

A Comparison of Composite and Aluminum Fuel Tanks Under Simulated Flight Conditions

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In response to potential fuel tank safety issues highlighted by the TWA flight 800 accident in 1996, the Federal Aviation Administration has conducted a significant amount of research studying the flammability of traditional aluminum fuel tanks. This research, along with the development and demonstration of a fuel tank inerting system has led to recent regulations requiring the reduction of flammability within high risk fuel tanks. Traditionally, fuel tanks located in the wing of an aircraft are considered to be of low flammability due to the rapid cooling that occurs in flight through the aluminum skin of the aircraft. There have however been recent advances in composite materials, and these advanced materials are increasingly being used in the construction of aircraft. The thermal properties of these composite materials cause them to retain heat significantly more than aluminum. As such, research must be performed on fuel tanks consisting of these new composite materials in order to determine the effect that this heat retention may have on the flammability exposure of aircraft wing tanks.

Tests were performed at the William J. Hughes Technical Center by the Fire Safety Branch of the Aircraft Research and Development Division using the environmental chamber as well as the air induction facility (wind tunnel) to examine the variation in flammability exposure of a fuel tank consisting of a composite material skin versus that of a traditional aluminum skin.