

TAMING THE FLAME

Fire Ruling Assigns New Task to Insulation

BY DARIUS NIKUSERESHT—
LOS ANGELES



Flight Environments' cocoon-like insulation system covers nearly all the interior structures of a fuselage. The company's weight-conscious products (over 500 units produced) are installed on business and VIP aircraft, including a Saudi-owned Boeing 747-400 currently undergoing modification at Jet Aviation, Switzerland. A key customer requirement of the \$247 million interior package is that it be very quiet.

On September 2, 2003, the Federal Aviation Administration (FAA) finalized the ruling on Improved Flammability Standards for thermal/acoustic insulation materials used in Transport-category aircraft. The regulations are intended to enhance the safety of civil aviation by reducing the possibility that insulation materials used in airplanes will contribute to either the spread of fire within airplanes or the penetration of external fire into airplanes. This final rule requires new airplane type designs to include insulation that passes improved flammability tests. It also requires manufacturers of new airframes that enter service after a phase-in period to equip them with insulation that passes improved flammability tests. Finally, it requires air carriers to use insulation meet-

ing the new flame propagation requirements when they replace insulation.

FAA-approved testing laboratories are scheduled to be up and running within two years.

Thermal/acoustic insulation has long been an option for additional comfort, but with this ruling, the FAA has mandated new flammability tests and criteria that address flame propagation and entry of external fire into the aircraft fuselage with the intent of reducing the incidence and severity of cabin fires, and providing additional time for evacuation.

"The ruling was intended very simply to

add additional protection for passengers," said Eamon Halpin, President and CEO of Flight Environments, Inc. (FEI), a leading thermal/acoustic insulation manufacturer. "For the first time, insulation, which has always been considered thermal protection for passengers, is now taking on a different role. A role of protection."

When the original proposal was released approximately three years ago, Paso Robles, California-based FEI began testing its materials at independent laboratories. The impact of the testing encouraged the firm to modify the

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thermal/acoustic insulation systems it manufactures to meet the proposed criteria.

"When the FAA issued its Notice of Proposed Rulemaking in September 2000, we began testing all our existing materials used in our systems and the selection worldwide of additional/alternative materials to enhance performance and to meet the new criteria," said Halpin. "In 2001, we started implementing systems with our new material selections, designed to meet the proposed requirements of the FAA ruling. At this point we have very successfully treated a large number of aircraft, including Boeing BBJs, 727s, 737s and 747s.

"We now look forward to the selection process of the test centers so that we can verify compliance. For the first time in our industry, the bar has been raised as regards to the standards that apply to thermal and acoustic insulation. This is a good thing for our industry as a whole. For years, we have stressed the importance of quality materials. Our business is creating a quiet and thermally stable aircraft interior, and we are confident that all of our current materials will meet the requirements. Flight Environments is ahead of the curve since our products have already met the criteria in independent testing and all carry a 10-year guarantee."

WORTHY TRADE-OFF

To keep up-to-date on current developments following the release of the original proposal, FEI VP of operations, Colin Judge, attended several meetings of the International Aircraft Fire Test Working Group (IAMFTWG), which were held to discuss how the final ruling should be issued. The IAMFTWG is an advisory committee consisting of representatives from the airlines, airframe manufacturers, material suppliers and regulatory authorities that contribute to FAA research.

"The meetings were helpful and informative, and the participation by the group itself was one of the key factors in feedback to the FAA," said Judge.

One area of concern regarding the new criteria is increased cost and weight of thermal/acoustic insulation materials. The FAA has stated that the weight of the materials would effectively be doubled: "It has been recognized that this ruling will add an additional weight to the aircraft, a most critical and sensitive area to all owner/operators. However, the safety aspect considered by the FAA is believed to outweigh the additional weight and cost that may be incurred by the operators and owners."

The Final Rule: Improved Standards for Thermal/Acoustic Insulation Materials Used in Transport-category Airplanes

The Federal Aviation Administration (FAA) has released a new final rule, FM Docket No. FAA-2000-7909: Amdt. Nos. 25-110, 91 121-289, 125-43,135-85, which incorporated two new testing requirements: Flame Propagation and Flame Penetration.

This new regulation is intended to enhance the safety of civil aviation by reducing the possibility that insulation materials will contribute to either the spread of fire within the airplane (Flame Propagation) or the penetration of an external fire into the airplane (Flame Penetration). While not eliminating all damage to, or losses of, airplanes by fire, nor preventing all injuries/fatalities from airplane fires, the improved tests will ensure that insulation materials will resist the propagation of fire, thereby reducing the severity of fire and the speed with which fires spread. Furthermore, the



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tests will ensure that insulation materials will delay the penetration of an outside fire into the airplane.

The Flame Propagation test involves exposure of thermal/acoustic insulation samples to a radiant heat source and a propane burner flame for 15 seconds. The tested insulation must not propagate flame more than 2 inches away from the burner. The flame time after removal of the burner must not exceed 3 seconds. The specific details of the new Flame Propagation test are outlined in FAR 25, Appendix F, Part VI, and apply to airplane operation under Parts 91, 121, 125, and 135.

The Flame Penetration test involves exposure of thermal/acoustic insulation blankets mounted on a test frame to a burner for four minutes. The insulation blankets must prevent flame penetration during this time, and limit the amount of heat that passes through the blanket during the test. The specific details of the new Flame Penetration test are outlined in FAR 25, Appendix F, Part VII, and apply to airplanes operating under Part 121. Furthermore, this test only applies to airplanes with a passenger capacity of 20 or greater, and targets insulation installed on the lower half of the fuselage.

While the current flammability requirements almost exclusively focus on materials located in occupied compartments (FAR 25.853) and cargo compartments (FAR 25.855), there is thermal/acoustical insulation installed throughout the fuselage in other areas, such as electrical/electronic compartments or surrounding air ducts. The materials in these areas also have the potential to spread fire. With implementation of the new rule, all areas throughout the fuselage will be accounted for under the new FAR 25.856 requirements.

With regard to compliance to the new rule, all insulation blanket materials delivered on new airplanes after September 2, 2005, must meet the requirements of the Flame Propagation test. Furthermore, for in-service airplanes delivered prior to September 2, 2005, all insulation blanket replacements which occur after this date must use new materials that meet the requirements of the Flame Propagation test. At this time, Boeing does not have a definite position from the FAA on what is meant by replacement. Boeing wants to know if this term includes any insulation blanket removed from the airplane for any maintenance purpose (damage, access, etc.),

or just replacement of damaged insulation blankets (using the same damage limits as contained in the AMM today).

For compliance with the Flame Penetration requirements, the new rule only targets airplanes with a passenger capacity of 20 or greater. For these types of airplanes, delivered after September 2, 2007, the insulation materials used around the lower half of the fuselage must meet the new test. It should be noted that the Flame Penetration requirements do not affect in-service airplanes delivered prior to September 2, 2007.

At this time, Boeing is working with various material suppliers on testing/qualification of new compliant materials. Also, Boeing is developing an implementation schedule for the new compliant materials. This schedule should be available in the fourth quarter of 2003. It is Boeing's initial plan to have replacement materials ready for production airplanes well before the compliance date of September 2, 2005.

An update on this issue will be provided to all aircraft operators on or before December 18, 2003.

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