

Stainless Steel Quarter-Turn

The Swagelok® Stainless Steel Hinging Action Demonstration is an effective way of illustrating what takes place inside the Swagelok tube fitting as it is being installed. This presentation provides a more in-depth and defined view of how the advanced geometry back ferrule works and is an excellent follow-up to the Mr. Smith Tube Fitting Installation and Brass Quarter Turn demonstrations.

1. Finger-tight Position

Tubing must be concentric and free of burrs prior to our quarter-turn increment pull-up.

2. One-Quarter Turn

- The nut has now moved 0.0125 in. [0.32 mm] forward
- Back ferrule nose begins to contact tubing surface
- Front ferrule is driven forward-Polishing action has started on the fitting body bevel
- Front ferrule has begun to make contact on tubing O.D.

3. One-Half Turn

- The nut has now moved 0.025 in. [0.64 mm] forward
- Front ferrule drives forward
- Back ferrule nose continues to hinge inward
- More polishing action on the fitting body bevel
- One distinct ridge on tubing I.D. caused by the front ferrule

4. Three-Quarter Turn

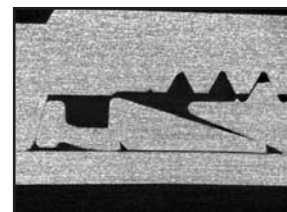
- The nut has now moved 0.0375 in. [0.95 mm] forward
- The front ferrule has made increased contact on the tubing
- Additional polishing of the fitting body bevel has occurred
- A second ridge can be visually confirmed on the I.D. of the tubing, which indicates back ferrule contact has begun to take place
- The back ferrule continues to hinge inward and nose indents the tube

5. One Turn

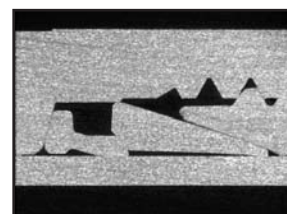
- The nut has now made one complete revolution and has traveled a distance of 0.050 in. [1.27 mm] forward
- Both ferrules are tight on the tubing with virtually no axial movement
- Polishing action of the body taper is now complete
- Front ferrule has stopped forward motion and trailing edge rises to live load the seal
- Back ferrule continues to hinge. Rear flange lifts upward, redirecting the center section downward focusing more force on colletting of the tube
- Two distinct ridges can now be seen on the tubing I.D., which have been created by the swaging action of the front and back ferrule

6. One-and-One-Quarter Turns

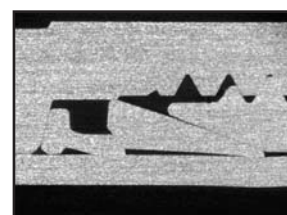
- The nut has now traveled 0.0625 [1.59 mm] and has completed the proper installation procedure of the Swagelok tube fitting. Verification of this installation can now be accomplished with the gap inspection gauge.
- No axial movement of the ferrules on the tubing O.D.
- Back ferrule has fully hinged supporting the tubing outboard of the grip point
- The front ferrule is completely live loaded to impart a vibration resistant, leak tight seal
- Distinct front and back ferrule ridges can be clearly seen on the tubing I.D.
- Upon disassembly, the tubing must be worked out of the fitting body since the tubing is enlarged ahead of the ferrules



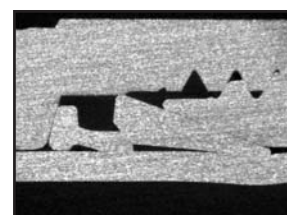
Finger-Tight Position



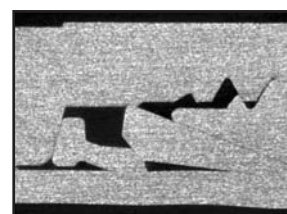
One-Quarter Turn



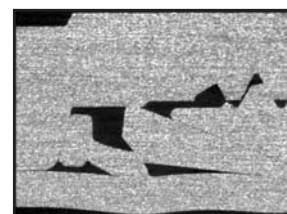
One-Half Turn



Three-Quarter Turn



One Turn



One-and-One Quarter Turns

Brass Quarter-Turn

The Swagelok® Brass Quarter-Turn Demonstration is an effective way of illustrating what takes place inside the Swagelok tube fitting as it is being installed. This presentation provides a more in-depth and defined view of how the Swagelok tube fitting works and is an excellent follow-up to the Mr. Smith Tube Fitting Installation demonstration. It is important to remember that prior to the quarter-turn demonstration, it is essential to discuss both the characteristics of the Leakage Formula and the forward movement of the nut in measured increments, which describes the reasoning behind consistent Gaugeability.

