

// ADAPTERS GUIDELINES

ADAPTER SELECTION

Selection of an appropriate ALFAGOMMA adapter for a given application depends on the fluid system operating parameters listed below and the tube material and wall thickness they require:

1. Type of fluid
2. Operating temperature range
3. Type of line - pressure, return or suction
4. Maximum flow rate through the line
5. Maximum operating / service pressure
6. Severity of service
7. Environment

Then, based on the tube selected and appropriate fluid system operating parameters, determine adapter type(s) and material(s) using the features comparison table below.

FEATURES COMPARISON OF TUBE FITTINGS				
Feature		ORFS	JIC 37°	BSP
Performance	Pressure capability*	Very High	Medium to High	Medium to High
	Seal Reliability	Excellent	Good	Very Good
		Elastomeric Seal	Metal to Metal Seal	Elastomeric Seal
		High tolerance to minor surface imperfections and damage. High tolerance to assembly variations.	Low tolerance to minor surface imperfections and damage. Low tolerance to assembly variations.	Low tolerance to minor surface imperfections and damage. Low tolerance to assembly variations.
Vibration Resistance in Rigid Systems	Excellent	Good	Very Good	
Tube Compatibility	Wall Thickness	All	Medium	Medium
	Critical Features	OD tolerance and hardness for flat tube, OD tolerance only for brazed tube	ID finish, wall thickness uniformity (concentricity) and hardness	OD tolerance and hardness
Assembly	Tube Preparation	Easy and quick (slower for sleeve brazing)	Easy and quick	Easy and quick (slower for welded nipple)
	Inspection	Easy and quick	Easy and quick	Critical, need experience
	Ease of Installation	Excellent, Minimum skill and training are necessary because of high tolerances to assembly variations	Good. Low tolerance to assembly variations. Requires skilled and trained personnel	
	Ease of Maintenance	Excellent, no tube entry	Very Good, Small tube entry	Good, Large tube entry
Temperature Capability Adapters without O-Ring	Steel	To be used only with O-ring	-65° F to 500° F	-65° F to 500° F
	Stainless Steel		-425° F to 1200° F	==
	Brass		-40° F to 400° F	==
Temperature Capability Adapters with O-Ring**	All Style of Adapter	-30 F to 250° F	-30 F to 250° F	-30 F to 250° F

* For details see Working Pressure Charts in the individual adapters section
 ** For details concerning O-ring see section "O-ring selection" and "Fluid Resistance Table"

JIC 37° ADAPTER (ISO 8434-2, SAE J514)

Main Features

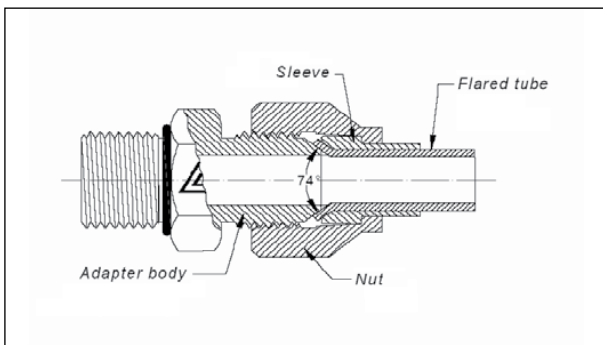
SAE J514 and ISO 8434-2, and commonly called 37° JIC adapters.

37° JIC adapter performs extremely well in all high pressure applications.

The seal is made by connecting a 37° flared tube surface to a 37° flare male and tightening by means of a nut and a sleeve. The flared tube avoids welded connection, so high performances are guaranteed even in case of severe vibrations, mechanic/hydraulic shocks and multiple assembly/disassembly operations.

When tightened, sleeve provides tube and adapter self alignment and helps to reduce the vibrations on the tube during application.

An appropriate choice of sleeve gives the possibility of assembling adapters with both metric and inch-tubes

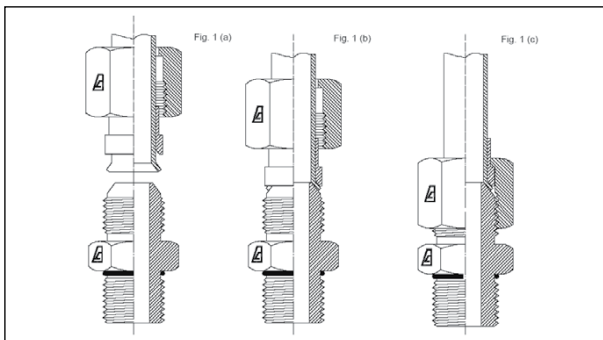


Flaring Operations

Perfect sealing is guaranteed with tubes having physical and mechanical characteristics obtained by cold-drawing and a ductility expressed as 21% of minimum elongation.

