













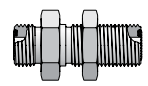

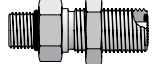


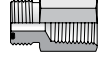
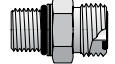

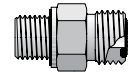


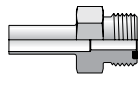

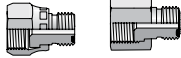

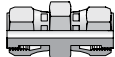
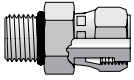
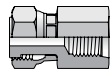
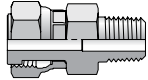
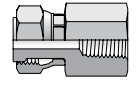
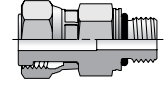
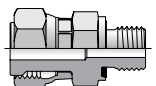

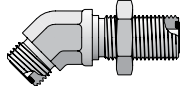
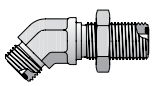
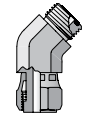
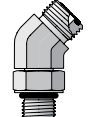
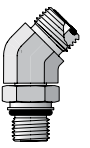
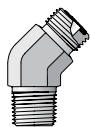
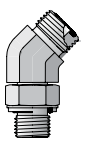




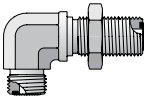
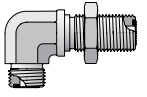
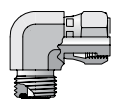
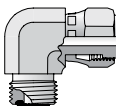
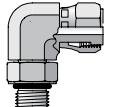
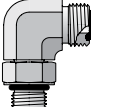
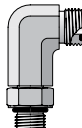

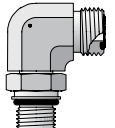
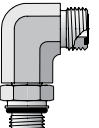
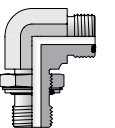
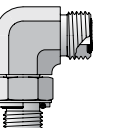

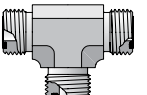
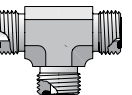
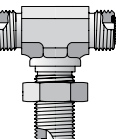
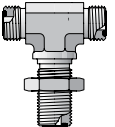
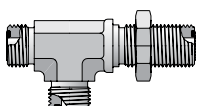
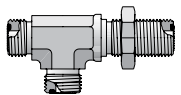
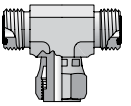
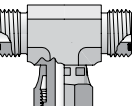
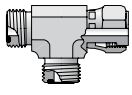
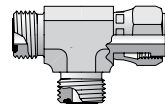
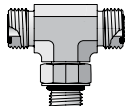
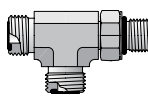
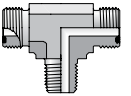
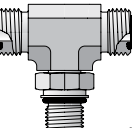
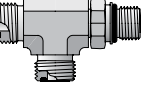
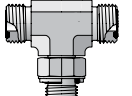
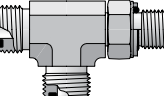
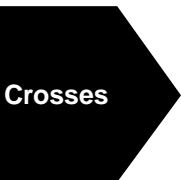
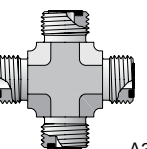





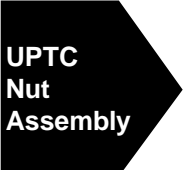

Seal-Lok™ O-Ring Face Seal Tube Fittings

A


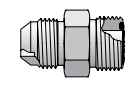
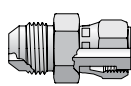
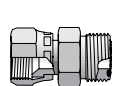
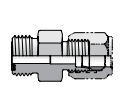
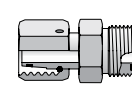
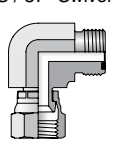


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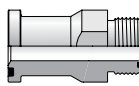
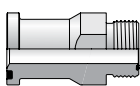
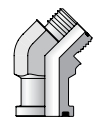
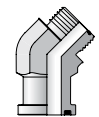

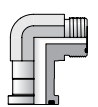
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	TLS (Metric) Braze Reducer Sleeve  A10	SBR (Inch and Metric) Braze Ring  A11	WLNL Bulkhead Locknut  A11	WLNML Blkhd Locknut - mm Hex  A11	
HMLO Union - mm Hex  A12	WLO Bulkhead Union  A12	WMLO Bulkhead Union - mm Hex  A13	WF5OLO ORFS Blkhd / SAE-ORB  A13	F5OLO ORFS / SAE-ORB  A14	
FLO ORFS / NPTF  A14	GLO ORFS / NPTF  A15	F87OMLO ORFS / ISO 6149  A15	F82EDMLO ORFS / Metric-ED  A15	F42EDMLO ORFS / BSPP-ED  A15	LOHB3 ORFS / Braze Socket  A16
MMLOHB3 ORFS / Braze - mm Hex  A16	LOHT3 ORFS / Tube Weld  A16		TRLON Tube End Reducer  A17	LOHL6 Extender and Expander  A17	HL6 ORFS Swivel Union  A17
F65OL ORFS Swivel / SAE-ORB  A18	G65L ORFS Swivel / SAE-ORB  A18		F6L ORFS Swivel / NPTF  A18	G6L ORFS Swivel / NPTF  A18	F687OML ORFS Swivel / ISO 6149  A19
F642EDML ORFS Swivel / BSPP-ED  A19		WNLO Bulkhead Union  A19	WLNML Bulkhead Union - mm Hex  A20	V6LO ORFS Swivel Elbow  A20	V5OLO ORFS / SAE-ORB  A20
V87OMLO ORFS / ISO 6149  A20		VLO ORFS / NPTF  A21	V40MLO ORFS / BSPP-ORR  A21		ELO Union Elbow  A21

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


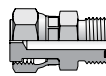
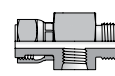
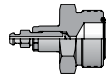
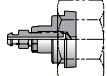
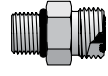
Conversion Adapters (Shown in Section K)

 <p>Conversion Adapters</p>	<p>XHLO 37° Flare / ORFS</p>  <p>K3</p>	<p>XHL6 37° Flare / ORFS Swivel</p>  <p>K3</p>	<p>LOHX6 ORFS / 37° Swivel</p>  <p>K3</p>	<p>BUHLO ORFS / Flareless (inch)</p>  <p>K4</p>	<p>LOHU86 Metric Swivel (EO)/ORFS</p>  <p>K4</p>
	<p>LOEX6 ORFS / 37° Swivel</p>  <p>K3</p>				


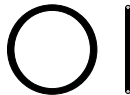



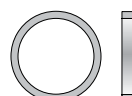



Flange Adapters (Shown in Section L)

 <p>SAE Flange Adapters</p>	<p>LOHQ1 Code 61 / ORFS</p>  <p>L12</p>	<p>LOHQ2 Code 62 / ORFS</p>  <p>L12</p>	<p>LOVQ1 Code 61 / ORFS</p>  <p>L30</p>	<p>LOVQ2 Code 62 / ORFS</p>  <p>L30</p>	<p>LOEQ1 Code 61 / ORFS</p>  <p>L31</p>
	<p>LOEQ2 Code 62 / ORFS</p>  <p>L31</p>				

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

 <p>Diagnostic, Bleed Adapters & Screen Fittings</p>	<p>LOHL6 Orifice Orifice Swivel with Orifice / ORFS</p>  <p>M9</p>	<p>LOHL6G5TP Orifice Swivel / ORFS / SAE-ORB</p>  <p>M5</p>	<p>PNLOBA Bleed Screw / ORFS</p>  <p>M10</p>	<p>FNLBA Bleed Screw / SAE-ORB</p>  <p>M10</p>	<p>Screen Fittings</p>  <p>M12</p>

O-Rings and Seals (Shown in Section N)

 <p>O-Rings and Seals</p>	<p>ORFS O-Ring</p>  <p>N4</p>	<p>SAE O-Ring</p>  <p>N4</p>	<p>ISO 6149 O-Ring</p>  <p>N5</p>	<p>Metric O-Ring</p>  <p>N5</p>	<p>Metric Retaining Ring</p>  <p>N5</p>
	<p>BSPP O-Ring</p>  <p>N6</p>	<p>BSPP Retaining O-Ring</p>  <p>N6</p>	<p>EOlastic Seal Ring</p>  <p>N6</p>		

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.

