

Investigation of Burning Behavior in the UL 94 Vertical Bunsen Burner Test

James Quintiere, Ph.D. University of Maryland

The UL-94 Vertical Burning Flammability Test (UL-94V) is studied in an attempt to predict its performance from conventional material fire properties. It is shown that the heat release parameter (HRP), its critical heat flux for piloted ignition (CHF), and the thermal response parameter (TRP) underlie most of the behavior of the test. The burner ignition premixed flame and the laminar diffusion flame of a material have a nominal heat flux of about 60 kW/m², and the flame height is found proportional to the heat release rate per unit area (HRR) to the first power. Also critical values of HRR required for ignition, sustained burning, and flame spread in the test were theoretically estimated at 80, about 250, and 300 kW/m², respectively. HRR was found to be a significant factor in correlating UL-94V ratings.