Wouldn't it be nice if leak-free connections could last forever? Nice, yes, but not exactly realistic. The good news is that fitting designs have improved significantly over time, making it easier to assemble and reassemble most connections and conduct routine maintenance without increasing the risk of leak paths.

There are two common types of fittings, however, that generally rank poor for reusability. When dealing with tapered thread pipe and Joint Industry Council (JIC) or 37º flare fittings, in particular, anyone doing maintenance on a fluid system should always ask: can I reassemble this fitting or does it need to be replaced?

Tapered Thread Pipe Fittings
Torque-sensitive fittings have been around for many years, and if you are working on old equipment, you're likely to come across tapered thread pipe fittings. They use a thread interface to make a metal-to-metal seal that generally is supplemented with the use of a sealant such as tape or paste. Repeated assembly and disassembly can distort the threads, so it's important to thoroughly inspect the threads for damage before reusing one of these fittings, as shown in Figure 1.

Figure 1: Fitting at sixth thread – this is maximum depth.

Ideally, you should replace the male fitting any time you disassemble a tapered thread fitting. But, if you're being frugal and want to try to reuse a fitting, here's a quick way to determine if your re-connection will be leak-free:

1. Are more than six threads engaging? In other words, has the sixth thread from the end gone into the female port?
2. Does it take more than two turns of sealant tape to make a seal?

If you answered yes to either of these questions, you should definitely replace the fitting. Why? Because six or more threads indicate that the threads are already damaged, and more than two turns of sealant tape is likely to crack the female port.

Also, be careful with the use of sealants on pipe threads. If some of the sealant gets into the hydraulic system, it can clog and cause other problems.

JIC 37º Flare Fittings
Tubing connections are made with cone, flare and O-ring connectors, and one of the most often used is the JIC 37º flare fitting, especially in high-pressure applications. Though the industry generally accepts that JIC 37º flare fittings are reusable, they may not always be reliable when reused. In fact, the JIC 37º flare fitting tops the Most Questionable list for reassembly.

JIC 37º flare fittings have a cone on the female adapter and a flare on the male adapter. The cone and flare seat against one another to create a complete mechanical seal between the male and female fitting. But, each time the metal-to-metal seal is made, the cone and flare further collapse, causing the material to be cold-worked. The result is a harder metal, which makes each subsequent assembly more difficult and problematic on two fronts: a leaking seal and reduced flow due to excessive nose collapse.
How can you determine if a JIC connection is reusable or not? Measure the amount of nose collapse and make certain that the hole diameter reduction is no more than 10 percent, as shown in Figure 2. For example, if the original hole diameter on a female cone adapter is 0.5 inches and it has been reduced to 0.45 inches or smaller, the fitting should be replaced. For a quick check, a pin gauge works well.

Do you have any tips or stories about reassembling fittings that you would like to share? If so, please send them along! As always, if you have any questions or comments, please post them and I’ll respond if warranted. If you want to talk to me directly, I can be reached at Parker Tube Fittings Division, 614.279.7070.

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