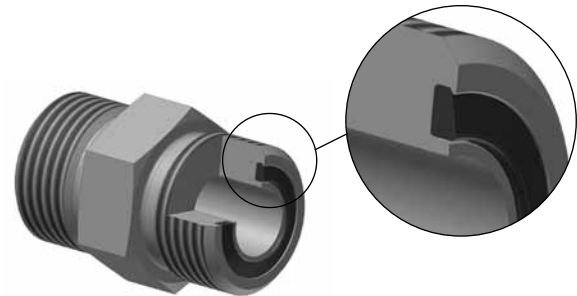


Fig. A1 — Captive O-ring Groove (CORG) Cutaway with Parker's trap seal

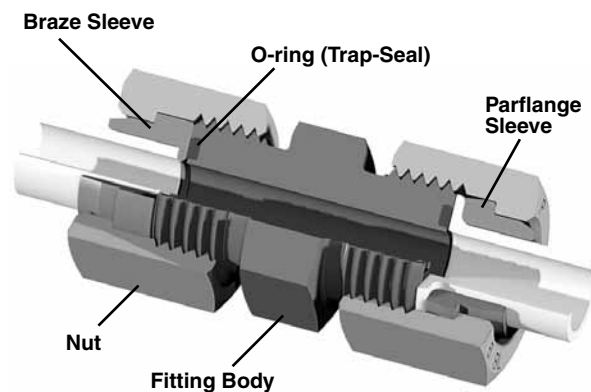


Fig. A2 — Seal-Lok Union cutaway with flanged and brazed assemblies

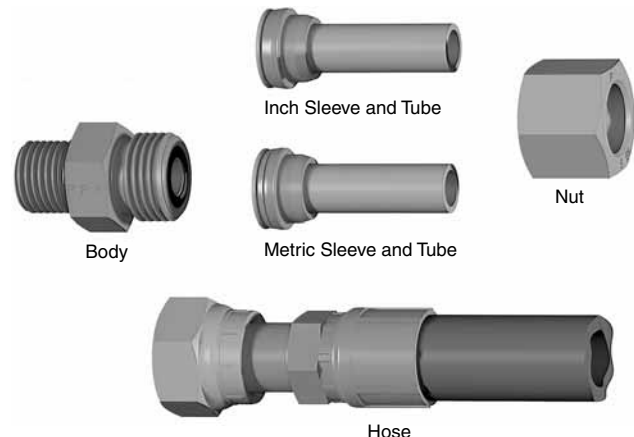


Fig. A3 — Seal-Lok Works with Inch or Metric Tube and Hose

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

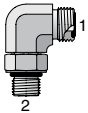
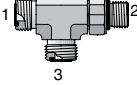
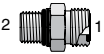
UPTC Seal-Lok consists of a base Seal-Lok ORFS fitting, a UPTC nut (including internal sealing and retaining elements) and a UPTC hose assembly, as shown in figure A4. The base ORFS fitting is a highly reliable and widely available off-the-shelf standard SAE J1453 adapter. The sealing O-Ring is supported 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	8UR10 C5OLO-S Uniform size, UPTC subassembly on 1st end only
	8-10 C5OLO-S	8-10UR10 C5OLO-S Jump size, UPTC subassembly on 1st end only
	8 R5OLO-S	8UR101 R5OLO-S Uniform size, UPTC subassembly on 1st and 3rd end
	8-10-8 R5OLO-S	8-10-8UR001 R5OLO-S Jump size, UPTC subassembly on 3rd end only
	8-10-8 R5OLO-S	8-10-8UR100 R5OLO-S Jump size, UPTC subassembly on 1st end only
	8M14F87OMLOS	8M14UR10F87OMLOS 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.

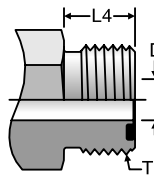
Robust Port Stud: The adjustable port stud is manufactured with a longer locknut designed to cover the uppermost threads completely. Since the backup washer is never exposed to the upper threads, it cannot be damaged during assembly. During assembly, exposed upper threads, as common with fittings from 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.

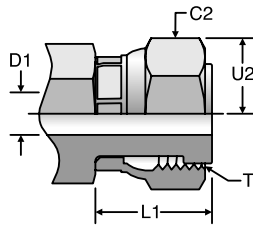
Universal Push to Connect (UPTC): Parker's UPTC offers a quick and easy way to assemble Seal-Lok configurations. UPTC is ideal for hard to reach applications or to speed up the process of assembly. The tangible operational and maintenance costs associated with each connection made will be reduced when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

Dimensions and pressures for reference only, subject to change.

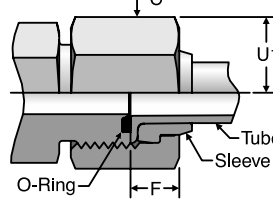
Seal-Lok O-Ring Face Seal Tube Ends



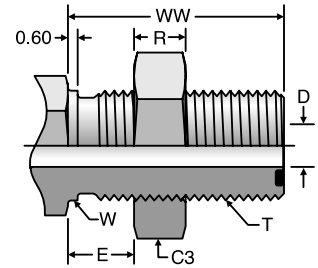
Seal-Lok Male Tube End



Seal-Lok Female Swivel



Seal-Lok Tube End Assembly



Seal-Lok Bulkhead

SAE Dash	Tube O.D.	T	Thread						Nominal Drill Tube End	Nominal Drill Swivel End	Max Bulkhead Thickness	Tube Nut Assembled Allowance	Swivel Turn Back	Male Turn Back	Bulkhead			Across Corners		
			UN/UNF	C		C2		C3							D ¹⁾	D1 ¹⁾	E	F	L1	L4
Size	(in.)	(mm)		(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(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 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 15 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 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 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 30 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 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 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.

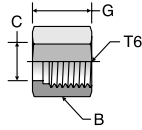
4) Note: For port and stud end dimensions reference section F: Pipe Fittings and Port Adapters.

Dimensions and pressures for reference only, subject to change.



BL
Tube Nut
ORFS

SAE 520110



TUBE FITTING PART #	END SIZE (in.)	T6 UNF/UNF-2B	B HEX (in.)	C (in.)	G (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	•	•

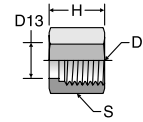
* Sizes 14 and 32 are not included in SAE J1453.