- Cut end of tube must be perpendicular to its axis . Note: cutting operation reduces the whole length of tube (almost $0,5 \pm 1$ mm for each end).
- Dimensions of the tube shall allow the correct placing on the flaring machine.
- Flared surface must be inspected to avoid excessive roughness and defects such as cracks or exfoliation.
- Length of flared zone shall be enough to allow a sufficient sealing surface and avoid the blowing off of the tube, but not excessive to prevent the contact with thread of the nut.

A well followed flaring procedure assures no leakage even after frequent assembling and disassembling operations.



ORFS ADAPTER (ISO 8434-3, SAE J1453)

Main Features

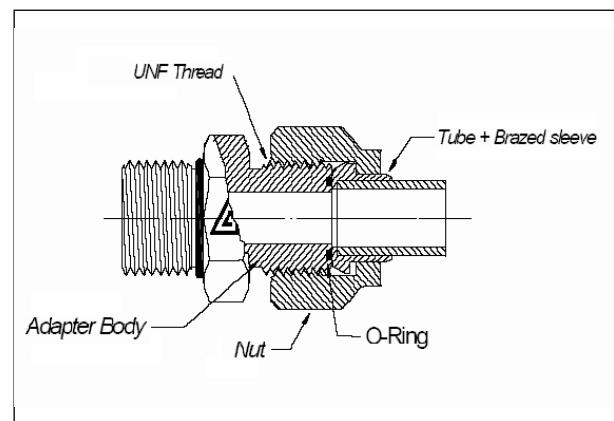
Adapters are designed and manufactured according to standard SAE J1453 and commonly called ORFS adapters.

O-Ring Face Seal adapters performs extremely well in all high pressure applications where elastomeric seals are needed to overcome leakage and leak resistance is crucial.

A seal is made when the O-Ring in the male contacts the 180° flat face of the tube. The male connector has a straight thread and a machined flat face. The seal takes place by compressing the O-Ring onto the flat face of the female.

ORFS system is composed by:.

- Nut.
- Sleeve for flat tube and a shouldered sleeve for brazing. An appropriate choice of sleeve gives the possibility of assembling adapters with both metric and inch-tubes.
- Various kind and size of adapter body.
- O-Ring material is NBR, Shore "A": 90, suitable for a temperature range of: $-30^{\circ}\text{C}/+130^{\circ}\text{C}$ ($-22^{\circ}\text{F}/+266^{\circ}\text{F}$).

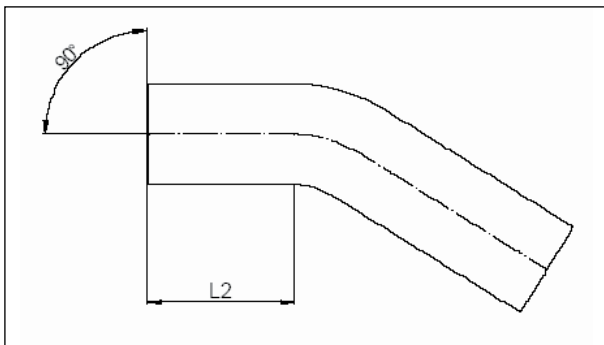


Flaring Tube Operations

Perfect sealing is guaranteed with tubes having physical and mechanical characteristics obtained by cold-drawing and a ductility expressed as 21% of minimum elongation.

- Cut end of tube must be perpendicular to its axis.
- Cutting operation reduces the whole length of tube.
- Dimensions of the end of the tube shall allow the correct placing on the flaring machine.
- Flared surface must be inspected to avoid excessive roughness and defects such as cracks or exfoliation.
- Brazing sleeve guarantees the same performances as the flared tube, and shall be used in the following cases:
- Tube is not in accordance with the above mechanical characteristics.
- The straight part of the tube is not of a sufficient length (see quote L2 and values listed in table of figure O-3).
- Tube thickness is lower than values listed in table (O-1).
- For cutting length consider shoulder of the sleeve (quote L1 of table O-1).

A well followed flaring procedure assures no leakage even after frequent assembling and disassembling operations.



