



JIC FITTINGS

Literature



Introduction:



Figure 1 JIC Fittings

JIC Fitting is a range of hydraulic fittings which is made in accordance with SAE J514 and ISO 8434-2 standards. The acronym JIC stands for Joint Industry Council. It is also known as the JIC 37 degrees flare fitting because it has a 37 degrees flare seating surface.

These fittings are used on oil hydraulic systems in many fields (fuel delivery, fuel power application, shipbuilding, mobile hydraulic equipment, etc). A JIC fitting system has three components that make a tubing assembly: fitting, flare nut, and sleeve.

Material:

Materials used to fabricate JIC fittings include carbon steel and stainless steel SS316L .

Sizes:

JIC body and flare nut are available in outer diameter ("OD) sizes between 1/8" to 1 2". Sleeve has two different reading measurements, metric size (mm) and inch outer diameter ("OD). Sleeve size is available from 3mm to 50mm and 1/8" to 2". Fitting sizes are designated by the corresponding outside diameter of the tubing for the various types of tube ends.



Figure 2 Flare Nut

Working Pressure:

The standard working pressure of the fittings ranges from 1000 to 5000 psi for different sizes and connections. The minimum burst pressure is four times the working pressure. JIC fittings must be able to withstand twice the working pressure for a period of 1 minute without failure or leakage.

Please take note that the pressure rating of a same fitting may vary when it is connected to different equipment. For example, if a fitting with a low working pressure is connected to a pipe, it will result in an overall even lower working pressure. In all cases, always consider the lowest pressure as the maximum working pressure of the system.

How does a JIC fitting works:

For tube connections, the assembly procedure starts from the preparation of the tube. First, the nut and sleeve are inserted onto the end of a tube. With the use of a flaring tool, form the end of the tube to 37 degrees. Next, tighten the nut by using a spanner until the nut is tight and the sleeve grips onto the tube.

If the fittings are bench assembled, the gripping action can be determined by rotating the tube by hand as the nut is drawn down. When the tube can no longer be rotated by hand, the sleeve has gripped onto the tube. When this happens, tighten the nut by turning it one full turn. This may vary slightly with different tubing materials, but for general practice, it is a good rule to follow.

Configurations of JIC Fitting:

Commonly used connection types consist of: JIC/BSPP Male Connector, JIC/ NPT Male connector, JIC Union, JIC/NPT Swivel Male Connector , JIC/ BSPP Swivel Male Connector.

JIC Fittings Pressure Ratings:

Working pressure rates are based on SAE J514 standards and are capable of 4 to 1 minimum burst pressure ratings.

Tube OD (Metric)	Tube OD (Inch)	SAE J514 1), in psig	SAE J514 2), in psig	SAE J514 3), in psig
6	1/4	5000	5000	4500
8	5/16	5000	5000	4000
10	3/8	5000	4000	4000
12	1/2	4500	3000	4000
16	5/8	3500	3000	3000
20	3/4	3500	2500	3000
25	1	3000	2000	2500
32	1 1/4	2500	1150	2000
38	1 1/2	2000	1000	1500
50	2	1500	1000	1125

Note:

SAE J514 1), in psig is for Unions and bulkheads

SAE J514 2), in psig is for Fittings with pipe threads

SAE J514 3), in psig is for Fittings with female swivel

JIC Fittings Assembly Torque:

For JIC flare fittings, it is important to assemble the fittings within the designed torque values to be able to achieve the designed pressure as per SAE J514 standards. Under torque and over torque will result in design pressure loss. Therefore, please refer to the table below for JIC's torque assembly pressure.

Tube OD (Metric)	Tube OD (Inch)	Assembly Torque (Nm)	Over Torque (Nm)
6	1/4	15-16	24
8	5/16	19-21	31
10	3/8	24-28	42
12	1/2	49-53	80
16	5/8	77-85	114
20	3/4	107-119	160
25	1	147-154	214
32	1 1/4	172-181	271
38	1 1/2	215-226	339
50	2	332-350	497

Note: Over Torque causes deformation of the 37 degree cone of the male end. Excessive deformation of the cone results in loss of clamping force and pressure loss.

JIC Fittings Temperature Ratings:

Body Material Temperature Rating

JIC Fittings temperature ratings vary in accordance to the body material as per below:

Stainless Steel	-60°C to 200°C
Carbon Steel	-40°C to 150°C
Brass	-45°C to 175°C

Elastomer's Temperature Rating

When combining seal material, the temperature rating of the seal may become the limiting factor on the fitting's temperature rating. Kindly refer to the temperature rating below:

NBR	-23°C to 120°C (Default Option)
Viton	-20°C to 180°C

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