



Product Test Report

PTR-3780

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

Ver 03
December 2022
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TITLE

Nitrogen Gas Seal Test with Repeated Reassembly of Alloy 825 Tubing with Stainless Steel Swagelok® Tube Fittings

PRODUCT TESTED

Samples Tested	Alloy 825 Tubing Size OD x Wall in.	Tubing Hardness 15-T	Working Pressure psig (bar)	Part Description Ordering Number
6	1/4 x 0.035	88	6400 (440)	Union Straight SS-400-6
6	1/4 x 0.065	87	10 200 (702)	Union Straight SS-400-6
6	3/8 x 0.035	85	4100 (282)	Union Straight SS-600-6
6	3/8 x 0.065	84	7500 (516)	Union Straight SS-600-6
6	1/2 x 0.049	84	4300 (296)	Union Straight SS-810-6
6	1/2 x 0.065	84	5900 (406)	Union Straight SS-810-6
6	3/4 x 0.065	84	3800 (261)	Union Straight SS-1210-6
6	3/4 x 0.095	84	5800 (399)	Union Straight SS-1210-6
6	1 x 0.083	83	3600 (248)	Union Straight SS-1610-6
6	1 x 0.109	83	4200 (289)	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 alloy 825 tubing.

TEST CONDITIONS

Original test date: November 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 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 at least 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 tightening. Step 1 was then repeated.
3. If leakage was not observed, the pressure was increased to 1.25 times working pressure for at least 10 minutes.

Gas Seal Reassembly Testing

4. The pressure was decreased to zero, and the samples were disassembled and reassembled according to Swagelok reassembly instructions.
5. The samples were tested for at least 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.



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TEST RESULTS

Alloy 825 Tubing Size OD x Wall in.	1.25 x WP psig (bar)	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
1/4 x 0.035	8000 (551)	12	12 / 12	Not applicable	11 / 12 ^①
1/4 x 0.065	12 750 (878)	12	12 / 12	Not applicable	12 / 12
3/8 x 0.035	5125 (353)	12	12 / 12	Not applicable	11 / 12 ^②
3/8 x 0.065	9375 (645)	12	12 / 12	Not applicable	11 / 12 ^③
1/2 x 0.049	5375 (370)	12	12 / 12	Not applicable	12 / 12
1/2 x 0.065	7375 (508)	12	12 / 12	Not applicable	11 / 12 ^②
3/4 x 0.065	4750 (327)	12	12 / 12	Not applicable	11 / 12 ^③
3/4 x 0.095	7250 (499)	12	12 / 12	Not applicable	10 / 12 ^{②③}
1 x 0.083	4500 (310)	12	12 / 12	Not applicable	12 / 12
1 x 0.109	5250 (361)	12	12 / 12	Not applicable	12 / 12

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

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

③ One fitting end leaked at reassembly 1, but sealed upon subsequent reassemblies.

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. 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