Hose mm	L2 Min mm
Ø 6 - Ø 12	73
Ø 14 - Ø 18	100
Ø 20 - Ø 22	120
Ø 25 - Ø 42	130

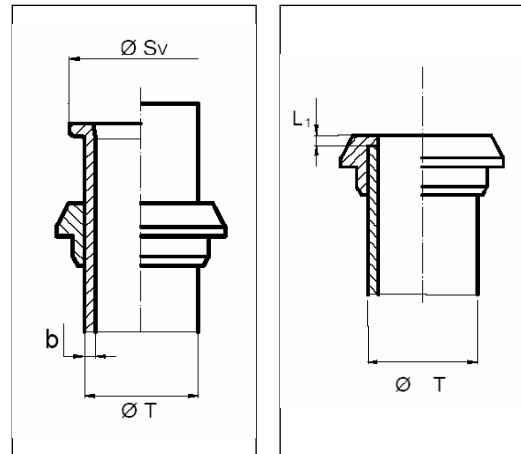
Only a few simple operations are required for assembling ORFS tube/adaptor.

Sleeve and Tube Flared:

- 1a) Place nut and sleeve on the tube with the appropriate orientation.
- 2a) Flare the tube (see procedure)
- 3a) Place the tube near seal surface of the adapter and screw by hand.
- 4a) Lock the adapter and tighten with a torque wrench

Brazed sleeve

- 1b) Cut the tube considering quote L1 of the sleeve (See Figure O-5);
- 2b) Clean and degrease accurately the end of the tube and the sleeve;
- 3b) Put the brazing ring into the sleeve
- 4b) Apply flux at the end of the tube and in the sleeve, then assemble the sleeve on the tube;
- 5b) Start brazing and be aware of not overheating flux material;
- 6b) Clean the connecting part and verify the good quality of weld around the external diameter of the hose;
- 7b) Complete the assembly procedure as described in points 3a) and 4a). See the correct installation torque in the attached table (O-2).



Hose		SV	
mm	In	mm	In
6	1/4	12,0	12,7
8	5/16	14,7	15,7
10	3/8	14,7	15,7
12	1/2	17,9	18,9
15		22,1	23,4
16	5/8	22,1	23,4
18		26,3	27,8
20	3/4	26,3	27,8
22		32,4	34,2
25	1	32,4	34,2
28		39,0	40,5
30		39,0	40,5
32	1.1/4	39,0	40,5
35		46,0	48,5
38	1.1/2	46,0	48,5

BSP ADAPTER (ISO 8434-6, BS 5200)

Main Features

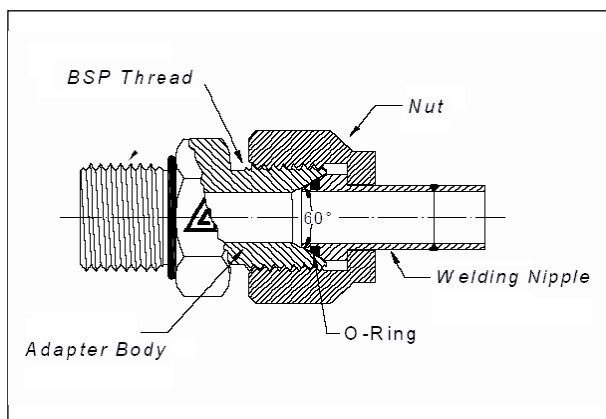
Adapters are designed and manufactured according to standard BS 5200, ISO 8434-6 and ISO 228-1 and they are commonly called BSP adapters (British Standard Pipe). BSP adapter is widely employed, it performs extremely well in all high pressure applications with oil and gas. The seal is made by connecting a 60° coned seat to the 60° male surface and tightening the nut assembly. The O-Ring placed in the tube groove improves the sealing. There are not welded part in the locking area and performances are good even after multiple assembly and disassembly operations, severe vibrations and mechanic/hydraulic shocks.

Assembling Procedure

Only a few simple operations are required for assembling BSP tube/adaptor:

- 1) Carefully align tube and adapter. Otherwise sealing is not guaranteed.
- 2) Lubricate accurately sealing surfaces with mineral oil or suitable lubricant.
- 3) Place the tube near seal surface of the adapter and tight by hand.
- 4) Lock the adapter and tighten with a torque wrench.

