



Understanding UL 94 Certifications and Limitations

We frequently receive inquiries from code officials about materials with UL 94 flammability ratings. The nature of the questions vary, but in general they involve whether a product or material with a UL 94 rating such as HB or V-0 is suitable for use in a model code application.

Let's shed some light on what the UL 94 Standard and its associated flammability ratings are and, more importantly, what they are not.

Model building, life safety and fire codes include numerous requirements that products and materials include specified minimum flammability ratings. Among other things, this includes tests to determine the following:

- Hourly fire resistance ratings.
- Surface burning characteristics of interior finish materials (flame spread and smoke developed).
- Roof covering flammability ratings.
- Flammability of contents within the building (such as mattresses, furniture, fabrics or floor coverings).
- Stored commodity classification.

Although the test methods and desired fire performance vary between tests, they have a common underlying principal behind them, namely that (1) a relatively large amount of the material is likely to be present, (2) the ignition source for the material may consist of a fairly substantial open flame or radiant energy source and (3) the tests are primarily based on the end-use of the product. Accordingly the fire tests specified in the model codes often are referred to as medium-scale or large-scale fire tests.

UL 94, the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances includes small scale tests that evaluate the flammability of polymeric (plastic) materials, used for parts in devices and appliances, in response to a small, open flame or radiant heat source under controlled laboratory conditions. The scope of UL 94 clearly indicates that it does not cover polymeric materials used for building construction, finishing or contents such as wall and floor coverings, furnishings or decorative objects. The results of most UL 94 flammability tests are not applicable to materials whose thickness exceeds 13.0 mm, or whose surface area exceeds 1m².

The UL 94 Standard provides a method for rating the ignition characteristics of plastic materials. Two UL 94 ratings that code officials commonly run across are HB and V (V-0, V-1, or V-2). These ratings are established using small-scale tests in which approximately 5 by ½ inch samples are subject to a ¾ inch, 50W tirrel burner flame ignition source. To achieve a HB rating, test samples, placed horizontally, burn slowly across the sample





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when the test flame is applied to the end of the sample. To achieve a V rating (e.g. V-2, V-1, or V-0) the test samples, placed vertically with the test flame impinging on the bottom of the sample, must extinguish within specified times, not burning to the top clamp or dripping molten material which ignites a cotton indicator.

UL has tested literally thousands of materials for UL 94 ratings, which are widely published in manufacturers' literature. The customers for these materials are primarily the end-use manufacturers of electrical equipment and products that are required to use UL 94 rated materials in their factory production.

However, building owners, architects or contractors sometimes run across UL 94 rated materials that they think might be used in a model code application, and submit them for AHJ approval. However, as mentioned, model codes do not recognize the small-scale UL 94 fire ratings, and there is no technical basis for accepting a UL 94 rating in lieu of other ratings specified in the Codes.

Plastic Commodity Classifications

One of the more common UL 94 questions we get from fire officials is whether the Classification of plastics stored in accordance with model fire codes can be changed based on the plastic material having a particular UL 94 rating. Unfortunately we are not aware of any firm data that would suggest that a UL 94 rating, by itself, would allow stored plastic materials to change from a Group A to a Group B plastic, etc.