

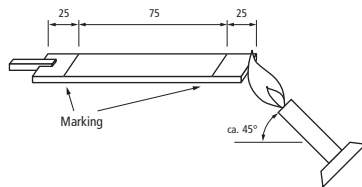
Technical Information | Plastics

Flame retardance of plastics

Standard 94 of the Underwriters Laboratories (UL94) is accepted worldwide as the predominant standard for classifying the flame retardance of plastics. The procedure according to UL94 is to test the ability of the material to extinguish itself after flaming. The classification is according to the speed of burning and the extinguishing time, droplet formation, and the duration of afterglow time. Depending on the wall thickness, several classifications are possible for each material. The basis for the appropriate specification of a material should correspond to the thickness of the moulding's main wall. Information on the UL 94 classification is only comparable and meaningful if it specifies the relevant wall thickness.

UL 94 HB

The test specimen is held horizontally and a flame brought up to it. For wall thicknesses up to 3 mm, the rate of combustion must be less than 75 mm/min, and less than 40 mm/min for wall thicknesses of 3 mm and over.

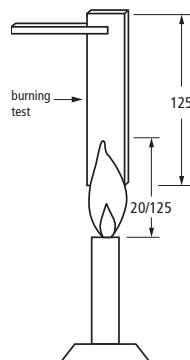


Often misunderstood:

Non-flame-retardant qualities (or materials which are not intended for flame-retardant applications) do not automatically meet horizontal burning criteria. Although the least rigorous, UL 94 HB is a category of flammability and can only be achieved by means of testing.

UL 94 V0, V1 und V2

In this category, test bars with the same dimensions and with a flame height as used for HB tests are tested vertically, but not horizontally. In addition to the burn and glowing combustion time, the decisive factor is whether burning drops form and whether they ignite the cotton wool underneath the test bar, which is only permissible for V2.



UL 94 V2

Test specimen vertical, flame height 20 mm; self-extinguishing up to 30 s after the flame has been removed; burning droplets are permissible; afterglow = max. 60 s.

UL 94 V1

Test specimen vertical, flame height 20 mm; self-extinguishing up to 30 s after the flame has been removed; no burning droplets; afterglow = max. 60 s.

UL 94 V0

Test specimen vertical, flame height 20 mm; self-extinguishing up to 10 s after the flame has been removed; no burning droplets; afterglow = max. 30 s.

UL 94 5V

This burning test is used to determine flammability classes UL 94 5VB and UL 94 5VA. In addition, plastics which meet at least classification V-2 can be tested – in this case, the flame height is 125 mm. The process exposes a vertically-mounted specimen 5 times for a period of 5 seconds with pauses of 5 seconds. In addition to the test criteria as per UL 94 V, this flammability test also takes into consideration the formation of holes in panels.

	UL 94 5VA	UL 94 5VB
Afterflame time / afterglow time of the test specimens after the 5th flame application [sec]	< 60	< 60
Burning droplets	no	no
Hole formation (in panels)	no	yes

The flammability category always refers to the raw material, tested using ideal test pieces. In the case of manufactured parts, deviations caused by different material thicknesses and the effects of processing are unavoidable.