



## Product Test Report

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

**PTR-3261**  
Ver 03  
October 2023  
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### TITLE

Tensile Pull Test of Super Austenitic 6Mo (6-moly) Stainless Steel Tubing With 6Mo Stainless Steel (6-moly) Swagelok® Tube Fittings

### PRODUCT TESTED

Samples Tested	6Mo SS Tubing Size OD x Wall in.	Tubing Hardness HRB	Description / Ordering Number
6	1/4 x 0.065	83	Male Connector 6Mo-400-1-4
6	1/2 x 0.083	86	Male Connector 6Mo-810-1-4

### PURPOSE

These assemblies were tested under laboratory conditions to observe the tube grip performance of 6Mo stainless steel Swagelok tube fittings when installed on 6Mo stainless steel heavy-wall tubing under tensile load.

### TEST CONDITIONS

Original test date: October 2012

Laboratory environment

### 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 ASTM E18-*Standard Test Methods for Rockwell Hardness of Metallic Materials*.
4. Used the ASTM E140 Table 6—*Approximate Hardness Conversion Numbers for Austenitic SS* to convert the 15-T readings to the HRB values.

#### Tensile Pull Test (Reference ASTM F1387):

1. For each sample, assembled one tube length and two male connectors according to Swagelok assembly procedures.
2. Attached non-pressurized samples to a tensile test machine.
3. Tensile pulled samples at a rate of 0.125 in. (3.2 mm) per minute until either the tube pulled out of the fitting or the tube fractured.



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4. The acceptance criterion is taken from ASTM F1387, Annex A7.

$$\text{Calculated tensile load} = A_p \times S_y$$

where:

$A_p$  = cross-section area of the tube based on wall thickness

$S_y$  = minimum specified yield strength of the tube.

5. The test result should exceed the calculated tensile load.

### TEST RESULTS

#### Tensile Pull Test

6Mo SS Tubing Size OD × Wall in.	Acceptance Criterion (Minimum Load) lbf (N)	Minimum Load Attained lbf (N)	Samples Exceeding Calculated Tensile Load
1/4 × 0.065	1845 (8206)	3136 (13 948)	6/6
1/2 × 0.083	5564 (24 748)	8511 (37 856)	6/6

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

ASTM E18—*Standard Test Methods for Rockwell Hardness of Metallic Materials*, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428

ASTM E140, *Table 6—Approximate Hardness Conversion Numbers for Austenitic SS*, ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2858

ASTM F1387-99, *Standard Specification for Performance of Piping and Tubing Mechanically Attached Fittings*, ASTM International, 100 Barr Harbor Drive, West, Conshohocken, PA 19428-2858