

## Leak Free Sealing Options

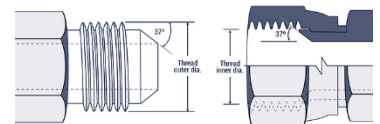


Working with fluids, gases, and solids the need to connect one component to another with a leak tight connection presents a multitude of challenges. Chemical and component compatibility are a must. Steel, brass, stainless steel and synthetics all have chemicals that they're compatible with and those that they're not. Some fittings require no sealant at all and utilize metal to metal connections, while others require seals, gaskets or O-rings made from Viton, nylon, rubber, Teflon, lead and more. Along with these materials there are numerous types of liquid sealers. The following is intended to just give you some basic knowledge with different options available to make connection that don't leak and will last.

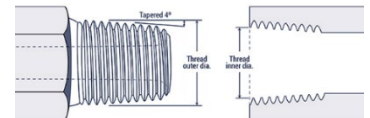
**Compression fittings** come in basically two types, Single-Ferrule or Dual-Ferrule, both compress a Ferrule onto the tube, wire or other material creating a seal. They are used in high- and low-pressure applications or just used to seal out the elements. Depending on the material needed ferrules can be made from copper, aluminum alloy, steel, stainless steel, plastic, ceramic and glass. Compression fittings can be over-tightened and must be used in accordance with the manufacture's guidelines. See a Dual Ferrule installation video at: [How to Assemble Tube Fittings](#)



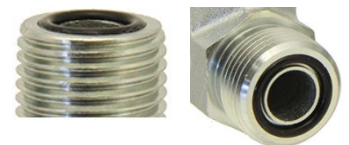
**JIC (Joint Industrial Conference)** – connectors seats on a metal-to-metal angled surface or flare seat face. JIC connectors utilize a 37-degree flare seat. The threads of this type of connector do not seal, the threads only squeeze the two mating surfaces together.



**NPT (National Pipe Tapered)** – NPT use a 30-degree tapered male and female thread that get tighter and tighter as they are screwed together. It seals by compressing the male and female tapered threads together and requires the addition on some type of additional sealant (see SEALANT below). Caution must be used when using any tapered thread due to the possibility of expanding the female half to the point of failure. This is easily done when using two dissimilar materials such as a steel male and female brass fitting.



**ORFS (O-ring Face Seal)** as the name implies us an O-ring recessed into the flat face of a fitting. When tightened, the O-ring is compressed between the flat face of the groove and the surface it's connecting to, allowing for a strong elastomeric seal. ORFS fitting require that the two metal components are tightened against one another to keep them from moving/rotating.



**ORB (O-Ring Boss)** – The ORB fitting seals using an O-ring locked between two surfaces. The threads on an ORB fitting are straight and have no taper.



Some ORB fittings have the ability to be rotated into position and secured with a lock nut thus allowing more directional control over hose or line positioning. This style fitting will have two wrench locations, one to thread it in and a second to secure in place (jam nut).



**Sealant** – Sealants may be a liquid, paste or thread tape. No matter the sealant selected it must be compatible with the product being used, for example, gasoline, water, propane etc. It is also just as important to verify that the sealant is compatible with the type of material, solid liquid or gas. Some sealants work well for gases but dissolve when exposed to the same product in its liquid form.

This video demonstrates just how important it is to use sealants the are compatible with the chemical involved.

[Importance of sealant and chemical incompatibilities video](#)

[From the internet](#)

### **Foreign threads**

*Foreign threads are the British standard pipe parallel threaded adapter (BSPP), the British standard pipe tapered threaded adapter (BSPT), and the Japanese tapered and parallel threaded fittings.*

Care must be used when ordering fittings including pressure gauges online to insure you are receiving a component with a thread that will mate and seal properly with what you have.

### **NPS, AN, or JIS**

#### **DIFFERENCE IN STANDARDS**

*The commonality between all these fittings is that they define how a component joins and seals to other hydraulic components like their female counterparts, pipes, hoses, and valve blocks. The sealing mechanism depends on the metal-to-metal contact achieved when two compatible fittings are linked.*

*Each standard is defined by the internal diameter, thread sizing dimensions of the adapter, the flare angle on their nose, and whether the threads run parallel or taper.*

#### **AN VS JIC:**

*The only difference between AN and JIC fittings is that AN fittings are manufactured as per more stringent tolerances for military applications.*

**JIS (Japanese Industry Standard)** - JIS tapered and parallel threads are the same as British standard pipe threads. The main difference is that parallel JIS threads have a 30° seat on the male end, and a 30° flared seat on the female ends. JIS tapered threads are the same as BSPT threads.

JIC and JIS connectors are NOT interchangeable

(See <https://www.jiayuanfitting.com/info/jis-vs-jic-fitting-standards-38546224.html> )

#### **JIS AND KOMATSU VS JIC:**

*JIS and Komatsu are similar in their appearance to JIC fittings; however, they have a 30° flare on their fittings as opposed to the 37° flare in JIC fittings. Additionally, JIS conforms to the BSP (British Standard Pipe) thread sizing and Komatsu to the millimeter.*

#### **SAE VS JIC:**

*The thread sizing in JIC fittings are based on SAE parallel running thread sizing. It is for this reason why SAE 45° flare thread fittings can thread onto JIC fittings; however, caution must be taken as they do not have the same flare angle for seating.*

**NOTE: NPT/NPS and BSP threads are not compatible. For more information see:**

<https://www.ralstoninst.com/news/story/the-difference-between-npt-bspp-and-bspt-seals> and

Additional information on connectors can be found at:

<https://www.hydraulicsdirect.com/Fitting-Thread-Chart-s/1934.htm>

<https://brennaninc.com/brennan-university-old/fitting-identification-introduction/>