** 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

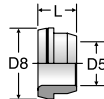
ISO 8434-3 NA
SAE 52M0110A



TUBE FITTING PART #	END SIZE		D THREAD UN/UNF-2B	D13 DRILL (mm)	H (mm)	S HEX (mm)	Material	
	(mm)	(in.)					-S	-SS
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



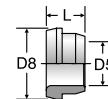
TUBE FITTING PART #	USED WITH FITTING SIZE	D5 END SIZE (mm)	D8 DIA (mm)	L (mm)	Material	
					-S	-SS
TPLS6	-4	6	12.75	7.5	•	•
TPLS8	-6	8	15.75	8.5	•	•
TPLS10	-6	10	15.75	8.5	•	•
TPLS12	-8	12	18.90	10.5	•	•
TPLS14	-10	14	23.50	10.5	•	•
TPLS15	-10	15	23.50	10.5	•	•
TPLS16	-10	16	23.50	10.5	•	•
TPLS18	-12	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 FITTING PART #	D5 END SIZE (in.)	D8 DIA (in.)	L (in.)	Material	
				-S	-SS
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	•	•

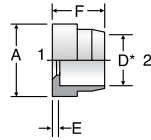
• Must be mechanically attached using Parflange system.

Dimensions and pressures for reference only, subject to change.

TL (Inch)

Braze Sleeve for Inch Tubing
ORFS Silver Braze Sleeve Reducer

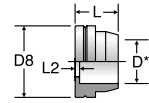
SAE 520115



TLS (Metric)

Braze Sleeve for Metric Tubing
ORFS Silver Braze Sleeve

ISO 8434-3 BRSL
SAE 5201M15



TUBE FITTING PART #	END SIZE		A (in.)	D* (in.)	E (in.)	F (in.)	Material	
	1 (in.)	2 (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 FITTING PART #	USED WITH FITTING SIZE	D* END SIZE (mm)	D8 DIA (mm)	L (mm)	L2 (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.

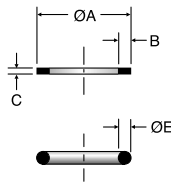
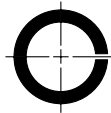
• Uses SBR (metric) silver braze rings

• Stainless steel part number example: TLSS10

Dimensions and pressures for reference only, subject to change.

SBR (Inch)

Silver Braze Ring for Inch Tubing

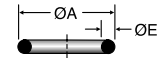
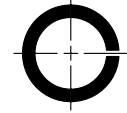


TUBE FITTING PART #	END SIZE (in.)	A DIA (in.)	B (in.)	C (in.)	E (in.)
4 SBR	1/4	0.260	—	—	0.05
6 SBR	3/8	0.390	0.07	0.03	—
8 SBR	1/2	0.515	0.07	0.03	—
10 SBR	5/8	0.640	0.07	0.03	—
12 SBR	3/4	0.765	0.08	0.04	—
14 SBR	7/8	0.890	—	—	0.06
16 SBR	1	1.015	0.08	0.04	—
20 SBR	1 1/4	1.265	0.08	0.04	—
24 SBR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



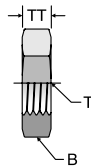
TUBE FITTING PART #	END SIZE (mm)	A DIA (mm)	E (mm)
SBR 6mm	6	6.4	1.2
SBR 8mm	8	8.4	1.2
SBR 10mm	10	10.4	1.2
SBR 12mm	12	12.4	1.2
SBR 16mm	16	16.4	1.2
SBR 20mm	20	20.4	1.6
SBR 25mm	25	25.4	1.6
SBR 30mm	30	30.4	1.6
SBR 38mm	38	38.4	1.6

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



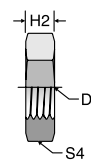
TUBE FITTING PART #	END SIZE (in.)	T TUBE END UN/UNF-2A	B HEX (in.)	TT (in.)	Material
					-S
4 WLNL	1/4	9/16 - 18	13/16	0.27	•
6 WLNL	3/8	11/16 - 16	1	0.31	•
8 WLNL	1/2	13/16 - 16	1 1/8	0.35	•
10 WLNL	5/8	1 - 14	1 5/16	0.41	•
12 WLNL	3/4	1 3/16 - 12	1 1/2	0.41	•
14 WLNL*	7/8	1 5/16 - 12	1 5/8	0.41	•
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



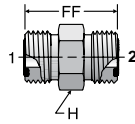
TUBE FITTING PART #	END SIZE		D TUBE END UN/UNF-2B	H2 (mm)	S4 HEX (mm)	Material
	(mm)	(in.)				S
4WLNML	6	1/4	9/16 - 18	7.0	22	•
6WLNML	8,10	3/8	11/16 - 16	8.0	27	•
8WLNML	12	1/2	13/16 - 16	9.0	30	•
10WLNML	14,15,16	5/8	1 - 14	10.5	36	•
12WLNML	18,20	3/4	1 3/16 - 12	10.5	41	•
16WLNML	22,25	1	1 7/16 -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



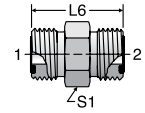
TUBE FITTING PART #	END SIZE		FF (in.)	H HEX (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 (in.)	2 (in.)			-S	-SS	D
	4 HLO	1/4					
6 HLO	3/8	3/8	1.22	3/4	9.2	9.2	4.0
6-4 HLO	3/8	1/4	1.18	3/4	9.2	9.2	4.0
8 HLO	1/2	1/2	1.40	7/8	9.2	9.2	4.0
8-6 HLO	1/2	3/8	1.32	7/8	9.2	9.2	4.0
10 HLO	5/8	5/8	1.67	1 1/16	6.0	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 / ORFS

ISO 8434-3 S
SAE 52M0101

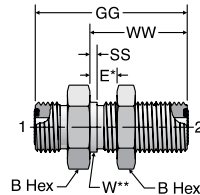


TUBE FITTING PART #	END SIZE 1 & 2		L6 (mm)	S1 HEX (mm)	Dynamic Pressure (x 1,000 PSI)	
	(mm)	(in.)			S	SS
	4HMLO	6				
6HMLO	8,10	3/8	31.0	19	9.2	9.2
8HMLO	12	1/2	35.5	22	9.2	9.2
10HMLO	14,15,16	5/8	42.5	27	6.0	6.0
12HMLO	18,20	3/4	47.0	32	6.0	6.0
16HMLO	22,25	1	49.5	41	6.0	6.0
20HMLO	28,30,32	1 1/4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

WLO

Bulkhead Union
ORFS / ORFS

SAE 520601
WLO-WLNL Body with Locknut
(See page A11 for WLNL)



TUBE FITTING PART #	END SIZE (in.)	B HEX (in.)	E MAX (in.)	GG (in.)	SS	W DIA (in.)	WW (in.)	Dynamic Pressure (x 1,000 PSI)	
								-S	-SS
								4 WLO	1/4
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.

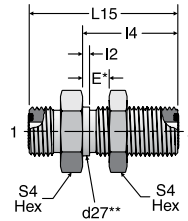


WMLO

Bulkhead Union – mm Hex
ORFS / ORFS

ISO 8434-3 BHS
SAE 52M0601

WMLO-WLNML - Body with Locknut
(See page A11 for WLNML)



TUBE FITTING PART #	END SIZE		d27** (mm)	E (mm)	I4 (mm)	I2 (mm)	L15 (mm)	S4 HEX (mm)	Dynamic Pressure (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.

