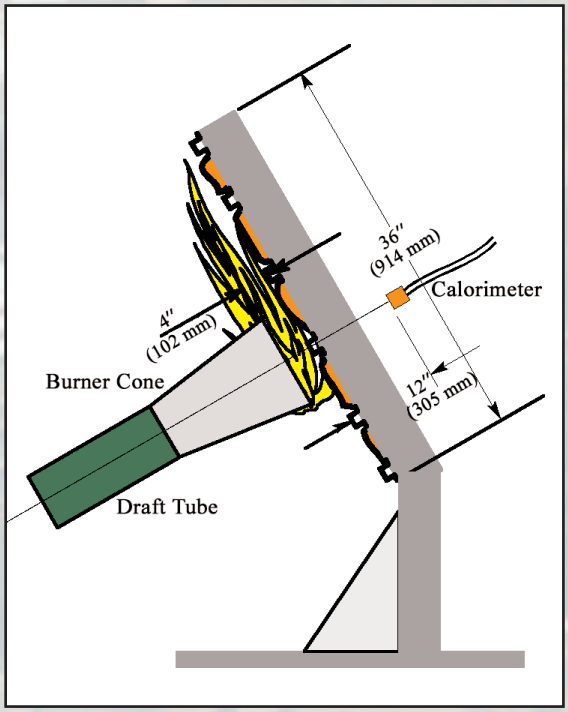
Aircraft Components Fire Test Facility, Building 287

The Aircraft Components Fire Test Facility houses two test bays, 2000 sq ft. and 1600 sq ft. respectively, designed and used for component or intermediate-scale fire tests.

Both bays are 20 feet high and are accessed through large rollup doors. Both bays are constructed of fireproof materials and contain large blowout panels for explosion protection. Centrally located instrumentation and control rooms contain test monitoring and data collection equipment that is connected to the bays via under-the-floor conduits. In addition to the test bays, the building includes a small work and buildup area, a conference room, a computer laboratory, and office space for six fire safety personnel.

Thermal Acoustical Insulation

High-priority testing in the facility has included the development of new fire test criteria for thermal acoustical insulation that are now required in the rule, "Improved Flammability Standard for Thermal Acoustic Insulation Materials Used in Transport Category Airplanes," adopted by the Federal Aviation Administration (FAA) on July 31, 2003. The new criteria are comprised of two separate fire tests for postcrash and in-flight fires. (1) The postcrash fire test measures fuselage burnthrough against a large external fuel fire. Its main components are a large burner and a fuselage frame test section. (2) The in-flight fire test measures ignition and flame propagation on an insulation blanket subjected to an in-flight fire. Its main components are a piloted ignition source, radiant heater, and horizontal sample holder. Both test methods are currently being modified and are undergoing round-robin testing in different laboratories to improve their repeatability (within a laboratory), reproducibility (between laboratories), and ease of operation.



Fuel Tank Inerting

Testing related to fuel tank explosive hazards is also conducted in the facility. Jet A fuel in a fuel tank test article is heated (or cooled) to measure the amount of time required for the ullage fuel vapor concentration to rise above (or drop below) the lean explosive limit. The test results have been employed to evaluate an aircraft manufacturer's proposal to prevent heated center

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wing fuel tank explosions by reducing the quantity of residual fuel below a specified critical level. The capabilities and characteristics of a hollow-fiber nitrogen gas generation system for fuel tank inerting were recently determined and documented. Testing was also conducted in a 1/4-scale model of a Boeing 747 center wing fuel tank to design the tank manifold for a nitrogen-enriched air distribution system.

Flight Data Recorders

Past projects have included the development of new fire test standards for flight data recorders, which included propane burner tests as well as long-term elevated temperature tests using a high-temperature programmable oven. The results were used in the development of a new Technical Standard Order for flight recorders.

Solid Oxygen Generators

The testing of solid oxygen generators was conducted under various scenarios. This included testing a single canister under various conditions up to full-scale tests of over 100 generators in a B727 cargo compartment. The results were used as part of the ValuJet investigation and in the justification for rulemaking to eliminate class D cargo compartments.

Halon 1301 Replacement

Testing was conducted to develop a methodology to use an environmentally friendly gas as a substitute for Halon 1301 in certification testing of fire suppressant and extinguishing systems. By substituting an ozone-friendly gas for Halon 1301 (an ozone-depleting gas), less Halon 1301 would be expended during the certification tests of new systems.

The cargo compartment fire suppression testing included comparisons of class D and class C cargo compartments for various fire threats and suppression systems. The test article used was a B727 cargo compartment. A number of fire scenarios were evaluated, including exploding aerosol cans. The suppression systems that were evaluated ranged from the presently used Halon 1301 system to nonconventional water mist systems. This work was done in support of rulemaking that requires fire detection and suppression systems in all cargo compartments.

Aircraft Wiring

Currently, fire tests are being conducted in a mockup of the attic space above the cabin ceiling where large quantities of wire bundles are routed. The objective is to determine the adequacy of the current FAA fire test requirement for aircraft wiring.

To find out more about the Aircraft Components Fire Test Facility, contact:

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