

## Fitting Instructions

Valco fittings are available in various metals (for use with metal tubing) and in PEEK (for use with PEEK tubing.) While metal ferrules can be used with PEEK and other polymeric tubing, polymeric ferrules (including PEEK) should *not* be used with metal tubing. The Valco Zero Dead Volume fitting is comprised of four parts: a female zero volume fitting detail, a male nut, a ferrule, and a length of tubing. (See Figure 1) Since the leak-tightness and integrity of the fitting is dependent upon tubing preparation and proper assembly, this publication addresses those two topics.

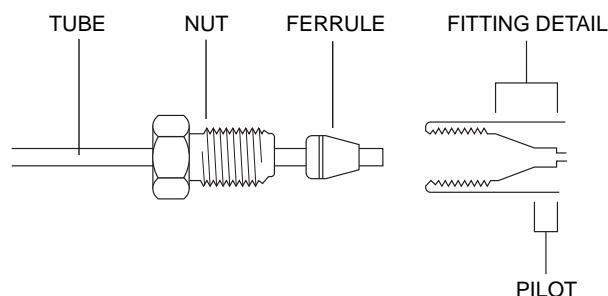


Figure 1: Parts of a Valco fitting

## Metal Tubing Preparation

### Cutting and Polishing

Since the tubing is an integral part of the fitting, it must be properly prepared if the entire fitting is to function as designed. To insure trouble-free service, Valco suggests purchasing our electrolytically pre-cut and polished tubing, available in stainless steel, electroformed nickel, Nickel 200, Hastalloy C, and other materials.

If other tubing is to be used, make certain that all tubing ends are cut square with the tube axis, and that both the ID and the OD are thoroughly deburred.

Next, inspect the end of the tubing where the ferrule will seat for scratches along its length. (**Figure 2**) Visible scratches along the tubing where the ferrule will seat are not acceptable, but those behind the front edge of the ferrule will not interfere with the integrity of the fitting. Minor scratches can often be eliminated by folding a small piece of fine emery cloth or wet-or-dry sandpaper (200 to 400 grit) around the end of the tubing and rolling the tubing between two fingers. This leaves concentric axial lines in the area where the ferrule seats, which, while not ideal, are less likely to cause a leak than longitudinal scratches.

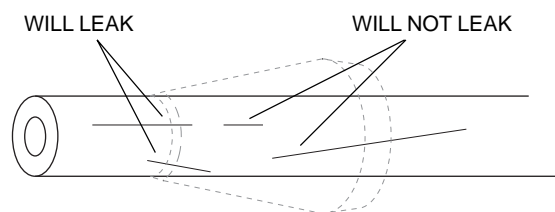
NOTE: Electropolishing is generally not successful as a repair for bad tubing, as it often simply rounds off the edges of a scratch without removing it.



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**Figure 2:** Scratches on tubing

## Cleaning

After it has been polished, the tubing must be cleaned to remove residual metal shavings and grit from the sand paper. This is best accomplished by using a syringe or pipette to force a solvent such as methyl or isopropyl alcohol or acetone through the tubing and then drying it with clean, dry compressed air or carrier gas.

### **CAUTION:**

Exercise good laboratory safety practices when using solvents, particularly when subjecting them to pressure.

## Polymeric Tubing Preparation

Polymeric tubing should be clean, with ends cut square to the tube axis and free of external and internal burrs. Our Clean Cut tubing cutter, product number JR-797, does a good job.

## Fitting Assembly

1. Slide the nut and ferrule onto the tubing in the order shown in **Figure 1**.
2. Insert this assembly into the fitting detail, screwing the nut in two or three turns by hand.
3. Push the tubing all the way forward into the detail so that it seats firmly. This is essential for a proper Zero Dead Volume connection.
4. Manually turn the nut into the detail until it is finger tight.
5. Using the appropriate open end wrench, turn the nut 1/4 turn (90°) past the point where the ferrule first starts to grab the tubing. Fittings larger than 1/8" will require more than 1/4 turn (as much as 180°). The amount of force required can vary considerably due to the friction between the nut and the threads and the composition and wall thickness of the tubing used. Because of these variables a torque specification is unreliable.

North America, South America, and Australia/Oceania contact:

**VICI® Valco Instruments Co. Inc.**  
 P.O. Box 55603  
 Houston, TX 77255  
 Sales: (800) 367-8424  
 Tech: (713) 688-9345  
 Fax: (713) 688-8106 valco@vici.com

Europe, Asia, and Africa contact:

**VICI® VICI AG International**  
 Parkstrasse 2  
 CH-6214 Schenkon  
 Switzerland  
 Phone: +41 41 925 6200  
 Fax: +41 41 925 6201 info@vici.ch  
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