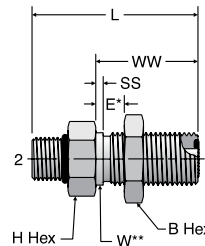
**d27 – Bulkhead pilot diameter. Recommended clearance hole is d27 + 0.4 mm

WF5OLO

Straight Thread Bulkhead Connector

ORFS / SAE-ORB

WF5OLO-WLNL - Body with Locknut
(See page A11 for WLNL)



TUBE FITTING PART #	END SIZE		B HEX (in.)	E MAX (in.)	H HEX (in.)	L (in.)	SS (in.)	W DIA (in.)	WW (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 UN/UNF-2A								-S	-SS
	4 WF5OLO	1/4									
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.

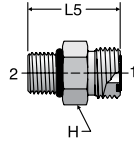
** W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Dimensions and pressures for reference only, subject to change.

F5OLO

Straight Thread Connector
ORFS / SAE-ORB

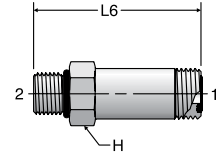
SAE 520120



FF5OLO

Long Straight Thread Connector
ORFS-Long / SAE-ORB

SAE 521720 (previously 520122)

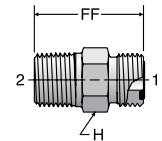


TUBE FITTING PART #	END SIZE		H HEX (in.)	L5 (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 (in.)	2 UN/UNF-2A			-S	-SS	D
4-5 F5OLO	1/4	1/2 - 20	5/8	1.16	9.2	9.2	4.0
4-6 F5OLO	1/4	9/16 - 18	3/4	1.20	9.2	9.2	4.0
4-8 F5OLO	1/4	3/4 - 16	7/8	1.32	9.2	9.2	4.0
6 F5OLO	3/8	9/16 - 18	3/4	1.26	9.2	9.2	4.0
6-4 F5OLO	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
8-12 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

TUBE FITTING PART #	END SIZE		H HEX (in.)	L6 (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 UN/UNF-2A			-S	-SS
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

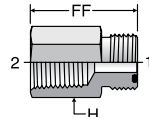


TUBE FITTING PART #	END SIZE		FF (in.)	H HEX (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 (in.)	2 NPTF			-S	-SS	D
4-4 FLO	1/4	1/4 - 18	1.26	5/8	6.0	6.0	3.0
4-6 FLO	1/4	3/8 - 18	1.32	3/4	6.0	6.0	3.0
4-8 FLO	1/4	1/2 - 14	1.52	7/8	6.0	6.0	3.0
6 FLO	3/8	1/4 - 18	1.25	3/4	6.0	6.0	3.0
6-2 FLO	3/8	1/8 - 27	1.16	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 - 11 1/2	2.13	1 3/8	4.5	4.5	2.3
16 FLO	1	1 - 11 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 - 11 1/2	2.30	1 3/4	3.0	3.0	1.5
20 FLO	1 1/4	1 1/4 - 11 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 - 11 1/2	2.27	1 7/8	4.5	4.5	2.3
24 FLO	1 1/2	1 1/2 - 11 1/2	2.40	2 1/8	3.0	3.0	1.5

Dimensions and pressures for reference only, subject to change.

GLO

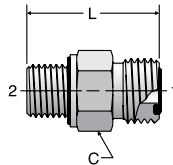
Female Pipe Connector
ORFS / Female Pipe



TUBE FITTING PART #	END SIZE		FF (in.)	H HEX (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 NPTF			-S	-SS
	4 GLO	1/4				
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

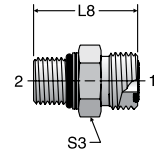
Male Connector – BSPP
(for ISO 1179-1 Port)
ORFS / BSPP-ED



TUBE FITTING PART #	END SIZE			C HEX (mm)	L (mm)	Dynamic Pressure (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 6149

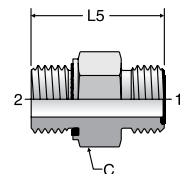


ISO 8434-3 SDS
SAE 52M0187

TUBE FITTING PART #	END SIZE			L8 (mm)	S3 HEX (mm)	Dynamic Pressure (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



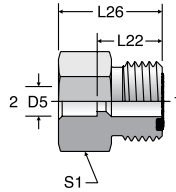
TUBE FITTING PART #	END SIZE			C HEX (mm)	L5 (mm)	Dynamic Pressure (x 1,000 PSI)	
	1		2			S	SS
	(mm)	(in.)	Metric				
4M12F82EDMLO	6	1/4	M12X1.5	17	29.7	9.2	9.2
4M14F82EDMLO	6	1/4	M14X1.5	19	30.5	9.2	9.2
6M14F82EDMLO	8,10	3/8	M14X1.5	22	31.9	9.2	9.2
6M16F82EDMLO	8,10	3/8	M16X1.5	22	31.9	9.2	9.2
8M16F82EDMLO	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



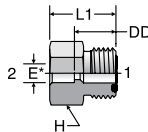
TUBE FITTING PART #	END SIZE		D5* TUBE SOCKET	L22 (mm)	L26 (mm)	S1 HEX	Dynamic Pressure (x 1,000 PSI)		
	1	2					S	SS	
	(mm)	(in.)							
4-6MMLOHB3	6	1/4	6	6.15	13.5	22.0	17	9.2	9.2
4-8MMLOHB3	6	1/4	8	8.15	13.5	22.0	17	9.2	9.2
6-10MMLOHB3	8, 10	3/8	10	10.15	14.5	23.0	19	9.2	9.2
8-12MMLOHB3	12	1/2	12	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

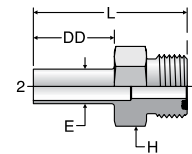
Braze Connector
ORFS / Braze Socket

SAE 520104



LOHT3

Tube Stub Connector
ORFS / Tube Weld



TUBE FITTING PART #	END SIZE		DD (in.)	E* DIA (in.)	H HEX (in.)	L1 (in.)	Dynamic Pressure (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.

TUBE FITTING PART #	END SIZE	DD (in.)	E DIA (in.)	H HEX (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)
	1 & 2 (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.

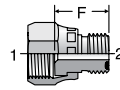
Dimensions and pressures for reference only, subject to change.



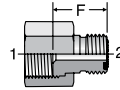
TRLON

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			Dynamic Pressure (x 1,000 PSI)		
TRLON	TRLON	TRLO						1 (in.)
*One Piece Design (With Crimp Nut)	**Two Piece Design (With Large Nut)	***Body Only (For Two-Piece Design Only)						
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	

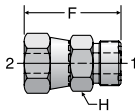
* Assembled with crimp nut.

** Assembled with large BL nut.

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

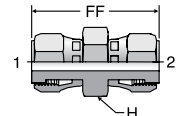
LOHL6

Tube End Extender / Expander
ORFS / ORFS Swivel



HL6

Swivel Nut Union
ORFS Swivel / ORFS Swivel



TUBE FITTING PART #	END SIZE			H HEX (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 (in.)	F (in.)		-S	-SS
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

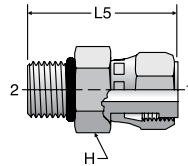
TUBE FITTING PART #	END SIZE			H HEX (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 (in.)	FF (in.)		-S	-SS
4 HL6	1/4	1/4	1.59	5/8	9.2	9.2
6 HL6	3/8	3/8	1.77	3/4	9.2	9.2
8 HL6	1/2	1/2	2.12	7/8	9.2	9.2
10 HL6	5/8	5/8	2.42	1 1/16	6.0	6.0
12 HL6	3/4	3/4	2.74	1 1/4	6.0	6.0
16 HL6	1	1	2.95	1 7/16	6.0	6.0

Dimensions and pressures for reference only, subject to change.

