Product Test Report

PTR-2142

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

TITLE:
Hose Insulation Test of Swagelok® PTFE Crimped S series Hose

PRODUCT TESTED:
Swagelok S series hose assemblies with 3/4 and 1 in. Swagelok tube adapter end connections
Ordering numbers: SS-ST12TA12TA12-36 for 3/4 in. hose assembly
SS-ST16TA16TA16-36 for 1 in. hose assembly

PURPOSE:
These hose assemblies were tested to observe the surface temperature under ambient laboratory conditions when fluid temperature was maintained at various values from –25 to 120°C (–13 to 248°F).

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TEST CONDITIONS:
Original test date: September 2009

Ambient temperature was approximately 20°C (70°F)

TEST METHOD:
- A flow loop was established to circulate silicone oil, Sil 180, through the hose assembly. A recirculating heater/chiller was used to achieve and maintain fluid temperatures.
- Type K thermocouple probes (1/8 in. diameter) were embedded in the flow stream upstream and downstream of the hose assembly to monitor fluid temperature. These thermocouples are designated TC1 and TC4 in the Test Flow Diagram, Figure 1.
- Type K thermocouple probes (1/16 in. diameter) were placed in intimate contact with the outside of the hose assembly, approximately 1/3 the length of hose from either end, to monitor temperature at the surface of the hose. These thermocouples are designated TC2 and TC3 in the Test Flow Diagram, Figure 1.
- The Type K thermocouples have a measurement accuracy of ± 1.5°C (± 2.7°F).
- Flow was established at approximately 10 L/min. Temperature was monitored at 5 second intervals with a temperature logger.
- Fluid temperature exiting the hose assembly was within 1°C (1.8°F) of the fluid temperature entering the hose assembly, indicating sufficient flow to maintain temperature.
- The recirculating heater/chiller was programmed to attain and hold a series of temperature set points (approximately 15 minutes per set point), allowing the surface to reach an equilibrium temperature (approximately 3 minutes). Five minutes of data at each fluid equilibrium temperature level were averaged and reported in the test results.
- Diagrams of the test setup and thermocouple attachment are shown in Figures 1 and 2.

Figure 1: Test Flow Diagram

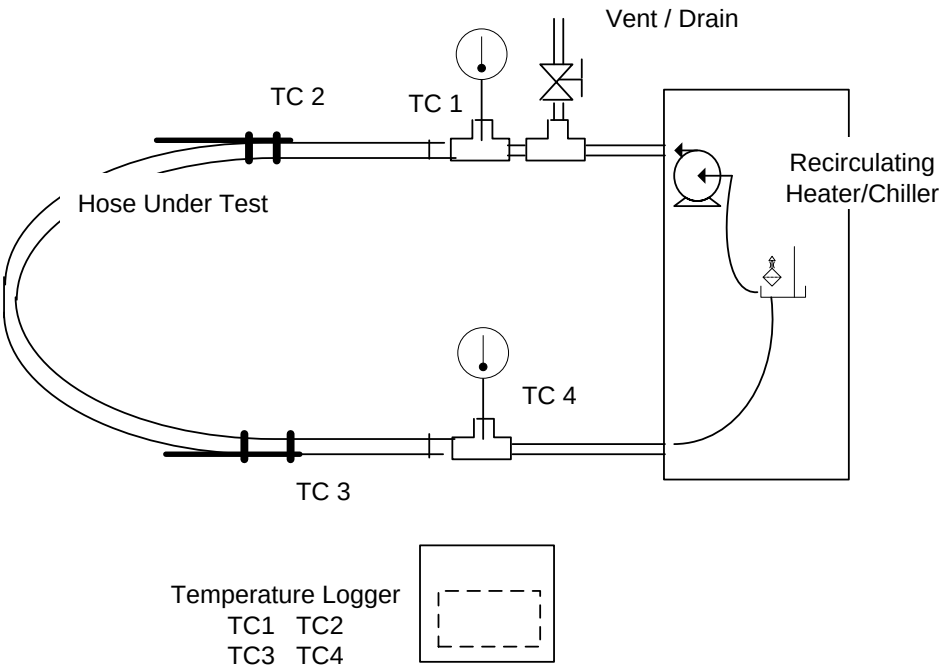
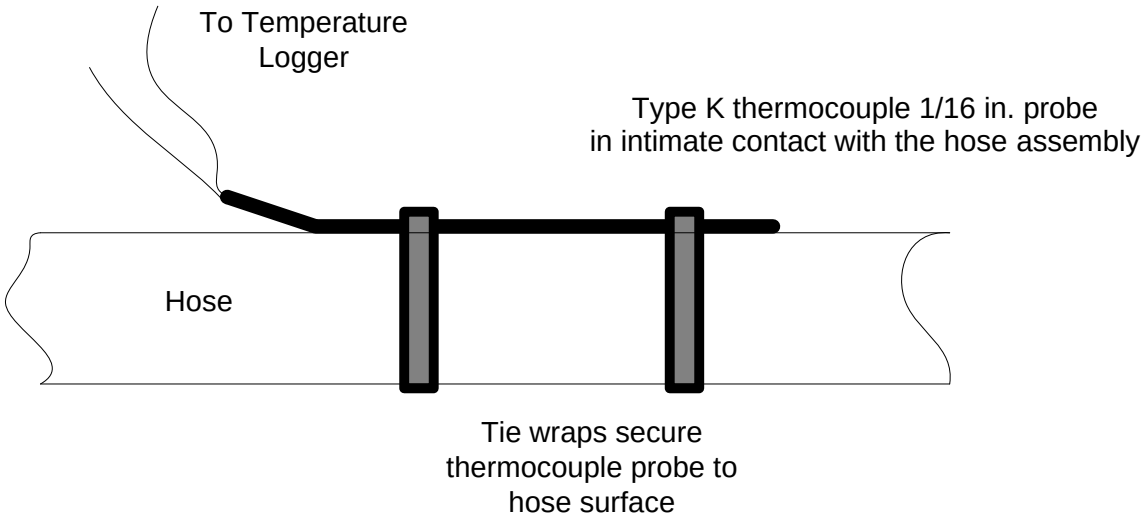


Figure 2: Detail of Thermocouple Attachment to Hose Surface



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TEST RESULTS

Table 1: Summary of Cooled Fluid Equilibrium Temperature Tests

Cooled Fluid Equilibrium Temperatures °C (°F)						
3/4 in. S series hose assembly						
Fluid Temperature (T1 and T4)	13 (55)	–2 (28)	–11 (12)	–15 (5)	–20 (–4)	–26 (–14)
Surface Temperature (T2 and T3)	17 (62)	7 (44)	3 (37)	1 (33)	–1 (30)	–4 (24)
1 in. S series hose assembly						
Fluid Temperature (T1 and T4)	13 (55)	–1 (30)	–11 (12)	–16 (3)	–21 (–5)	–26 (–14)
Surface Temperature (T2 and T3)	15 (59)	7 (44)	2 (35)	–1 (30)	–3 (26)	–6 (21)

Table 2: Summary of Heated Fluid Equilibrium Temperature Tests

Heated Fluid Equilibrium Temperatures °C (°F)			
3/4 in. S series hose assembly			
Fluid Temperature (T1 and T4)	58 (136)	78 (172)	118 (244)
Surface Temperature (T2 and T3)	42 (107)	53 (127)	73 (163)
1 in. S series hose assembly			
Fluid Temperature (T1 and T4)	58 (136)	79 (174)	119 (246)
Surface Temperature (T2 and T3)	47 (116)	60 (140)	85 (185)

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.