See the correct installation torque in the attached table B-1



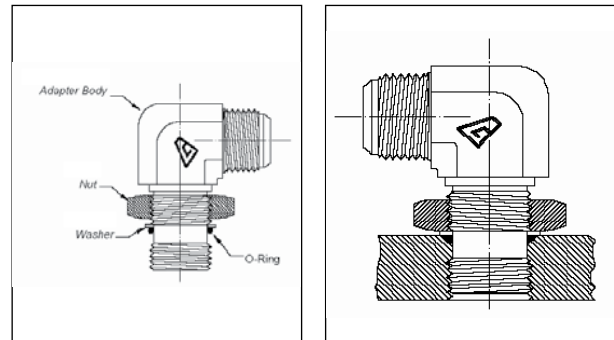
Assembly Instruction For Adjustable Adapter Thread: SAE, UNF, BSPP, Metric

Lubricate the O-Ring with mineral oil. Back off locknut as for as possible.

Make sure that washer is pushed-up as much as possible. Screw by hand the adapter into the port until the O-Ring enter the port.

To align adaptor orientation to tube end or hose assembly, unscrew the adaptor by the required amount, but not more than one full turn.

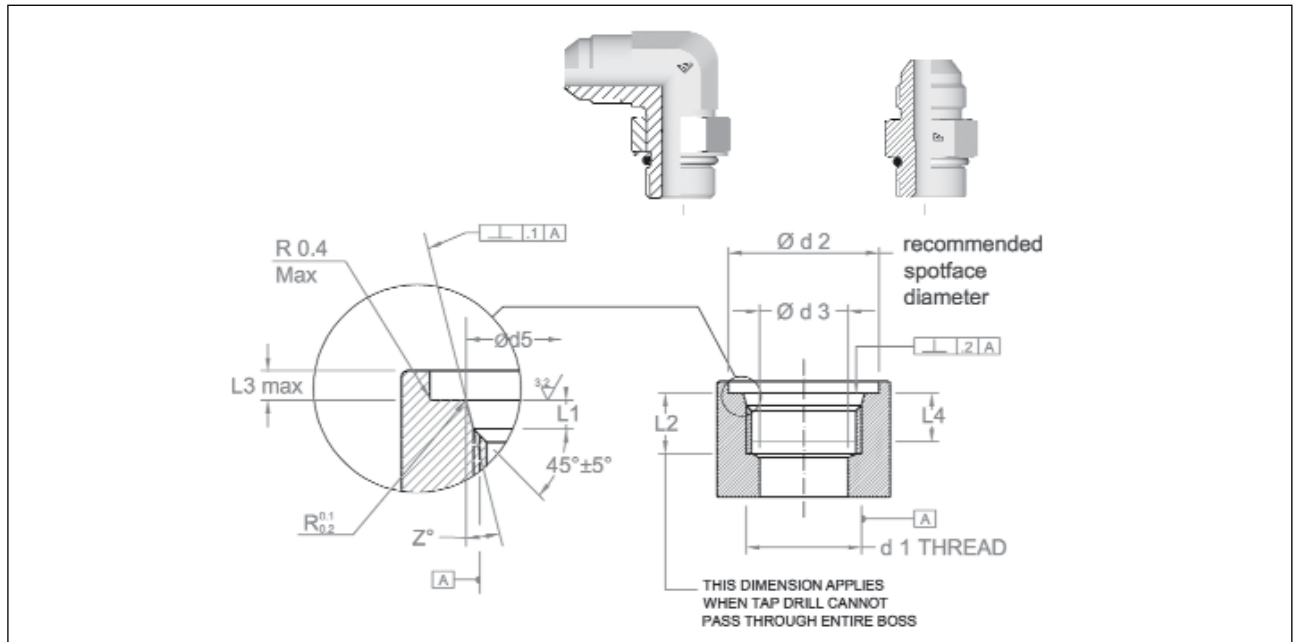
Hold the adapter in desired position by mean of a wrench and tighten locknut to the suggested torque value by means of a dynamometric wrench.