F650L

Straight Thread Swivel Connector
ORFS Swivel / SAE-ORB

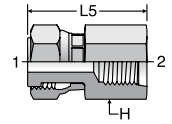
SAE 520181



TUBE FITTING PART #	END SIZE		H HEX (in.)	L5 (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 UN/UNF-2A			-S	-SS
	4 F650L	1/4				
6 F650L	3/8	9/16 - 18	3/4	1.57	9.2	9.2
8 F650L	1/2	3/4 - 16	7/8	1.95	9.2	9.2
10 F650L	5/8	7/8 - 14	1 1/16	2.13	6.0	6.0
12 F650L	3/4	1 1/16 - 12	1 1/4	2.34	6.0	6.0
16 F650L	1	1 5/16 - 12	1 1/2	2.66	6.0	6.0
20 F650L	1 1/4	1 5/8 - 12	1 7/8	2.66	5.0	5.0

G65L

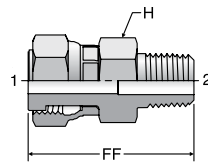
Straight Thread Swivel Female Connector
ORFS Swivel / SAE-ORB



TUBE FITTING PART #	END SIZE		H HEX (in.)	L5 (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 UN/UNF-2B			-S	-SS
	4 G65L	1/4				
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

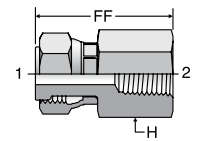
Pipe Thread Swivel Connector
ORFS Swivel / NPTF



TUBE FITTING PART #	END SIZE		FF (in.)	H HEX (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 NPTF			-S	-SS
	4 F6L	1/4				
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

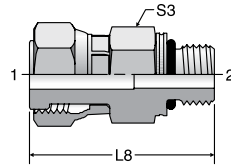


TUBE FITTING PART #	END SIZE		FF (in.)	H (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 NPTF			-S	-SS
	4-4 G6L	1/4				
6 G6L	3/8	1/4 - 18	1.60	7/8	6.0	6.0
8-4 G6L	1/2	1/4 - 18	1.75	7/8	6.0	6.0

Dimensions and pressures for reference only, subject to change.

F687OML

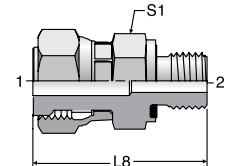
Swivel ISO 6149 Connector
ORFS Swivel / ISO 6149



TUBE FITTING PART #	END SIZE			L8 (mm)	S3 HEX (mm)	Dynamic Pressure (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

F682EDML

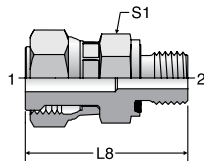
Swivel Metric Connector
ORFS Swivel / Metric-ED



TUBE FITTING PART #	END SIZE			L8 (mm)	S1 HEX (mm)	Dynamic Pressure (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

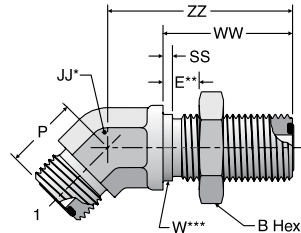


TUBE FITTING PART #	END SIZE			L8 (mm)	S1 HEX (mm)	Dynamic Pressure (x 1,000 PSI)	
	1		2			S	SS
	(mm)	(in.)	BSPP				
4F642EDML	6	1/4	1/8	34.0	14	7.2	7.2
6F642EDML	8, 10	3/8	1/4	40.2	19	9.2	9.2
8F642EDML	12	1/2	3/8	47.3	22	9.2	9.2
10F642EDML	14, 15, 16	5/8	1/2	51.8	27	6.0	6.0
12F642EDML	18, 20	3/4	3/4	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 / ORFS

SAE 520801
WNLO-WLNL - Body with Locknut
(See page A11 for WLNL)



TUBE FITTING PART #	END SIZE		B HEX (in.)	E MAX (in.)	JJ (in.)	P (in.)	SS (in.)	W DIA (in.)	WW (in.)	ZZ (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 (in.)									-S	-SS
	4 WNLO	1/4									1/4	13/16
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.

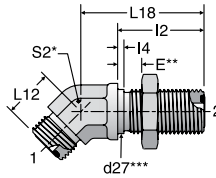
*** W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

Dimensions and pressures for reference only, subject to change.

WNMLO

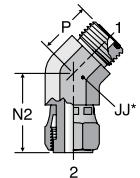
45° Bulkhead Union Elbow – mm Hex
ORFS / ORFS

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 FITTING PART #	END SIZE		d27*** (mm)	E (mm)	I2 (mm)	I4 (mm)	L12 (mm)	L18 (mm)	S2 (mm)	Dynamic Pressure (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

TUBE FITTING PART #	END SIZE 1 & 2 (in.)	JJ (in.)	N2 (in.)	P (in.)	Dynamic Pressure (x 1,000 PSI)	
					-S	-SS
					4 V6LO	1/4
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

* S2 – Across Wrench Flats.

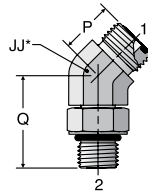
** E – Maximum bulkhead thickness.

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

V5OLO

45° Straight Thread Elbow
ORFS / SAE-ORB

SAE 520320

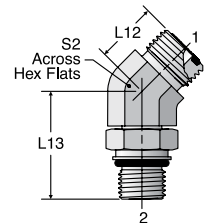


* JJ – Across Hex Flats

V87OMLO

45° Metric Straight Thread Elbow
ORFS / ISO 6149

ISO 8434-3 SDE45
SAE 52M0387



* S2 – Across Hex Flats

TUBE FITTING PART #	END SIZE		JJ (in.)	P (in.)	Q (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 UNUNF-2A				-S	-SS
	4 V5OLO	1/4				7/16 - 20	9/16
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

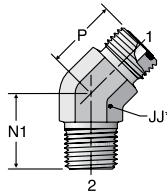
TUBE FITTING PART #	END SIZE			L12 (mm)	L13 (mm)	S2 (mm)	Dynamic Pressure (x 1,000 PSI)	
	1		2				S	SS
	(mm)	(in.)	ISO 261					
4M12V87OMLO	6	1/4	M12X1.5	16.0	30.0	14	6.0	6.0
4M14V87OMLO	6	1/4	M14X1.5	17.5	31.5	17	6.0	6.0
6M16V87OMLO	8,10	3/8	M16X1.5	19.0	33.5	17	6.0	6.0
8M18V87OMLO	12	1/2	M18X1.5	20.5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

Dimensions and pressures for reference only, subject to change.



