

## UltiMetal Plus Flexible Metal Ferrule Trouble Shooting

### Asymmetry / Leaking connections

After pre-swaging the UltiMetal Plus Flexible Metal ferrule onto the column tubing, inspect the ferrule for symmetry.

If the ferrule appears distorted, as shown by the figure on the left in the photo below, it is likely that the swaging tool (or swaging nut) has been damaged from over tightening using standard metal ferrules.

Over tightening of hard metal ferrules, like Siltite ferrules, can damage the threads or sealing face of metal fittings. Once a fitting has been distorted, the flexible metal ferrules may not seat properly, resulting in leaks.



Wrong

Correct

Replace the swaging nut or swaging tool, and repeat the process with a new flexible metal ferrule and the new hardware.

Asymmetry can also occur if the instrument of Capillary Flow Technique device has been damaged. Inspect the ferrule for asymmetry is experiencing leaking when connecting the column in the fitting.

### Column Breakage

The Flexible Metal ferrule was designed to be forgiving during the swaging process to reduce column breakage. However, they can still be over tightened, resulting in column damage.

The table below provides guidance for each flexible ferrule part number on how much torque is required to pre-swage a flexible metal ferrule onto the appropriate column tubing.

Part Number	Column ID	Angle, loose till swaged
G3188-27501	0.1 - 0.25mm fused silica	50 to 100 degrees
G3188-27502	0.32mm fused silica	30 to 70 degrees
G3188-27503	0.53mm fused silica	20 to 50 degrees
G3188-27504	No hole	60 degrees

G3188-27505	0.25-0.32mm UltiMetal tubing	40 to 90 degrees
G3188-27506	0.53mm UltiMetal tubing	20 to 50 degrees

Use small (5 to 15 degrees at a time) increments when approaching the target angle on the table. Check to see if the ferrule is gripping the column each time, stop as soon as gripping occurs.

To make the column connection in the fitting, again use small (10-20 degree) increments with the ¼ inch open end wrench until a reliable, leak free seal is made. This applies to all sizes of the Flexible Metal ferrule.

The design of the flexible metal ferrule reduces the probability of column breakage. However rotating the wrench more than the recommended degrees may result in damage to the fragile column.

Unlike other ferrule designs, a reliable leak free seal is best made with *the minimally recommended torque* – not more. Applying more torque will not provide a better seal. By compressing the flexible ferrule less, the column can be removed and reinstalled with the same ferrule.

#### Stuck Ferrules

Properly swaged (not over tightened) Flexible Metal ferrules can usually be extracted from the fitting with removal of the internal nut. If the ferrule does not release from the fitting, insert a pointed object (thumb pin, paper clip) into the ferrule release hole (see below) and press firmly. You will hear a click as the ferrule releases.

