

Appendix O. Flammability rating for plastic materials

UL 94 is the Standard which defines the tests for flammability of plastic materials for parts in devices and appliances.

The standard classifies plastics according to how they burn in various orientations and thicknesses, from the least flame-retardant to most flame-retardant.

Class HB – Horizontal burning test

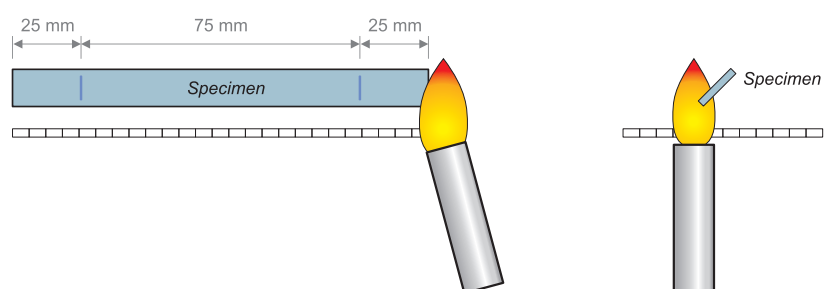
The specimen is placed horizontally and exposed to a Bunsen burner flame ($h = 20\text{ mm}$) for 30 seconds.

Any ignition or burning is noted. A HB classification is awarded on the basis of the burning rate of specimens (6 test specimens $125\text{ mm} \times 13\text{ mm}$) up to 13 mm thick.

Assessment criteria for UL 94 HB are:

- burning rate of specimens between 3 mm and 13 mm thick over a distance of 75 mm is $\leq 40\text{ mm/min}$ or
- burning rate of specimens up to 3 mm thick over a distance of 75 mm is $\leq 75\text{ mm/min}$ or
- burning must cease before the 100 mm mark.

Figure O.1. Horizontal burning test



Class V0, V1 e V2 – Vertical burning test

In this test the specimen is placed vertically and exposed to a Bunsen burner flame ($h = 20$) for two periods of 10 seconds (the second period is applied after extinction). The assessment criteria are burning time, total burning time and the dropping of burning particles of specimens (10 test specimens 125 mm x 13 mm) up to 13 mm thick as follows.

Classification	V0	V1	V2
Burning time after each flame application	≤ 10 sec	≤ 30 sec	≤ 30 sec
Total burning time per batch	≤ 50 sec	≤ 250 sec	≤ 250 sec
Burning up to the clamp	No	No	No
Burning and glowing time after second flame application	≤ 30 sec	≤ 60 sec	≤ 60 sec
Ignition of cotton wadding	No	No	Yes

Figure O.2. Vertical burning test

