



Understanding UL94 Flame Ratings by Aardvark Polymers



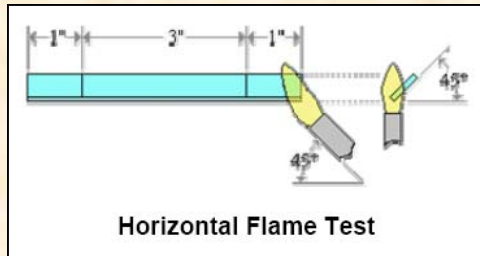
Celebrating the first
25 years.
1983-2008

gapolymers.com

UL flame ratings group materials into categories based on their flammability. UL 94 covers two types of testing: vertical burn and horizontal burn.

Horizontal Testing (HB)

Procedure: A specimen is supported in a horizontal position and is tilted at 45°. A flame is applied to the end of the specimen for 30 seconds or until the flame reaches the 1 inch mark. If the specimen continues to burn after the removal of the flame, the time for the specimen to burn between the 1 and 4 inch marks is recorded. If the specimen stops burning before the flame spreads to the 4 inch mark, the time of combustion and damaged length between the two marks is recorded. Three specimens are tested for each thickness.



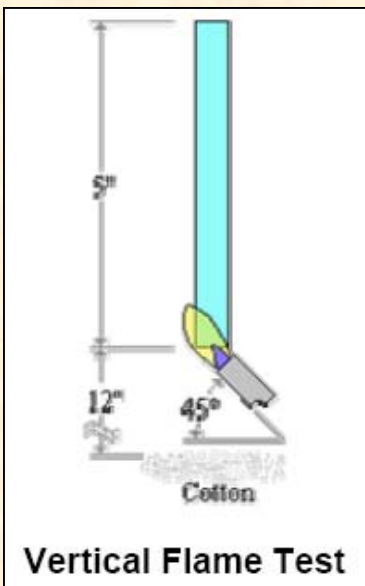
Horizontal Rating Requirements HB

*Specimens must not have a burning rate greater than 1.5 inches/minute for thicknesses between 0.120 and 0.500 inches and 3 inches/minute for thicknesses less than 0.120 inches.

*Specimens must stop burning before the flame reaches the 4 inch mark.

Vertical Testing (V-0, V-1, V-2)

Procedure: A specimen is supported in a vertical position and a flame is applied to the bottom of the specimen. The flame is applied for ten seconds and then removed until flaming stops at which time the flame is reapplied for another ten seconds and then removed. Two sets of five specimens are tested. The two sets are conditioned under different conditions.



Vertical Ratings Requirements:

V-0

- Specimens must not burn with flaming combustion for more than 10 seconds after either test flame application.
- Total flaming combustion time must not exceed 50 seconds for each set of 5 specimens.
- Specimens must not burn with flaming or glowing combustion up to the specimen holding clamp.
- Specimens must not drip flaming particles that ignite the cotton.
- No specimen can have glowing combustion remain for longer than 30 seconds after removal of the test flame.

V-1

- Specimens must not burn with flaming combustion for more than 30 seconds after either test flame application.
- Total flaming combustion time must not exceed 250 seconds for each set of 5 specimens.
- Specimens must not burn with flaming or glowing combustion up to the specimen holding clamp.
- Specimens must not drip flaming particles that ignite the cotton.
- No specimen can have glowing combustion remain for longer than 60 seconds after removal of the test flame.

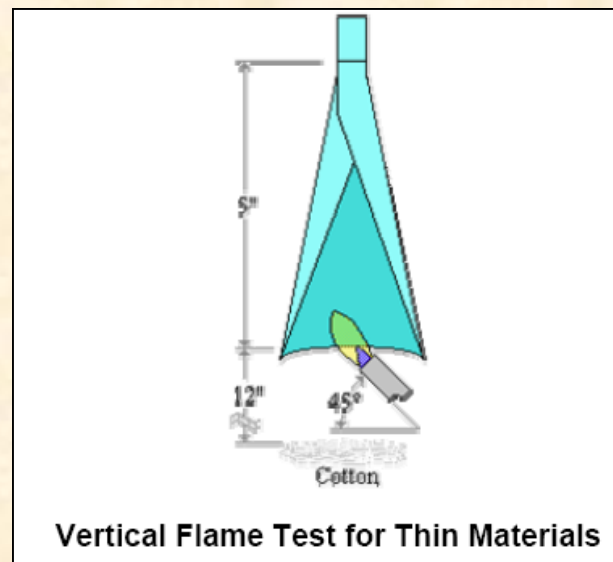
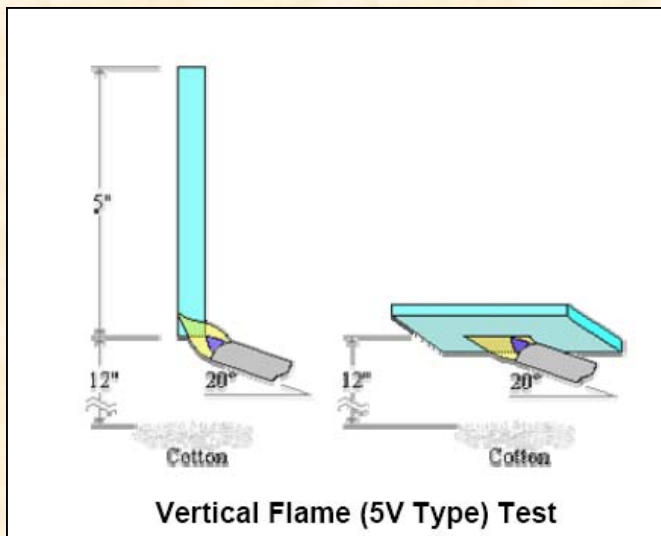
V-2

