



## Product Test Report

**PTR-394**

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

Ver 05  
November 2018  
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### TITLE

Hydrostatic Pressure Test of 316 Stainless Steel Swagelok® Tube Fittings with 1 Turn of Fitting Nut Assembly on Extra Heavy-Wall, Normal to Extra-Hard Tubing

### PRODUCT TESTED

The following bar stock and forged body Swagelok tube fittings were tested 316 stainless steel seamless tubing.

Ordering Number	Part Form	Tubing Size	Tubing Hardness HRB
<b>Fractional, in.</b>			
SS-400-1-4	Bar stock	1/4 × 0.083	82
SS-400-9	Forging		95
SS-500-1-4	Bar stock	5/16 × 0.083	80
SS-500-9	Forging		
SS-810-1-4	Bar stock	1/2 × 0.095	77
SS-810-9	Forging		99
SS-810-1-4	Bar stock	1/2 × 0.095	77
SS-810-C	Forging		
<b>Metric, mm</b>			
SS-8M0-1-4	Bar stock	8 × 1.8	100+
SS-8M0-9	Forging		
SS-8M0-1-4	Bar stock	8 × 2.0	80
SS-8M0-9	Forging		
SS-10M0-1-4	Bar stock	10 × 2.2	72
SS-10M0-C	Forging		98
SS-12M0-1-4	Bar stock	12 × 2.5	100+
SS-12M0-C	Forging		

### PURPOSE

These assemblies were tested under laboratory conditions to observe the performance of Swagelok tube fittings with advanced geometry back ferrules at 1 turn past finger tight assembly when used on extra heavy-wall, normal to extra-hard tubing under hydrostatic pressure.

This testing evaluates the tube gripping ability of assembled tube fittings to sustain hydraulic over pressure, attaining up to 3.5 × working pressure without hydraulic leakage and up to 4.0 × working pressure without fitting material rupture or tube slippage.



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### TEST CONDITIONS

Original test date: December 2001

#### Tube preparation:

Tubing lengths were cut using a tube cutter for 1/2 in. diameter and under. Each tube length assured a minimum of three diameter lengths between fittings after assembly.

#### Fitting assembly:

Each sample tested consisted of one tube length and two test fittings, one bar stock and one forged body (except samples with bar stock bodies only), assembled 1 turn past finger-tight.

### TEST METHOD

The fittings were leak tested using the following controlled laboratory conditions:

1. Each sample was attached to a hydraulic test stand.
2. The tubing was restricted from burst by clamping blocks thereby forcing a failure at the fitting-to-tubing engagement.
3. Pressure was gradually increased and the pressure was recorded when loss of tube grip, material rupture or leakage that prevented applying higher pressure occurred, whichever came first.
4. Results were compared to the tubing working pressure.

### TEST RESULTS

#### Swagelok Tube Fittings, 1 Turn Assembly, Extra Heavy-Wall, Normal to Extra-Hard Tubing

##### Fractional

Tubing Size in.	Tubing Hardness HRB	Samples Tested	Working Pressure (WP) psig (bar)	Samples Attaining 3.0 × WP Without Leakage	Samples Attaining 3.5 × WP Without Leakage	Samples Attaining 4 × WP Without Tube Slip
1/4 × 0.083	82	24	12 000 (826)	24 / 24	24 / 24	21 / 21
1/4 × 0.083	95	24	12 000 (826)	24 / 24	16 / 24	8 / 8
5/16 × 0.083	80	12	10 500 (723)	12 / 12	6 / 12	2 / 3
1/2 × 0.095	77	24	7800 (537)	24 / 24	24 / 24	3 / 3
1/2 × 0.095 <sup>⓪</sup>	77	17	7800 (537)	17 / 17	17 / 17	17 / 17
1/2 × 0.095	99	16	7800 (537)	16 / 16	15 / 16	5 / 16



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### Metric

Tubing Size mm	Tubing Hardness HRB	Samples Tested	Working Pressure (WP) bar (psig)	Samples Attaining 3.0 × WP Without Leakage	Samples Attaining 3.5 × WP Without Leakage	Samples Attaining 4 × WP Without Tube Slip
8 × 1.8	100+	8	650 (9433)	8 / 8	8 / 8	6 / 8
8 × 2.0	80	8	720 (10 449)	8 / 8	3 / 8	1 / 1
10 × 2.2	72	16	620 (8998)	16 / 16	5 / 16	0 / 0
10 × 2.2	98	16	620 (8998)	16 / 16	16 / 16	11 / 14
12 × 2.5	100+	32	590 (8563)	32 / 32	32 / 32	4 / 24

① Bar stock bodies only

**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. 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.