VLO

45° Male Elbow
ORFS / NPTF

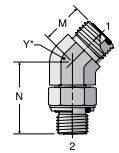


* JJ – Across Wrench Flats

TUBE FITTING PART #	END SIZE		JJ (in.)	N1 (in.)	P (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 NPTF				-S	-SS
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



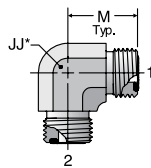
* Y – Across Hex Flats

TUBE FITTING PART #	END SIZE		M (mm)	N (mm)	Y (mm)	Dynamic Pressure (x 1,000 PSI)	
	1 (mm)	2 (in.) BSPP				S	SS
4-4V40MLO	6	1/4 1/4 - 19	17.5	32.0	19	4.0	4.0
6V40MLO	8,10	3/8 1/4 - 19	19.0	32.0	19	4.0	4.0
6-6V40MLO	8,10	3/8 3/8 - 19	19.0	33.5	19	4.0	4.0
6-8V40MLO	8,10	3/8 1/2 - 14	19.5	43.5	27	4.0	4.0
8V40MLO	12	1/2 3/8 - 19	20.5	33.5	19	4.0	4.0
8-8V40MLO	12	1/2 1/2 - 14	21.0	43.5	27	4.0	4.0
10V40MLO	14,15,16	5/8 1/2 - 14	23.5	43.5	27	4.0	4.0
10-12V40MLO	14,15,16	5/8 3/4 - 14	24.5	46.5	30	4.0	4.0
12V40MLO	18,20	3/4 3/4 - 14	26.0	46.5	30	4.0	4.0
12-16V40MLO	18,20	3/4 1 - 11	26.0	51.0	37	4.0	4.0
16V40MLO	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

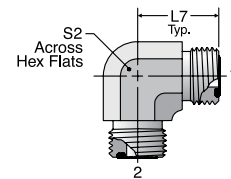
TUBE FITTING PART #	END SIZE		JJ (in.)	M (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 (in.)			-S	-SS
6 ELO	3/8	3/8	3/4	0.98	9.2	9.2
8 ELO	1/2	1/2	3/4	1.10	9.2	9.2
10 ELO	5/8	5/8	1 1/16	1.32	6.0	6.0
12 ELO	3/4	3/4	1 3/16	1.48	6.0	6.0
16 ELO	1	1	1 7/16	1.63	6.0	6.0
20 ELO	1 1/4	1 1/4	1 5/8	1.75	5.0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

ISO 8434-3 E
SAE 52M0201



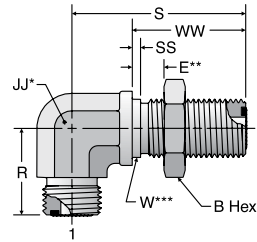
TUBE FITTING PART #	END SIZE		L7 (mm)	S2 (mm)	Dynamic Pressure (x 1,000 PSI)	
	1 & 2				S	SS
	(mm)	(in.)				
4EMLO	6	1/4	21.5	14	9.2	9.2
6EMLO	8,10	3/8	25.0	19	9.2	9.2
8EMLO	12	1/2	28.0	19	9.2	9.2
10EMLO	14,15,16	5/8	33.5	27	6.0	6.0
12EMLO	18,20	3/4	37.5	30	6.0	6.0
16EMLO	22,25	1	41.5	36	6.0	6.0
20EMLO	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)



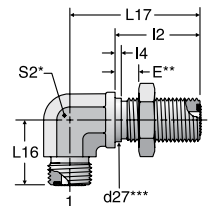
TUBE FITTING PART #	END SIZE		B HEX (in.)	E MAX (in.)	JJ (in.)	R (in.)	S (in.)	SS (in.)	W (in.)	WW (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 (in.)									-S	-SS
4 WELO	1/4	1/4	13/16	0.55	9/16	0.89	1.85	0.06	0.56	1.24	9.2	9.2
6 WELO	3/8	3/8	1	0.55	3/4	1.02	2.05	0.06	0.69	1.34	9.2	9.2
8 WELO	1/2	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 FITTING PART #	END SIZE		d27*** (mm)	E (mm)	I2 (mm)	I4 (mm)	L16 (mm)	L17 (mm)	S2 (mm)	Dynamic Pressure (x 1,000 PSI)	
	1 & 2 (mm)	(in.)								S	SS
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.

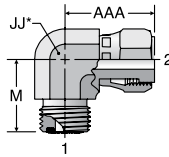
Dimensions and pressures for reference only, subject to change.



C6LO

Swivel Nut Elbow
ORFS / ORFS Swivel

SAE 520221



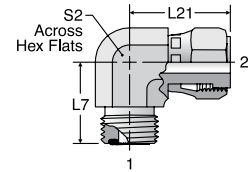
* JJ – Across Wrench Flats

TUBE FITTING PART #	END SIZE		AAA (in.)	JJ (in.)	M (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 (in.)	2 (in.)				-S	-SS	D
	4 C6LO	1/4						
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 Swivel

ISO 8434-3 SWE
SAE 52M0221



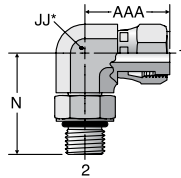
* S2 – Across Hex Flats

TUBE FITTING PART #	END SIZE		L7 (mm)	L21 (mm)	S2 (mm)	Dynamic Pressure (x 1,000 PSI)		
	1 (mm)	2 (in.)				S	SS	D
	4C6MLO	6						
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	

AOEL6

Straight Thread Swivel Elbow
ORFS Swivel / SAE-ORB

SAE 520281



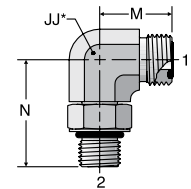
* JJ – Across Wrench Flats

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

C5OLO

Straight Thread Elbow
ORFS / SAE-ORB

SAE 520220



* JJ – Across Wrench Flats

TUBE FITTING PART #	END SIZE		JJ (in.)	M (in.)	N (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 (in.)	2 UN/UNF-2A				-S	-SS	D
	4 C5OLO	1/4						
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.

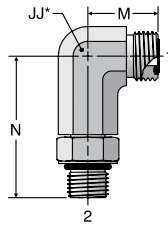
*** JJ for these parts does not conform to SAE.

Dimensions and pressures for reference only, subject to change.

CC5OLO

Long Straight Thread Elbow
ORFS-Long / SAE-ORB

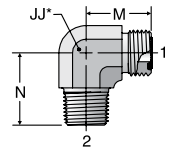
SAE 521520



* JJ – Across Wrench Flats

CLO

Male Pipe Elbow
ORFS / NPTF



* JJ – Across Wrench Flats

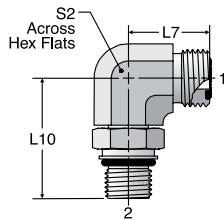
TUBE FITTING PART #	END SIZE		JJ (in.)	M (in.)	N (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 UN-UNF-2A				-S	-SS
	4 CC5OLO	1/4					
6 CC5OLO	3/8	9/16 - 18	3/4	0.98	2.62	6.0	6.0
8 CC5OLO	1/2	3/4 - 16	3/4	1.10	2.95	6.0	6.0
10 CC5OLO	5/8	7/8 - 14	1 1/16	1.32	3.50	6.0	6.0
12 CC5OLO	3/4	1 1/16 - 12	1 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 FITTING PART #	END SIZE		JJ (in.)	M (in.)	N (in.)	Dynamic Pressure (x 1,000 PSI)		
	1 (in.)	2 NPTF				-S	-SS	D
	4 CLO	1/4						
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 6149

ISO 8434-3 SDE
SAE 52M0287



TUBE FITTING PART #	END SIZE			L7 (mm)	L10 (mm)	S2 (mm)	Dynamic Pressure (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.