- Specimens must not burn with flaming combustion for more than 30 seconds after either test flame application.
- Total flaming combustion time must not exceed 250 seconds for each set of 5 specimens.
- Specimens must not burn with flaming or glowing combustion up to the specimen holding clamp.
- Specimens can drip flaming particles that ignite the cotton.
- No specimen can have glowing combustion remain for longer than 60 seconds after removal of the test flame.

Vertical Testing (5V, 5V-A, 5V-B)

Testing is done on both bar and plaque specimens. Procedure for Bars: A bar specimen is supported in a vertical position and a flame is applied to one of the lower corners of the specimen at a 20° angle. The flame is applied for 5 seconds and is removed for 5 seconds. The flame application and removal is repeated five times.

Procedure for Plaques: The procedure for plaques is the same as for bars except that the plaque specimen is mounted horizontally and a flame is applied to the center of the lower surface of the plaque.



5V

- Specimens must not have any flaming or glowing combustion for more than 60 seconds after the five flame applications.
- Specimens must not drip.
- Specimens must not be destroyed in the area of the flame.

5V-A

- Specimens must not have any flaming or glowing combustion for more than 60 seconds after the five flame applications.
- Specimens must not drip flaming particles that ignite the cotton.
- Plaque specimens must not exhibit burnthrough (a hole).

5V-B

- Specimens must not have any flaming or glowing combustion for more than 60 seconds after the five flame applications.
- Specimens must not drip flaming particles that ignite the cotton.
- Plaque specimens may exhibit burn through (a hole).

Vertical Testing of Thin Materials (VTM-0, VTM-1, VTM-2)

This test is used for materials that are thin, or are too flexible or may distort, shrink or flex during ordinary vertical testing. Procedure: An 8x2 in specimen is rolled longitudinally around a 1/2 in diameter mandrel and taped on one end. When the mandrel is removed the specimen forms a cone. The cone is supported in a vertical position and a flame is applied to the bottom of the specimen. The flame is applied for three seconds and then removed until flaming stops at which time the flame is reapplied for another three seconds and then removed. Two sets of five specimens are tested. The

VTM-0

- Specimens must not burn with flaming combustion for more than 10 seconds after either test flame application.
- Total flaming combustion time must not exceed 50 seconds for each set of 5 specimens.
- Specimens must not burn with flaming or glowing combustion up to the specimen holding clamp.
- Specimens must not drip flaming particles that ignite the cotton.
- No specimen can have glowing combustion remain for longer than 30 seconds after removal of the test flame.
- No specimen shall have flaming or glowing combustion up to a mark 5 inches from the bottom of the specimen.

VTM-1

- Specimens must not burn with flaming combustion for more than 30 seconds after either test flame application.
- Total flaming combustion time must not exceed 250 seconds for each set of 5 specimens.
- Specimens must not burn with flaming or glowing combustion up to the specimen holding clamp.
- Specimens must not drip flaming particles that ignite the cotton.
- No specimen can have glowing combustion remain for longer than 60 seconds after removal of the test flame.
- No specimen shall have flaming or glowing combustion up to a mark 5 inches from the bottom of the specimen.

VTM-2

- Specimens must not burn with flaming combustion for more than 30 seconds after either test flame application.
- Total flaming combustion time must not exceed 250 seconds for each set of 5 specimens.
- Specimens must not burn with flaming or glowing combustion up to the specimen holding clamp.
- Specimens can drip flaming particles that ignite the cotton.
- No specimen can have glowing combustion remain for longer than 60 seconds after removal of the test flame.
- No specimen shall have flaming or glowing combustion up to a mark 5 inches from the bottom of the specimen

For more information contact:
Aardvark Polymers
www.aardvarkpolymers.net
info@aardvarkpolymers.com
+1-609-483-1013



Build up
your business

Aardvark Polymers is an operational subsidiary of :

gapolymers.com

High Performance Polymers

Product, Process, Market, and Business Development



Celebrating the first
25 years.
1983-2008