

## Features, JIC/ORFS Conversion Fittings

O-ring face seal fittings are intended for general application in industrial and commercial hydraulic systems, where the use of elastomeric seals is acceptable to prevent leakage. These fittings are capable of operating at working pressures from 28 in. Hg (95-kPa) vacuum to 6,000 psi (41.3 MPa) as specified in the tables below. Fitting styles are available to provide connections between tubing, male or female NPTF pipe and SAE J1926/1/ISO-11926-1 O-ring ports.

ORFS fittings supplied by Air-Way feature the SAE J1453 "Style B" O-ring groove design for the tube connection end, which provides improved O-ring retention.

ORFS fittings are typically joined to tubing by means of a braze on tube sleeve and tube nut. Tube preparation and brazing processes follow standard industry practices for high quality braze joints.

The design of the ORFS fitting tube end is identical for either inch or metric tubing. With the exception of stock size, the tube fittings described in this section are interchangeable with equivalent fitting styles (unions, bulkheads, tees, etc.) per ISO 8434-3.

37 degree flared tube fittings provide leakproof, full flow connections in hydraulic systems operating at working pressures as specified in the tables below. A large variety of fitting styles are available to allow connection of flared tube ends, machined male or female 37 degree ends or male or female NPTF pipe or hose ends. Also included in this section are low-pressure beaded hose stem fittings.

37 degree flared fittings are the most commonly used tube connection in worldwide use today. Tube preparation and flaring processes are easily accomplished with either hand or power tools. The large variety of fitting configurations and jump sizes available provide for simplified fabrication requirements and reduced parts count in complex systems.

The design of the 37 degree flared fitting tube end is identical for either inch or metric tubing. With the exception of stock size, the flared tube fittings described in this section are interchangeable with equivalent fitting styles (unions, bulkheads, tees, etc.) per ISO 8434-2.

All 37 degree fitting styles are also available with the optional **Flare-O™** tube end design. Call for details.

## Performance

Where applicable, fittings are designed and qualified to the requirements of SAE J1453 and J514.

## Construction

Unless otherwise specified, fittings are machined from carbon steel barstock and forgings. Standard plating is Zinc with a yellow Dichromate finish per ASTM B633 (Type II SC2) and is rated at 96 hours minimum salt spray resistance.

## Threads

**Straight Threads:** Internal and external straight threads conform to the Unified National Class 2A and Class 2B Series respectively, with modified minor diameters where specified. Plated external threads may conform to Class 3A maximum diameters after plating.

**NPTF Threads:** Male and female pipe threads conform to the Dryseal American Standard Taper Pipe Thread (SAE J476a, NPTF) Series which will provide pressure tight joints without the use of a lubricant or sealer. Use of these fittings with non-dryseal NPT pipe or hose ends is not recommended for high-pressure applications.

**Note:** Where not functionally objectionable, use of a compatible lubricant/sealant is recommended for either NPT or NPTF threads to minimize the possibility of galling in assembly.

## Assembly Information

For brazing and assembly instructions, refer to the Technical Data Section for the appropriate fitting end. Also, refer to the Technical Data Section for recommendations regarding tubing pressure ratings and hose/tube routing information.

Tubing for single flare tube ends should be either seamless or welded and drawn, fully annealed tubing per SAE J524 or J525. For double flaring, tubing per SAE J356, J524, J525 or J526 may be used.

For proper sealing with 37 degree flared fittings, flares for tubing should conform to the requirements of SAE J533. For heavy wall tubing, the optional tube preparation and single flare configuration specified in SAE J533 is also recommended. This optional configuration provides extended sealing surface contact area versus conventional flares.

Please note the following:

In the design and fabrication of tubing or hose runs for any hydraulic system, precautions should be taken to allow for sufficient adjustment of the hose or tubing so that proper alignment can be attained at the fitting connections. Improper fit-up or misalignment should be corrected before final connections are made. Location of fitting connections should be planned to maximize accessibility. Whenever possible, use a torque wrench to



tighten connections to the recommended installation torque.

Bulkhead fittings may be ordered with or without lock nuts. To order fittings with lock nut, add (-LN) suffix to base catalog part number.

### Ordering Information

Size of fittings are indicated by dash number relating to sixteenths of an inch for the nominal O.D of the tube size used. Example: 1/2 inch tube = 8/16 or (-8) size.

If information is needed for jump sizes not shown, please contact customer service for engineering assistance. Dimensions are rounded for brevity. Please contact factory for exact dimensions and tolerances.