METRIC PORT - ISO 6149 - SAE 2244-1

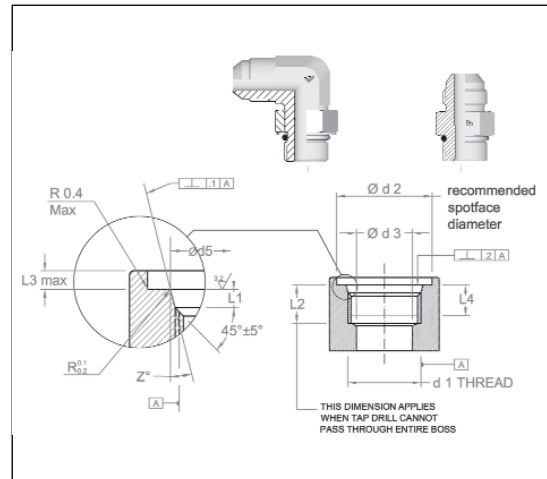
Metric Thread	D2 ²⁾ min	D3 ³⁾ min	D5 +0,10	D6 +0,50	L1 +0,40	L2 min	L3 max	L4	Z° ±1°	Assembly Torque +10%
D1	mm	mm	mm	mm	mm	mm	mm	mm		Nm
M8x1	17	14	9,1	14	1,6	11,5	1	10	12°	10
M10x1	20	16	11,1	16	1,6	11,5	1	10	12°	20
M12x1,5	23	19	13,8	19	2,4	14	1,5	11,5	15°	35
M14x1,51	25	21	15,8	21	2,4	14	1,5	11,5	15°	45
M16x1,5	28	24	17,8	24	2,4	15,5	1,5	13	15°	55
M18x1,5	30	28	19,8	26	2,4	17	2	14,5	15°	70
M22x1,5	34	29	23,8	29	2,4	18	2	15,5	15°	100
M27x3	40	34	29,4	34	3,1	22	2	19	15°	170
M33x2	49	43	35,4	43	3,1	22	2,5	19	15°	310
M42x2	60	52	44,4	52	3,1	22,5	2,5	19,5	15°	330
M48x2	66	57	50,4	57	3,1	25	2,5	22	15°	420
M60x2	76	67	52,4	67	3,1	27,5	2,5	24,5	15°	500

- 1) Preferred for diagnostic port application
- 2) Spotface diameter with identification ridge
- 3) Spotface diameter without identification ridge

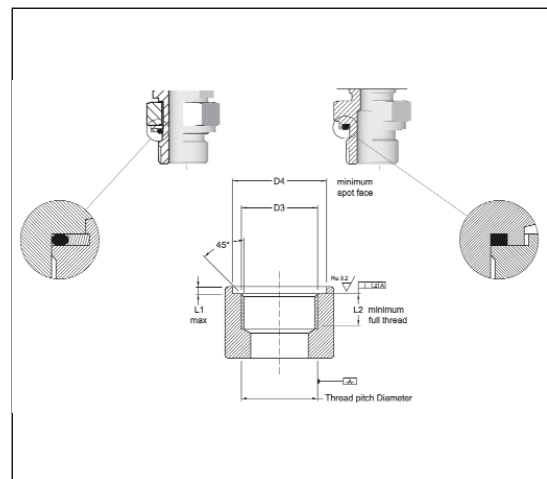


SAE UNF PORT - SAE J1926-1 - ISO 11926

ANSI B1.1	D2	D3 min	D3 +0,13	L1 +0,40	L2 min	L3 max	L4 min	Z° ±1°	Assembly Torque +10%
D1	mm	mm	mm	mm	mm	mm	mm		Nm
7/16"-20	21	4,4	12,4	2,4	14	1,6	11,5	12°	20
1/2"-20	23	6	14	2,4	14	1,6	11,5	12°	25
9/16"-18	25	7,5	15,6	2,5	15,5	1,6	12,7	12°	35
3/4"-16	30	10	20,6	2,5	17,5	2,4	14,3	15°	70
7/8"-14	34	12,5	23,9	3,3	20	2,4	16,7	15°	100
1" 1/16-12	41	16	29,2	3,3	23	2,4	19	15°	170

**BSPP PORT - ISO 9974 - DIN 3852-1**

ANSI B1.1 Thread	D3 +0.20	D4	L1 max	L2 min	Assembly Torque +10%
D1	mm	mm	mm	mm	Nm
1/8"-28	9,8	15	1	8	20
1/4"-19	13,2	20	1,5	12	50
3/8"-19	16,7	23	2	12	80
1/2"-14	21	28	2,5	14	100
3/4"-14	26,5	33	2,5	16	200
1"-11	33,3	41	2,5	18	380
1" 1/4-11	42	51	2,5	20	500
1" 1/2-11	47,9	56	2,5	22	600

**METRIC PORT - ISO 9974 - DIN 3852-1**

Metric Thread	D3 +0.20	D4 min	L1 max	L2 min	Assembly Torque +10%
D1	mm	mm	mm	mm	Nm
M12x1,5	12	18	1,5	12	35
M14x1,5	14	20	1,5	12	45
M16x1,5	16	23	1,5	12	55
M18x1,5	18	25	2	12	68
M20x1,5	20	27	2	14	80
M22x1,5	22	28	2,5	14	98
M27x2	27	33	2,5	16	180
M33x2	33	41	2,5	18	310
M42x2	42	51	2,5	20	330
M48x2	48	56	2,5	22	400