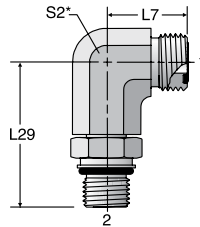
Dimensions and pressures for reference only, subject to change.



CC87OMLO

Long 90° Metric Straight Thread Elbow
ORFS-Long / ISO 6149

ISO 8434-3 SDEL
SAE 52M1587

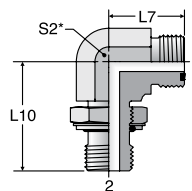


* S2 – Across Hex Flats

TUBE FITTING PART #	END SIZE			L7 (mm)	L29 (mm)	S2 (mm)	Dynamic Pressure (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



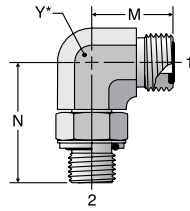
* S2 – Across Hex Flats

TUBE FITTING PART #	END SIZE			L7 (mm)	L10 (mm)	S2 (mm)	Dynamic Pressure (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

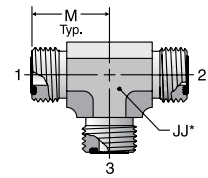


* Y – Across Wrench Flats

JLO

Union Tee
ORFS (all three ends)

SAE 520401



* JJ – Across Wrench Flats

TUBE FITTING PART #	END SIZE		M (mm)	N (mm)	Y (mm)	Dynamic Pressure (x 1,000 PSI)		
	1					S	SS	
	(mm)	(in.)						
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

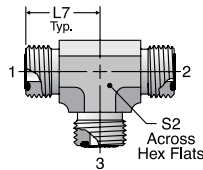
TUBE FITTING PART #	END SIZE		M (in.)	Dynamic Pressure (x 1,000 PSI)	
	1-3			-S	-SS
	(in.)	JJ (in.)			
4 JLO	1/4	9/16	0.85	9.2	9.2
6 JLO	3/8	3/4	0.98	9.2	9.2
8 JLO	1/2	3/4	1.10	9.2	9.2
10 JLO	5/8	1 1/16	1.32	6.0	6.0
12 JLO	3/4	1 3/16	1.48	6.0	6.0
16 JLO	1	1 7/16	1.63	6.0	6.0
20 JLO	1 1/4	1 5/8	1.75	5.0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

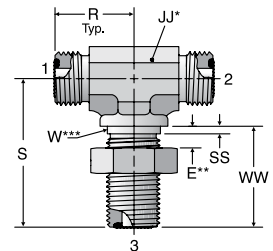


* S2 – Across Hex Flats

WJLO

Bulkhead Branch Tee
ORFS (all three ends)

SAE 520959
WJLO-WLNL - Body with Locknut
(See page A11 for WLNL)



TUBE FITTING PART #	END SIZE		L7 (mm)	S2 (mm)	Dynamic Pressure (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 FITTING PART #	END SIZE 1-3 (in.)	E MAX (in.)	JJ (in.)	R (in.)	S (in.)	SS (in.)	W DIA (in.)	WW (in.)	Dynamic Pressure (x 1,000 PSI)	
									-S	-SS
									4 WJLO	1/4
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.

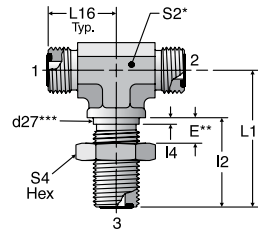
*** W – Bulkhead pilot diameter. Recommended clearance hole is W + 0.015".

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)



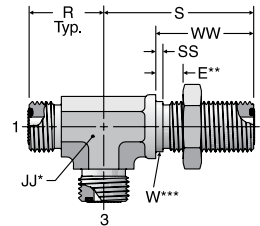
TUBE FITTING PART #	END SIZE		d27***	E	I2	I4	L16	L17	S2	S4 HEX (mm)	Dynamic Pressure (x 1,000 PSI)	
	1-3										S	SS
	(mm)	(in.)										
4WJMLO	6	1/4	14.3	14	31.5	1.5	22.5	47.0	14	22	9.2	9.2
6WJMLO	8,10	3/8	17.5	14	34.0	1.5	26.0	52.0	19	27	9.2	9.2
8WJMLO	12	1/2	20.6	14	36.5	2.5	29.0	55.5	19	30	9.2	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 FITTING PART #	END SIZE	E MAX	JJ	R	S	SS	W DIA	WW	Dynamic Pressure (x 1,000 PSI)	
									-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".

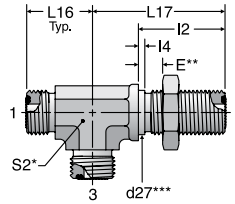
Dimensions and pressures for reference only, subject to change.



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 FITTING PART #	END SIZE		d27*** (mm)	E (mm)	I2 (mm)	I4 (mm)	L16 (mm)	L17 (mm)	S2 (mm)	Dynamic Pressure (x 1,000 PSI)	
	1-3									S	SS
	(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.

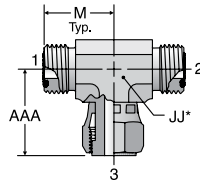
** E – Maximum bulkhead thickness.

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

S6LO

Swivel Nut Branch Tee
ORFS / ORFS / ORFS Swivel

SAE 520433



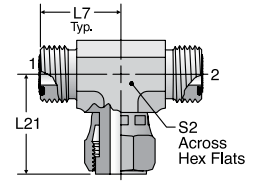
* JJ – Across Wrench Flats

TUBE FITTING PART #	END SIZE		AAA (in.)	JJ (in.)	M (in.)	Dynamic Pressure (x 1,000 PSI)	
	1-3					-S	-SS
	(in.)	(in.)					
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

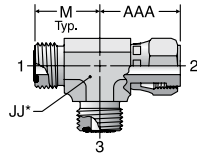
TUBE FITTING PART #	END SIZE		L7 (mm)	L21 (mm)	S2 (mm)	Dynamic Pressure (x 1,000 PSI)	
	1-3					S	SS
	(mm)	(in.)					
4S6MLO	6	1/4	21.5	27.2	14		
6S6MLO	8,10	3/8	25.0	29.7	19	9.2	9.2
8S6MLO	12	1/2	28.0	38.0	19	9.2	9.2
10S6MLO	14,15,16	5/8	33.5	41.0	27	6.0	6.0
12S6MLO	18,20	3/4	37.5	46.5	30	6.0	6.0
16S6MLO	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

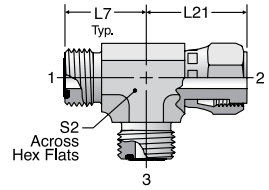


* JJ – Across Wrench Flats

R6MLO

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

ISO 8434-3 SWRT
SAE 52M0432



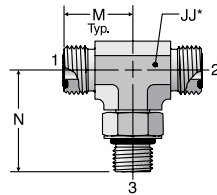
TUBE FITTING PART #	END SIZE		JJ (in.)	M (in.)	Dynamic Pressure (x 1,000 PSI)	
	1-3 (in.)	AAA (in.)			-S	-SS
6 R6LO	3/8	1.17	3/4	0.98	9.2	9.2
8 R6LO	1/2	1.50	3/4	1.10	9.2	9.2
10 R6LO	5/8	1.61	1 1/16	1.32	6.0	6.0
12 R6LO	3/4	1.83	1 3/16	1.48	6.0	6.0
16 R6LO	1	2.11	1 7/16	1.63	6.0	6.0
20 R6LO	1 1/4	2.28	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 FITTING PART #	END SIZE		L7 (mm)	L21 (mm)	S2 (mm)	Dynamic Pressure (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 FITTING PART #	END SIZE			JJ (in.)	M (in.)	N (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 (in.)	3 UN/UNF-2A				-S	-SS
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

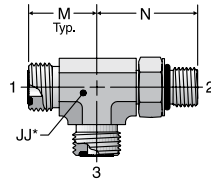
Dimensions and pressures for reference only, subject to change.



