-Lok adapters, see page A7.

Dimensions and pressures for reference only, subject to change.