1. Finger-tight Position

- Tubing must be concentric and free of burrs prior to our quarter-turn increment pull-up.

2. One-Quarter Turn

- The nut has now moved 0.0125 in. [0.32 mm] forward
- Both ferrules are still loose on the tubing
- Polishing action has started on the fitting body bevel
- Front ferrule only has begun to make contact on tubing O.D.
- Slight ridge, created by the front ferrule is visible on tubing I.D.

3. One-Half Turn

- The nut has now moved 0.025 in. [0.64 mm] forward
- Front ferrule has made contact with the tubing O.D. but some movement may still occur
- Back ferrule has not made contact and moves freely on tubing
- More polishing action on the fitting body bevel
- One distinct ridge on tubing I.D. caused by the front ferrule

4. Three-Quarter Turn

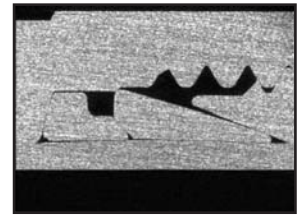
- The nut has now moved 0.0375 in. [0.95 mm] forward
- The front ferrule has made increased contact on the tubing
- Although some movement may still exist, the back ferrule is now making contact on the tubing O.D. and the gap between the back and front ferrule has been significantly reduced
- Additional polishing of the fitting body bevel has occurred
- A second ridge can be visually confirmed on the I.D. of the tubing, which indicates back ferrule contact has begun to take place

5. One Turn

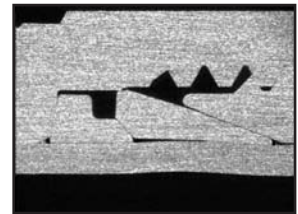
- The nut has now made one complete revolution and has traveled a distance of 0.050 in. [1.27 mm] forward
- Both ferrules are tight on the tubing with virtually no axial movement
- Polishing action of the body bevel is now complete
- Two distinct ridges can now be seen on the tubing I.D., which have been created by the swaging of the front and back ferrules.
- Front ferrule trailing edge rises to live load the seal.

6. One-and-One-Quarter Turns

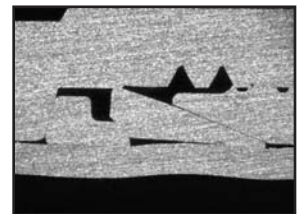
- The nut has now traveled 0.0625 [1.59 mm] and has completed the proper installation procedure of the Swagelok tube fitting. Verification of this installation can now be accomplished with the gap inspection gauge.
- No axial movement of the ferrules on the tubing O.D.
- Front ferrule fully loaded to maintain seal
- Distinct front and back ferrule ridges can be clearly seen on the tubing I.D.
- Upon disassembly, the tubing must be worked out of the fitting body since the tubing is enlarged ahead of the ferrules



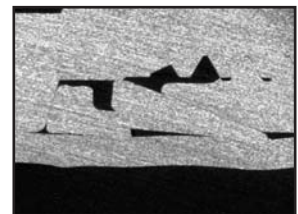
Finger-Tight Position



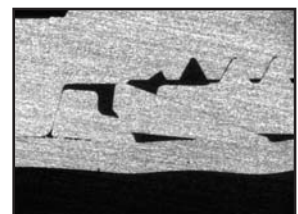
One-Quarter Turn



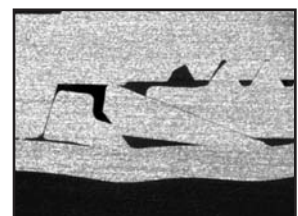
One-Half Turn



Three-Quarter Turn



One Turn



One-and-One-Quarter Turns