

## Product Test Report

**PTR-5020**

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

Ver 01  
December 2021  
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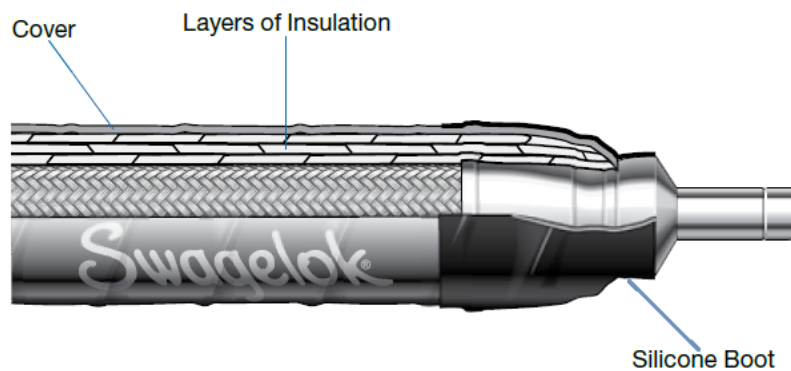
### TITLE

UL94 Vertical Flammability Test of Silicone Boots for Swagelok® Insulated Hose Assemblies

### PRODUCT TESTED

Sixty specimens of silicone boots were tested. The silicone boots are used for the insulated hose assembly option Y.

Example part number: SS-FJ8TA8TA8-55-YB4.



### PURPOSE

The silicone boots were tested for vertical flammability according to UL94 test methods.

### TEST CONDITIONS

Original test date: February 2020

Room temperature laboratory environment

## TEST METHOD

The specimens were tested according to ASTM D3801-19 method per UL94 specification:

1. Each specimen was clamped with the longitudinal axis vertical, so that the lower end of the specimen was 300 mm above a horizontal layer of cotton. See Figure 1.
2. The burner was placed away from the specimen and ignited. The flame height was then adjusted.
3. After approaching the test specimen from the wide side in a horizontal plane, the test flame was placed centrally under the lower end of the test specimen for a flame-impingement time of 10 seconds. The test flame was then withdrawn, and the afterflame time of the specimen was measured in seconds ( $t_1$ ).
4. When the flaming of the specimen ceased, the test flame was immediately placed under the specimen for another flame-impingement time of 10 seconds. After this second flame application, the test flame was withdrawn and the afterflame and afterglow times were measured, in seconds ( $t_2$ ).
5. Noted and recorded were any particles that fell from the specimen and, if so, whether they ignited the cotton. The burn length of the specimen was also recorded.
6. Steps 1 through 5 were repeated on the remaining specimens.

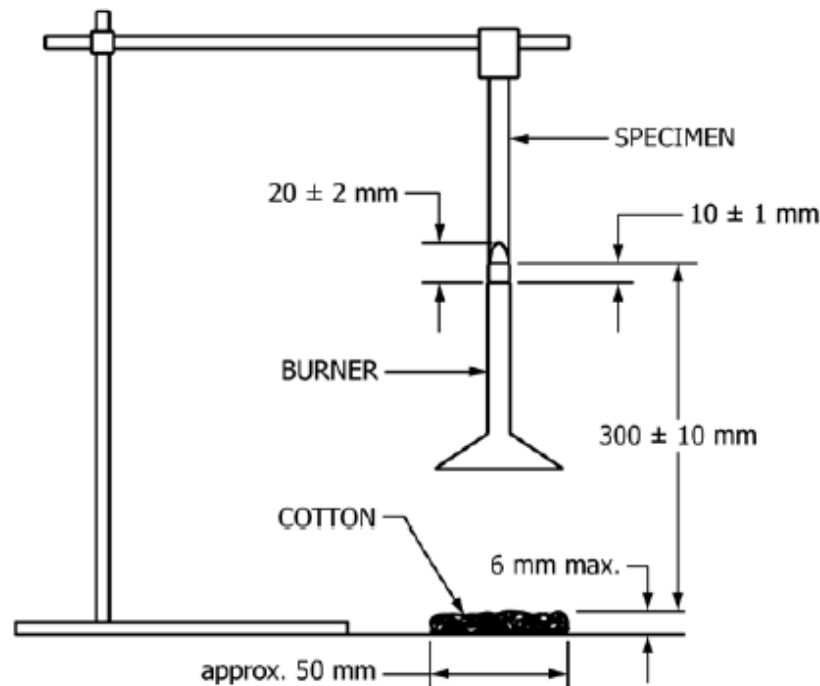


FIG. 1 Vertical Burning Test for V-0, V-1, and V-2 Classification



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### TEST RESULTS

#### UL94 – Vertical Burn

	Test Specimen Condition	
	Specimen conditioned 48 hours at 23°C (73°F) and 50% relative humidity	Specimen conditioned 168 hours at 70°C (158°F)
Afterflame time for each individual specimen $t_1$	30 of 30 specimen $\leq 10s$	30 of 30 specimen $\leq 10s$
Afterflame time for each individual specimen $t_2$	30 of 30 specimen $\leq 10s$	30 of 30 specimen $\leq 10s$
Total afterflame time for any condition set ( $t_1$ or $t_2$ for the 5 specimens)	6 of 6 sets of 5 specimen each $\leq 50s$	6 of 6 sets of 5 specimen each $\leq 50s$
Afterflame plus afterglow time for each individual specimen after the second flame set ( $t_1 + t_2$ )	30 of 30 specimen $\leq 30s$	30 of 30 specimen $\leq 30s$
Afterflame or afterglow of any specimen up to the holding clamp	No	No
Cotton indicator ignited by flaming particles or drops	No	No

All specimens tested met the requirements for UL94 V-0 classification.

Criteria for passing UL94 Standards (Table 8.1 excerpt from UL94):

**Table 8.1**  
**Materials classifications**

Criteria conditions	V-0	V-1	V-2
Afterflame time for each individual specimen $t_1$ or $t_2$	$\leq 10s$	$\leq 30s$	$\leq 30s$
Total afterflame time for any condition set ( $t_1$ plus $t_2$ for the 5 specimens)	$\leq 50s$	$\leq 250s$	$\leq 250s$
Afterflame plus afterglow time for each individual specimen after the second flame application ( $t_2+t_3$ )	$\leq 30s$	$\leq 60s$	$\leq 60s$
Afterflame or afterglow of any specimen up to the holding clamp	No	No	No
Cotton indicator ignited by flaming particles or drops	No	No	Yes

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.



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### **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 D3801-19 Standard Test Method for Measuring the Comparative Burning Characteristics of Solid Plastics in a Vertical Position, ASTM International, West Conshohocken, PA, 2019, [www.astm.org](http://www.astm.org)

UL 94 Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, Edition Number: 6, Edition Date: 2013-03-28

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