

Bunsen Burner Testing of Cabin Materials at Simulated Altitude

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A series of tests was conducted to determine the effect of altitude on FAA Bunsen burner testing. The standard 12-second vertical Bunsen burner test procedure from the FAA Aircraft Materials Fire Test Handbook was used for all testing, but the ambient air pressure was varied to represent altitudes ranging from sea level to 8000 feet. The first tests completed were with the Bunsen burner flame by itself. The mass flow rate of the methane fuel decreased as the altitude increased to keep the flame height constant, which was expected because the mass of oxygen in the surrounding air also decreased. The flame temperature dropped slightly as altitude increased, but still stayed well above the 1550°F minimum. The flame was stable at all altitudes and no visual differences were noted as the air pressure decreased. Four different materials were tested as well, but only two were used across all the altitudes because they were the only ones that produced consistently long burn times, which was necessary to provide a basis for comparison. These two materials were a 1/32" thick glass epoxy and a 1/32" thick woven carbon fiber. The decreased ambient air pressure of the higher altitudes did not significantly affect the flame times or burn lengths of the two materials tested.