



Product Test Report

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

PTR-393
Ver 06
December 2022
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TITLE

Fire (Burn) Test with Water Quench (Reference API 607) of Stainless Steel Swagelok® Tube Fittings

PRODUCT TESTED

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

Ordering Number	Form	Tubing Size in.	Tubing Hardness HRB
SS-810-6-4	Bar stock	1/4 × 0.065	77
SS-810-9	Forging	1/2 × 0.083	84
SS-810-3	Forging		

PURPOSE

These assemblies were tested under laboratory conditions to observe the performance of Swagelok tube fittings with advanced geometry back ferrules when exposed to a 1500°F (815°C) burn and a water quench.

TEST CONDITIONS

Original test date: December 2001

Tube preparation:

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

Fitting assembly:

The test fittings and tubing were assembled 1 1/4 turns past finger-tight according to Swagelok tube fitting installation instructions.

TEST METHOD

API Standard 607, fire test for soft-seated quarter turn valves, was adapted for tube fittings as follows:

1. Eight 1/2 in. Swagelok tube fittings and two 1/4 in. Swagelok tube fittings were assembled into a single test loop.
2. The loop was attached to the fire test stand.
3. The samples were pressurized to a constant 4500 psig (310 bar) with a fixed reservoir of water and examined for leakage.
4. Two thermocouples were positioned within the flame zone to measure flame temperature.
5. Eight burners were lit and focused on the test loop.
6. The samples were exposed to flame (1400 to 1800°F, 1500°F average) [760 to 982°C, 815°C average] for a period of 40 minutes.
7. Upon completion of the burn portion of the test, the samples were quenched with water from two overhead spray nozzles for a period of five minutes.
8. The samples were monitored for leakage and loss of water during the quench process.



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TEST RESULTS

Ordering Number	Form	Tubing Size in.	Samples Tested	Result
SS-810-6-4	Bar stock	1/4 × 0.065	2	Pass—No Detectable Leakage
SS-810-9	Forging	1/2 × 0.083	8	Pass—No Detectable Leakage
SS-810-3	Forging			

Figures 1 and 2 show the samples during the test.

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.

Reference Documents

API Standard 607, *Fire Test for Soft-Seated Quarter-Turn Valves*, Fourth Edition, May 1993



Figure 1: Samples during flame exposure.



Figure 2: Samples during water quench.