R5OLO

Straight Thread Run Tee
ORFS / SAE-ORB / ORFS

SAE 520428

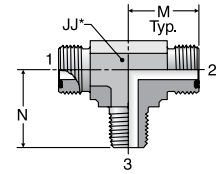


* JJ – Across Wrench Flats

SLO

Male Pipe Tee
ORFS / ORFS / NPTF

SAE 520425



* JJ – Across Wrench Flats

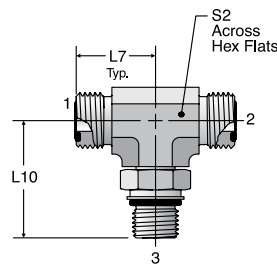
TUBE FITTING PART #	END SIZE			JJ (in.)	M (in.)	N (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 (in.)	2 UN/UNF-2A	3 (in.)				-S	-SS
	4 R5OLO	1/4	7/16 - 20					
4-6-4 R5OLO	1/4	9/16 - 18	1/4	3/4	0.92	1.46	6.0	6.0
6 R5OLO	3/8	9/16 - 18	3/8	3/4	0.98	1.46	6.0	6.0
6-8-6 R5OLO	3/8	3/4 - 16	3/8	3/4	1.04	1.59	6.0	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 FITTING PART #	END SIZE		JJ (in.)	M (in.)	N (in.)	Dynamic Pressure (x 1,000 PSI)	
	1 & 2 (in.)	3 NPTF				-S	-SS
	4-4-4 SLO	1/4					
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 FITTING PART #	END SIZE			L7 (mm)	L10 (mm)	S2 (mm)	Dynamic Pressure (x 1,000 PSI)	
	1 & 2 (mm)		3 ISO 261				S	SS
	4M12S87OMLO	6	1/4					
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

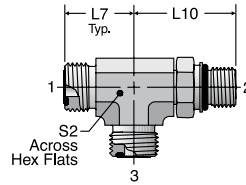
Dimensions and pressures for reference only, subject to change.



R87OMLO

Metric Straight Thread Run Tee
ORFS / ISO 6149 / ORFS

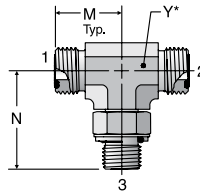
ISO 8434-3 SDRT
SAE 52M0488



TUBE FITTING PART #	END SIZE			L7 (mm)	L10 (mm)	S2 (mm)	Dynamic Pressure (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



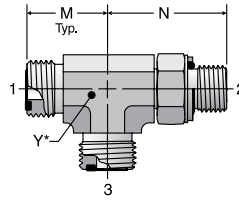
*Y – Across Wrench Flats

TUBE FITTING PART #	END SIZE			M (mm)	N (mm)	Y (mm)	Dynamic Pressure (x 1,000 PSI)	
	1 & 2		3				S	SS
	(mm)	(in.)	BSPP					
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



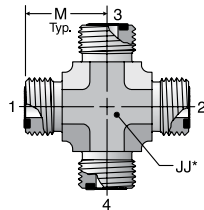
* Y – Across
 Wrench Flats

TUBE FITTING PART #	END SIZE			M (mm)	N (mm)	Y (mm)	Dynamic Pressure (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

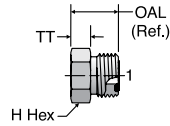
TUBE FITTING PART #	END SIZE	JJ (in.)	M (in.)	Dynamic Pressure (x 1,000 PSI)	
				-S	-SS
	1-4 (in.)				
4 KLO	1/4	9/16	0.85	9.2	9.2
6 KLO	3/8	3/4	0.98	9.2	9.2
8 KLO	1/2	3/4	1.10	9.2	9.2
10 KLO	5/8	1 1/16	1.32	6.0	6.0
12 KLO	3/4	1 3/16	1.48	6.0	6.0
16 KLO	1	1 7/16	1.63	6.0	6.0
20 KLO	1 1/4	1 5/8	1.75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

Dimensions and pressures for reference only, subject to change.

PNLO

Plug
ORFS

SAE 520109



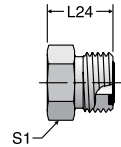
TUBE FITTING PART #	END SIZE	H HEX (in.)	OAL (REF) (in.)	TT (in.)	Dynamic Pressure (x 1,000 PSI)	
					-S	-SS
					1 (in.)	
4 PNLO	1/4	5/8	0.65	0.20	9.2	9.2
6 PNLO	3/8	3/4	0.75	0.32	9.2	9.2
8 PNLO	1/2	7/8	0.87	0.35	9.2	9.2
10 PNLO	5/8	1 1/16	1.02	0.41	6.0	6.0
12 PNLO	3/4	1 1/4	1.08	0.41	6.0	6.0
14 PNLO*	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
ORFS

ISO 8434-3 PL
SAE 52M0109

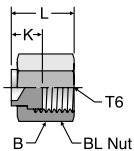


TUBE FITTING PART #	ORFS TUBE O.D.		L24 (mm)	S1 HEX (mm)	Dynamic Pressure (x 1,000 PSI)	
	(mm)	(in.)			S	SS
4PNMLO	6	1/4	16.5	17	9.2	9.2
6PNMLO	8,10	3/8	19.0	19	9.2	9.2
8PNMLO	12	1/2	22.0	22	9.2	9.2
10PNMLO	14,15,16	5/8	26.0	27	6.0	6.0
12PNMLO	18,20	3/4	27.5	32	6.0	6.0
16PNMLO	22,25	1	28.0	41	6.0	6.0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

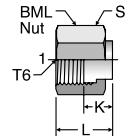


TUBE FITTING PART #	TUBE O.D. (in.)	T6 SWIVEL UN/UNF-2B	B HEX (in.)	K (in.)	L (in.)	Dynamic Pressure (x 1,000 PSI)	
						-S	-SS
4 FNL	1/4	9/16 - 18	11/16	0.35	0.66	9.2	9.2
6 FNL	3/8	11/16 - 16	13/16	0.41	0.74	9.2	9.2
8 FNL	1/2	13/16 - 16	15/16	0.47	0.87	9.2	9.2
10 FNL	5/8	1 - 14	1 1/8	0.53	1.02	6.0	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

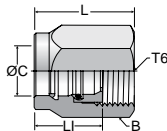
Cap
ORFS



TUBE FITTING PART #	TUBE O.D.		T6 SWIVEL UN/UNF-2B	K (mm)	L (mm)	S HEX (mm)	Dynamic Pressure (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 PART #	END SIZE (in.)	T6 UN/UNF-2B	B HEX (in.)	L (in.)	L1 (in.)	C	
						Nominal Nipple 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.