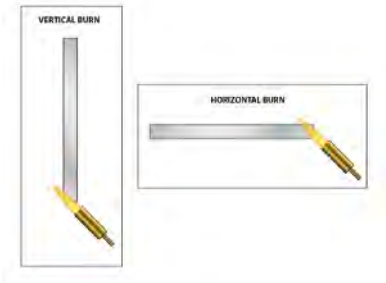
NuSil's UL 94 Flammability Testing

Application Note

Electronic devices and appliances must be tested per the Underwriters Laboratories' (UL) standards before they can be sold and distributed in most global markets. UL testing is meant to verify the device can safely operate under normal conditions without any abnormally high risk of fire or electrical default. Flame classification, designated in some UL standards, is one of the most common selection criteria for polymeric components used in electronic appliances and devices. Fire-resistant components give the designer confidence the device will deliver the desired performance.

The most commonly consulted standard for evaluating a polymer's flame rating is UL 94, Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances. This standard distinguishes between flame classifications based on the flame position, extinguishing time, and pattern of destruction. Horizontal and vertical burns are differentiated by where the flame is placed relative to the polymeric specimen. Each classification is further denoted by the amount of time it takes for the flame to extinguish once the flame source is removed.



Once removed, the amount of flame propagation and degree of specimen destruction determine whether the polymer can be denoted as passing that classification. The highest achievable classification is 5VA with the most aggressive testing conditions and least amount of allowable destruction. The lowest achievable classification is HB, with the least aggressive testing and sole requirement that the flame eventually self-extinguishes. Due to the chemical nature of silicones most are inherently capable of achieving an HB rating. Various formulation changes can be made to influence the classification. For instance, those silicones which contain inorganic fillers are more flame resistant.

Flame Classification	Details
5VA	surface burn, self-extinguishes within 60 seconds, no hole may be present in the specimen
5VB	surface burn, self-extinguishes within 60 seconds, a hole may appear in the specimen
V-0	vertical burn, self-extinguishes within 10 seconds, no flaming drips of polymer
V-1	vertical burn, self-extinguishes within 60 seconds, no flaming drips of polymer
V-2	vertical burn, self-extinguishes within 60 seconds, flaming drips of polymer are allowed
HB	horizontal burn, burns at a slower rate than that specified in the standard for the thickness of the specimen tested

NuSil's silicones are not UL-Recognized, meaning they are not officially registered with the UL and have not been tested by the UL. However, those which undergo burn testing are tested per UL 94 by a third party UL-certified laboratory. This means that our silicones will pass the designated flame classification specified on our product literature. The claims we make for our products do not absolve manufacturers from testing end devices. NuSil Technology is willing to arrange further testing of our products upon request. Requests will be considered on a case-by-case basis.

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