Home/Flammability Testing
UL 94, "The Standard for Flammability of Plastic Materials for Parts in Devices and Appliances", is one of the most widely accepted flammability performance standards for plastic materials. This standard determines a material's ability to propagate or extinguish a flame once ignited. According to UL, this standard has been harmonized with IEC 60707, 60695-11-10 and 60695-11 -20 and ISO 9772 and 9773.

There are 12 flame classifications specified in UL 94. The classifications are used to describe materials burning characteristics after test specimens have been exposed to a specified test flame under controlled laboratory conditions. The classifications relate to the rate of burning, time to extinguish, ability to resist dripping, and whether or not the drips are burning.

Six of the classifications relate to commonly used materials in enclosures, structural parts, and insulators. Listed in descending order of flammability, the classifications are:

5VA Afterflame or afterglow ≤ 60 seconds after 5th flame application, specimen may not have a burn-through.

5VB Afterflame or afterglow time ≤ 60 seconds after 5th flame application, specimen may have burn-through.

V-0 burning stops within 10 seconds, no drips allowed
V-1 burning stops within 30 seconds, no drips allowed
V-2 burning stops within 30 seconds, flaming particles allowed
HB slow burning on a horizontal specimen less than 76 mm/min for thickness less than 3mm.

The next three classifications are a result of the "Thin Material Vertical Burning Test". This test is for thin materials that are not capable of supporting themselves in a horizontal position. For example, substrates used on flexible printed circuit boards. The classifications are:

VTM-0 Afterflame ≤ 10s afterglow < 30s, no dripping
VTM-1 Afterflame ≤ 30s afterglow ≤ 30s. afterglow ≤ 60s, no dripping
VTM-2 Afterflame ≤ 30s, afterglow ≤ 60s, dripping allowed

Finally, the last three classifications are for horizontal burning of foamed material. Materials may be classified as follows:

HF-1 Afterflame ≤ 2s, afterglow ≤ 30s, no dripping
HF-2 Afterflame ≤ 3s, afterglow ≤ 30s, dripping allowed
HBF burning rate not exceeding 40mm/ min

FMVSS 302 (Federal Motor Vehicle Safety Standard #302)
Officially known as 49 CFR 571.302, The Federal Motor Vehicle Safety Standard (FMVSS) 302 for Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks, and Buses is one of the most common automotive materials tests. Founded as a Federal Standard in 1972, it is identical to the Canadian Motor Vehicle Safety Standard (CMVSS) 302 and will occasionally be called out on a specification or part print simply as MVSS 302.

FMVSS 302 is a general safety measure which seeks to reduce the likelihood of injury or death that may result from a vehicle fire. This test, as written, involves burning two or more samples of a 356mm x 102mm x thickness (13mm maximum) plaque or section of material and measuring the burn rate in millimeters per minute (mm/min). Ignition is at one end of the sample by exposing it to a Bunsen burner flame for 15 seconds. The burn rate dictates conforming or non-conforming material, and a maximum burn rate of 102mm/min is allowed by FMVSS 302, although this criteria may be overridden by an OEM specification or part print detail.

The Society of Automotive Engineers (SAE) J369 and the International Standards Organization (ISO) 3795 are technically equivalent methods of test to FMVSS 302. However they both require burning five specimens per material.