



Product Test Report

PTR-2089

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

Ver 04
September 2022
Page 1 of 3

TITLE

Thermal Cycle and Thermal Soak Test of 6ELT Stainless Steel Swagelok® Tube Fittings with Stainless Steel Tubing

PRODUCT TESTED

The following Swagelok tube fittings were tested with 316 stainless steel tubing.

Ordering Number	Part Form	Tubing Size	Tubing Hardness HRB
Fractional, in.			
6ELT-400-6	Bar stock	1/4 × 0.065	82
6ELT-600-6	Bar stock	3/8 × 0.083	89
6ELT-810-6	Bar stock	1/2 × 0.083	81
6ELT-1210-6	Bar stock	3/4 × 0.109	80
6ELT-1610-6	Bar stock	1 × 0.120	80

PURPOSE

These assemblies were tested to observe the thermal cycle and thermal soak performance of 6ELT stainless steel Swagelok tube fittings at the elevated temperature of 1200°F (648°C) under laboratory conditions.

THERMAL CYCLE TEST CONDITIONS

Original test date: July 2009

Fitting assembly:

Each assembly consisted of the tubing and two fittings. The test fittings and tubing were assembled according to Swagelok tube fitting installation instructions.

TEST METHOD

1. The fitting assemblies were attached to a positive pressure gas test stand, submerged in water, pressurized to the working pressure nitrogen gas for at least 10 minutes, and monitored for leakage.
2. The assemblies were placed into a furnace and elevated to a temperature of 1200°F (648°C).
3. The assemblies were allowed to stabilize at temperature for at least 2 hours.
4. The assemblies were removed from the furnace and allowed to air cool.
5. Steps 2 through 4 were repeated for a total of three thermal cycles.
6. The assemblies were re-attached to a positive pressure gas test stand, submerged in water, pressurized to the working pressure at 1200°F (648°C) with nitrogen gas for at least 10 minutes, and monitored for leakage.
7. The assemblies were then pressurized to the working pressure rating at room temperature with nitrogen gas for at least 10 minutes, and monitored for leakage.



Product Test Report

PTR-2089

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

Ver 04
September 2022
Page 2 of 3

TEST RESULTS

Tube Size in.	Assemblies Tested	Working Pressure at 1200°F (648°C) psig (bar)	Assemblies Attaining WP at 1200°F (648°C) After Three Thermal Cycles Without Leakage	Working Pressure (WP) psig (bar)	Assemblies Attaining WP at Room Temp Without Leakage
1/4 × 0.065	4	3770 (259)	4 / 4 Passed	10 200 (702)	4 / 4 Passed
3/8 × 0.083	4	2780 (191)	4 / 4 Passed	7500 (516)	4 / 4 Passed
1/2 × 0.083	4	2480 (170)	4 / 4 Passed	6700 (461)	4 / 4 Passed
3/4 × 0.109	4	2150 (148)	4 / 4 Passed	5800 (400)	4 / 4 Passed
1 × 0.120	4	1740 (119)	4 / 4 Passed	4700 (323)	4 / 4 Passed

THERMAL SOAK TEST CONDITIONS

Fitting assembly:

Each assembly consisted of the tubing and two fittings. The test fittings and tubing were assembled according to Swagelok tube fitting installation instructions.

TEST METHOD

1. The fitting assemblies were attached to a positive pressure gas test stand, submerged in water, pressurized to the working pressure with nitrogen gas for at least 10 minutes, and monitored for leakage.
2. The assemblies were placed into a furnace, pressurized to the elevated temperature working pressure and elevated to a temperature of 1200°F (648°C).
3. The assemblies were allowed to stabilize at temperature and remain holding pressure for 100 hours and monitored for leakage.
4. The assemblies were removed from the furnace and allowed to air cool.
5. The assemblies then were attached to a hydraulic burst test stand, pressurized to 4 × the working pressure and held for 1 minute.



Product Test Report

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

PTR-2089
Ver 04
September 2022
Page 3 of 3

TEST RESULTS

Tube Size in.	Assemblies Tested	Working Pressure at 1200°F (648°C) psig (bar)	Assemblies Attaining 100 Hr at 1200°F (648°C) Without Pressure Decay	Working Pressure (WP) psig (bar)	Assemblies Attaining 4 x WP
1/4 x 0.065	4	3770 (259)	4 / 4 Passed	10 200 (702)	4 / 4 Passed
3/8 x 0.083	4	2780 (191)	4 / 4 Passed	7500 (516)	4 / 4 Passed
1/2 x 0.083	4	2480 (170)	4 / 4 Passed	6700 (461)	4 / 4 Passed
3/4 x 0.109	4	2150 (148)	4 / 4 Passed	5800 (400)	4 / 4 Passed
1 x 0.120	4	1740 (119)	4 / 4 Passed	4700 (323)	4 / 4 Passed

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.

Swagelok—TM Swagelok Company