



Product Test Report

PTR-3269

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

Ver 02
December 2022
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TITLE

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

PRODUCT TESTED

Samples Tested	Alloy 825 Tubing Size OD x Wall in.	Tubing Hardness 15-T	Test Pressure psig (bar)	Part Description Ordering Number	Part Description Ordering Number
12	3/4 x 0.065	78	3800 (261)	Union Straight 825-1210-6	Union Elbow 825-1210-9
12	3/4 x 0.095	78	5800 (399)	Union Straight 825-1210-6	Union Elbow 825-1210-9
12	1 x 0.083	80	3600 (248)	Union Straight 825-1610-6	Union Elbow 825-1610-9
12	1 x 0.109	84	4200 (289)	Union Straight 825-1610-6	Union Elbow 825-1610-9

Samples Tested	Alloy 825 Tubing Size OD x Wall mm	Tubing Hardness 15-T	Test Pressure bar (psig)	Part Description Ordering Number	Part Description Ordering Number
12	18 x 1.5	83	240 (3483)	Union Straight 825-18M0-6	Union Elbow 825-18M0-9
12	18 x 2.5	87	400 (5805)	Union Straight 825-18M0-6	Union Elbow 825-18M0-9
12	25 x 2.0	80	240 (3483)	Union Straight 825-25M0-6	Union Elbow 825-25M0-9
12	25 x 2.8	81	300 (4354)	Union Straight 825-25M0-6	Union Elbow 825-25M0-9

PURPOSE

These assemblies were tested under laboratory test conditions to observe the gas seal reassembly performance of alloy 825 Swagelok tube fittings when installed on alloy 825 tubing.

TEST CONDITIONS

Original test date: November 2012

- 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 with the United Hardness Tester 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 Remake 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.
4. The pressure was dropped, and all samples were disassembled and reassembled one time according to Swagelok tube fitting installation instructions. This constitutes 1 reassembly of the fitting. Steps 1 and 3 were then repeated.
5. Samples were reassembled according to step 4 and tested for at least 10 minutes at 1 times working pressure and 1.25 times working pressure at the 5th and 10th reassembly.
6. Samples were monitored for leakage throughout the test. The acceptance criterion was less than 1 bubble per minute at the applied pressure.



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TEST RESULTS

Tubing Size OD x Wall in.	1.25 x Test Pressure psig (bar)	End Connections Tested	Number of Acceptable Samples		
			After Standard Assembly and Initial Test	After Additional 1/8 Turn and Retest	After 10 Reassemblies
3/4 x 0.065	4750 (327)	24	24 / 24	24 / 24	23 / 24 ^①
3/4 x 0.095	7250 (500)	24	24 / 24	24 / 24	24 / 24
1 x 0.083	4500 (310)	24	23 / 24	24 / 24	23 / 24 ^①
1 x 0.109	5250 (361)	24	24 / 24	24 / 24	24 / 24

① One fitting leaked at the 10th reassembly; upon reassembly, no leakage was detected.

Tubing Size OD x Wall mm	1.25 x Test Pressure psig (bar)	End Connections Tested	Number of Acceptable Samples		
			After Standard Assembly and Initial Test	After Additional 1/8 Turn and Retest	After 10 Reassemblies
18 x 1.5	300 (4354)	24	24 / 24	24 / 24	24 / 24
18 x 2.5	500 (7256)	23	23 / 23	23 / 23	23 / 23
25 x 2.0	302 (4383)	32	29 / 32	30 / 32 ^①	32 / 32
25 x 2.8	375 (5442)	24	24 / 24	24 / 24	24 / 24

① Two fittings leaked after the additional 1/8 turn; upon reassembly, no leakage was detected.

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. Test results are not offered as statistically significant. 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