



## Product Test Report

**PTR-3562**

Swagelok Company  
29500 Solon Road  
Solon, Ohio 44139 U.S.A.

Ver 02  
November 2018  
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### TITLE

Nitrogen Gas Seal Test with Repeated Reassembly of Tungum® Tubing with Stainless Steel Swagelok® Tube Fittings

### PRODUCT TESTED

Samples Tested	Tungum Tubing Size OD x Wall in.	Tubing Hardness 15T	Working Pressure psig (bar)	Part Description Ordering Number
12	1/4 x 0.028	82	4000 (275)	Union Straight SS-400-6
12	1/4 x 0.065	81	10 200 (702)	Union Straight SS-400-6
12	3/8 x 0.035	84	3300 (227)	Union Straight SS-600-6
12	3/8 x 0.065	82	6500 (447)	Union Straight SS-600-6
12	1/2 x 0.049	82	3700 (254)	Union Straight SS-810-6
12	1/2 x 0.083	83	6700 (461)	Union Straight SS-810-6
12	3/4 x 0.065	84	3300 (227)	Union Straight SS-1210-6
12	3/4 x 0.109	84	5800 (399)	Union Straight SS-1210-6
12	1 x 0.109	83	4200 (289)	Union Straight SS-1610-6
12	1 x 0.120	84	4700 (323)	Union Straight SS-1610-6

### PURPOSE

These assemblies were tested under laboratory test conditions to observe the gas seal reassembly performance of stainless steel Swagelok tube fittings when installed on Tungum tubing.

### TEST CONDITIONS

Original Test Date: January 2014

- Each sample tested consisted of one tube length and two test fittings. The fittings were assembled according to the Swagelok tube fitting installation instructions.
- Testing was completed in a room temperature laboratory environment.



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### TEST METHOD

#### Hardness Measurements of Tubing:

1. Performed five hardness measurements equally spaced apart on each tube OD using the 15-T scale with the 1/16-inch diameter ball penetrator.
2. Reported the average of the five measurements.
3. Added the tubing cylindrical values taken from the Wilson Chart #53 Cylindrical Conversion Table.

#### Gas Seal Testing

1. The samples were attached to a positive pressure gas test stand, submerged in water, and pressurized to working pressure with nitrogen gas for a minimum of 10 minutes.
2. If leakage was observed, the pressure was dropped and samples showing leaks were tightened with a 1/8 turn of the nut. Step 1 was then repeated.
3. If leakage was not observed, the pressure was increased to 1.25 times working pressure for a minimum of 10 minutes.

#### Gas Seal Reassembly Testing

4. The pressure was dropped, and the samples were disassembled and reassembled according to Swagelok reassembly instructions.
5. The samples were tested for a minimum of 10 minutes at 1 times working pressure and 1.25 times working pressure.
6. Steps 4 and 5 were repeated at the reassembly points described in the test results tables. The acceptance criterion was less than 1 bubble per minute at the applied pressure.

### TEST RESULTS

Tubing Size OD × Wall in.	1.25 × WP psig (bar)	Samples (End Connections) Tested	Number of Acceptable Samples		
			After Standard Assembly and Initial Test	After Additional 1/8 Turn and Retest	After 1, 5, 10, 15, 20 and 25 Reassemblies
1/4 × 0.028	5000 (344)	24	24 / 24	Not applicable	23 / 24 <sup>①</sup>
1/4 × 0.065	12 750 (878)	24	24 / 24	Not applicable	23 / 24 <sup>①</sup>
3/8 × 0.035	4125 (284)	24	24 / 24	Not applicable	23 / 24 <sup>②</sup>
3/8 × 0.065	8125 (559)	24	24 / 24	Not applicable	23 / 24 <sup>②</sup>
1/2 × 0.049	4625 (318)	24	24 / 24	Not applicable	24 / 24
1/2 × 0.083	8375 (577)	24	24 / 24	Not applicable	24 / 24

① One fitting end leaked at reassemblies 1 and 5, but sealed upon subsequent reassemblies.

② One fitting end leaked at reassemblies 5 and 10, but sealed upon subsequent reassemblies.



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Tubing Size OD x Wall in.	1.25 x WP psig (bar)	Samples (End Connections) Tested	Number of Acceptable Samples		
			After Standard Assembly and Initial Test	After Additional 1/8 Turn and Retest	After 1, 5, and 10, Reassemblies
3/4 x 0.065	4125 (284)	24	24 / 24	Not applicable	24 / 24
3/4 x 0.109	7250 (499)	24	24 / 24	Not applicable	24 / 24
1 x 0.109	5250 (361)	24	24 / 24	Not applicable	24 / 24
1 x 0.120	8875 (611)	24	24 / 24	Not applicable	24 / 24

**The tests were conducted beyond the product's recommended operating parameters and do not modify the published product ratings.**

These tests were performed to consider a specific set of conditions and should not be considered valid outside those conditions. Swagelok Company makes no representation or warranties regarding these selected conditions or the results attained there from. Laboratory tests cannot duplicate the variety of actual operating conditions. See the product catalog for technical data.

### SAFE PRODUCT SELECTION

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

### Referenced Documents

*Wilson Cylindrical Correction Chart # 53*, Wilson Instrument Division, 929 Connecticut Avenue, Bridgeport, CT 06602