



## Product Test Report

**PTR-5003**

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

Ver 02  
June 2022  
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### TITLE

Thermal Cycle Test of 1 1/2 Inch 316 Stainless Steel Swagelok® IPT Series Medium-Pressure Cone and Thread Fittings

### PRODUCT TESTED

The following 316 stainless steel Swagelok IPT series medium-pressure cone and thread fitting components were tested.

Ordering Number	Part Type	Size in.	Material
CN24MF15	Coupling	1 1/2	316 strain hardened stainless steel
GL24M	Gland		
CL24M	Collar		
PL24M	Plug		
N24M15	Coned and threaded tube nipple	1 1/2 OD x 15/16 ID	

### PURPOSE

These components were assembled and tested under laboratory conditions to observe the performance of 1 1/2 inch 316 stainless steel Swagelok IPT series medium-pressure cone and thread fittings during a thermal cycle test.

### TEST CONDITIONS

Original test date: September 2015

- Each sample consisted of a coupling body with a collar, gland, and coned and threaded tube nipple installed into one port, and a gland and plug installed into the opposing port.
- The male threads of the gland and tip of the plug and nipple cone were lightly coated with Silver Goop™ lubricant prior to assembly. The collar was installed on the tube nipple's threads until 1 to 2 full threads were exposed. The gland was tightened to 200 ft·lb (271 N·m) for both the nipple and plug end connections.

### TEST METHOD

1. Each sample was attached to a multiport manifold.
2. The test samples were proof tested with gas by attaching the manifold to a gas test stand, submerging in water, pressurizing to 1.25 times working pressure with nitrogen, and monitoring for leakage. The acceptance criterion was less than 1 bubble per minute at the applied pressure.
3. The manifold and samples were installed into a thermal chamber.
4. The manifold and test samples were filled with fluid for elevated temperature testing.



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5. Pressure and temperature of the samples was elevated to 13 950 psig (961 bar) and 640°F (337°C).
6. Pressure to the inlet of the samples was isolated.
7. The samples were heated for four hours and monitored for pressure decay. The acceptance criterion was no significant pressure decay.
8. Pressure was relieved and the samples were slowly cooled to room temperature.
9. Steps 4 to 8 were repeated for a total of three thermal cycles.
10. The manifold and samples were removed from the thermal chamber and the fluid was drained.
11. The samples were tested by attaching the manifold to a gas test stand, submerging in water, pressurizing to 1.25 times working pressure with nitrogen, and monitoring for leakage. The acceptance criterion was less than 1 bubble per minute at the applied pressure.
12. The manifold and samples were installed back into the thermal chamber.
13. The manifold and test samples were filled with fluid for low-temperature testing.
14. Pressure and temperature of the samples was adjusted to 15 000 psig (1034 bar) and -90°F (-67°C).
15. Pressure to the inlet of the samples was isolated.
16. The samples were chilled for four hours and monitored for pressure decay. The acceptance criterion was no significant pressure decay.
17. Pressure was relieved and the samples were slowly cooled to room temperature.
18. Steps 13 to 17 were repeated for a total of three thermal cycles.
19. The manifold and samples were removed from the thermal chamber and the fluid was drained.
20. The samples were tested by attaching the manifold to a gas test stand, submerging in water, pressurizing to 1.25 times working pressure with nitrogen, and monitoring for leakage. The acceptance criterion was less than 1 bubble per minute at the applied pressure.

### TEST RESULTS

Connection Type	Samples Tested	Working Pressure psig (bar)	Initial Gas Test (1.25 x WP)	Elevated Temp Cycle Test at 640°F (337°C)	Intermediate Gas Test (1.25 x WP)	Low-Temp Cycle Test at -90°F (-67°C)	Final Gas Test (1.25 x WP)
Tube Nipple	6	15 000 (1034)	6 / 6 Pass	6 / 6 Pass	6 / 6 Pass	6 / 6 Pass	6 / 6 Pass
Plug	3	15 000 (1034)	3 / 3 Pass	3 / 3 Pass	3 / 3 Pass	3 / 3 Pass	3 / 3 Pass

**This test was conducted beyond the product's recommended operating parameters and does not modify the published product ratings.**



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This test was 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, Goop —TM Swagelok Company