Order standard fittings from appropriate chart indicating required dash numbers. For example, FF7403-8-8 is 1/2" ORFS tube end with 13/16-16 straight thread and 1/2" 37deg. male tube end with 3/4-16 straight thread. Jump size FF7403-8-6 is 1/2" ORFS tube end with 13/16-16 straight thread and 3/8" 37 deg male tube end with 9/16-18 straight thread. Pictorial views for each fitting style indicate the correct numbering sequence for fitting ends.

Nominal Tube Size		Thread Size (Notes 1&2)		Working Pressures					
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J1453 ORFS Tube End	SAE J1926/2/ ISO 11926-2 O-Ring Port Thread Size	ORFS Tube Ends, Unions and Bulkheads		Heavy Duty Stud Ends Per SAE J1926/2/ISO 11926-2			
						Non-Adjustable Studs		Adjustable Studs	
				Mpa	psi	MPa (3)	psi	MPa (3)	psi
-4	1/4	9/16-18 UNF	7/16-20 UNF	41.3	6,000	63	9,000	40	6,000
-5	5/16	5/8-18 UNF	1/2-20 UNF	41.3	6,000	63	9,000	40	6,000
-6	3/8	11/16-16 UNF	9/16-18 UNF	41.3	6,000	63	9,000	40	6,000
-8	1/2	13/16-16 UNF	3/4-16 UNF	41.3	6,000	63	9,000	40	6,000
-10	5/8	1-14 UNF	7/8-14 UNF	41.3	6,000	63	9,000	40	6,000
-12	3/4	1-3/16-12 UN	1-1/16-12 UN	41.3	6,000	40	6,000	40	6,000
-14	7/8	1-5/16-12 UN	1-3/16-12 UN	41.3	6,000	40	6,000	40	6,000
-16	1	1-7/16-12 UN	1-5/16-12 UN	41.3	6,000	40	6,000	31.5	5,000
-20	1 1/4	1-11/16-12 UN	1-5/8-12 UN	27.5	4,000	25	4,000	25	4,000
-24	1 1/2	2-12 UN	1-7/8-12 UN	27.5	4,000	25	4,000	20	3,000

1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)

2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts

3) MPa ratings for J1926/2/ISO 11926-2 stud ends are rationalized values as published in those standards.

Nominal Pipe Size		Thread Size	Working Pressures	
Nom SAE Dash Size	Nom Inch Pipe O.D.	Dryseal Pipe Thread (NPTF) Male and Female	Fittings With NPTF Pipe Threads	
			MPa	psi
-2	1/8	1/8-27	34.5	5,000
-4	1/4	1/4-18	27.5	4,000
-6	3/8	3/8-18	21	3,000
-8	1/2	1/2-14	21	3,000
-12	3/4	3/4-14	17	2,500
-16	1	1-11-1/2	14	2,000
-20	1 1/4	1-1/4-11-1/2	8	1,150
-24	1 1/2	1-1/2-11-1/2	7	1,000
-32	2	2-11-1/2	7	1,000

1) Dryseal American Standard Taper Pipe Thread



Nominal Tube Size		Thread Size	Working Pressures			
Nom SAE Dash Size	Nom Inch Tube O.D.	SAE J514 Flared Tube End and SAE J1926/3/ ISO 11926-3 O-Ring Port Thread Size (Notes 1&2)	37 Deg. Flared Tube Ends, Unions and Bulkheads		37 Deg. Female Swivels	
			MPa	psi	MPa	psi
-2	1/8	5/16-24 UNF	34.5	5,000	34.5	5,000
-3	3/16	3/8-24 UNF	34.5	5,000	34.5	5,000
-4	1/4	7/16-20 UNF	34.5	5,000	31	4,500
-5	5/16	1/2-20 UNF	34.5	5,000	27.5	4,000
-6	3/8	9/16-18 UNF	34.5	5,000	27.5	4,000
-8	1/2	3/4-16 UNF	31	4,500	27.5	4,000
-10	5/8	7/8-14 UNF	24	3,500	21	3,000
-12	3/4	1-1/16-12 UN	24	3,500	21	3,000
-14	7/8	1-3/16-12 UN	21	3,000	17	2,500
-16	1	1-5/16-12 UN	21	3,000	17	2,500
-20	1 1/4	1-5/8-12 UN	17	2,500	14	2,000
-24	1 1/2	1-7/8-12 UN	14	2,000	10.5	1,500
-32	2	2-1/2-12 UN	10.5	1,500	8	1,125

1) Threads per SAE J475 Class 2A ext. Class 2B int. (Ref. ISO-263/ISO-R725)

2) Unified class 2B threads apply to swivel nuts and with minor diameter modified to class 3B limits for locknuts

