AIM AVIATION

DEPT. OF TRANSPORTATION

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Our ref: 120577 Your ref: Date: January 2nd 2001

US Department of Transportation Dockets
Docket No. FAA-2000-7909
400 Seventh Street SW
Room Plaza 401
Washington
DC 20590
United States of America

Dear Sir or Madam,

Docket No. FAA-2000-7909; Notice No. 00-09 – 10
Improved Flammability Standards for Thermal/Acoustic Insulation Materials Used in Transport Category Airplanes

AIM Aviation is a group of seven trading companies located in Europe and the United States whose business is the design and manufacture of complete aircraft interiors and modifications to the interiors of certified aircraft, which includes design and manufacture of thermal/acoustic insulation blankets for airframe structures and systems. This letter contains the consolidated comments from all AIM Aviation companies upon the "Improved Flammability Standards for Thermal/Acoustic Insulation Materials Used in Transport Category Airplanes; Proposed Rule" dated Wednesday, September 20, 2000.

In this letter headings printed in *italics* are headings in the NPRM document.

AIM Aviation Comments on the Proposed Rule

Proposed Part 25 Requirements

AIM Aviation supports the introduction of new flammability tests for thermal/acoustic insulation to replace the current FAR 25 Appendix F Part I Vertical Tests.

Flame Propagation

AIM Aviation supports the application of the proposed new tests to all thermal or acoustic insulation, in the Interior compartments occupied by crew or passengers, irrespective of its location.

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Burnthrough

Lower Half

AIM Aviation requests that the term "Lower Half" be more closely defined to clarify the FAA intent with regard to the periphery of the aircraft fuselage, transverse and longitudinal bulkheads and other insulated features within the Lower Half of fuselage. (For example, is the burnthrough test applicable to the insulation on forward and aft pressure bulkheads and pressure bulkheads forward, aft and above centre wing box areas ?).

Applicability

AIM Aviation agrees that the new burnthrough requirement should be applicable only to airplanes with a passenger capacity of 20 or greater.

Installation Details

Tests performed by the UK CAA have highlighted the criticality of the means of fastening blankets and the detail design of blanket overlaps to the maintenance of the burnthrough integrity of the installed insulation system.

Although the proposed rule does not require replacement insulation in aircraft to meet the burnthrough test, AIM Aviation is aware that some operators plan to voluntarily introduce burnthrough resistant blankets as replacements, with the objective of improving occupant safety.

AIM considers that the installation of burnthrough resistant blankets as replacements for those originally installed without modification of the attachment methods and seams would not represent an increase in safety. AIM suggests that the advisory material must make it clear that it applies to replacement burnthrough insulation, not just insulation installed in "new designs" and "newly manufactured airplanes".

Fuselage Burnthrough Alternative

AIM Aviation considers that there should be formal requirements to prevent removal of insulation from certified Part 25 aircraft with more than 20 passengers, as a means of avoiding compliance with the proposed burnthrough test.

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Equivalency (Applies to both Burnthrough and Flame Propagation)

AIM Aviation requests that the detail of the proposed test methods be included in an early revision to DOT/FAA/AR-00/12 "Aircraft Materials Fire Test Handbook" and that the Cotton Swab test contained in that document be deleted.

Proposed Operating Requirements

AIM Aviation concurs with the FAA's intent to introduce improved materials through changes in the operating requirements.

Flame Propagation

New Production

AIM Aviation agrees that newly manufactured airplanes operating in Parts 91, 121,125 and 135 should be required to comply with the new flame propagation requirement from two years after the date of publication of the final rule.

Whilst suitable materials do exist, they do carry a cost penalty of at least 34% compared with the present generation materials in widespread use (depending upon current material type). Insulation blanket manufacturers cannot absorb this additional cost. There will therefore be an effect upon the cost of new production aircraft. The new materials are also typically 39% heavier than present materials, resulting in a weight gain of approximately 80 pounds on a typical single deck twin aisle transport aircraft.

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AIM Aviation Certification Concerns

AIM Aviation is concerned that Certification of new (or replacement) insulation meeting the flame propagation requirement of the proposed 25.856 by the proposed effectivity date may be difficult. This is because of the lack of operational test apparatus available to the insulation blanket industry for certification tests. AIM Aviation is concerned that the test method is still under development by the FAA Technical Centre, and that the proposed method of demonstrating acceptability of test chambers is by comparison by the "round robin" process. Previous examples of test development by this method have required up to thirteen years for the test method and apparatus to stabilise. (Thirteen years is the time between publication of NPRM 87-10 and the publication of the Aircraft Materials Fire Test Handbook, the definitive documentation of the acceptable Heat Release and Smoke Density test methods.)

Replacement

AIM Aviation concurs with the FAA intent to require replacement insulation to comply with the new flame propagation requirements.

However replacements will involve a moderate cost and weight penalty compared with new insulation of the current construction. However as most installed insulation blankets gradually increase in weight due to moisture absorption, it is likely that the replacement insulation will represent a weight reduction at the time of installation.

AIM Aviation agrees that replacement insulation installed in airplanes operating in Parts 91, 121, 125 and 135 should be required to comply with the new flame propagation requirement from 2 years after the date of publication of the final rule.

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Method of Certification of Replacement Insulation on an Piecemeal Basis

AIM Aviation is concerned that the NPRM does not address the intended method of Certification of replacement insulation installed on an attrition basis. As the replacement insulation blankets will have an effect on the weight, and flammability characteristics affecting the airworthiness of the aircraft, we consider that replacement would normally be classified as a Major Change to the Type Design. This would invoke Type Certificate Amendment or Supplemental Type Certificate procedures.

Insulation blankets are normally replaced during scheduled maintenance activities on commercial aircraft, and only when individual blankets are damaged. Replacement of a small number of individual blankets or small groups of blankets is normal. Different blankets are often replaced on different serial numbers of the same aircraft type. If each installation of individual replacement blankets requires a Type Certificate Amendment or an STC, the administration effort by the responsible design organisation, the aircraft operator and the FAA will be onerous.

Alternatively an STC application could be submitted for all insulation in selected areas of a particular aircraft type. However approval would not be granted until a complete installation had been subject to a conformity inspection. This could place an onerous out-of-service time burden on the aircraft operator and require removal of interior parts and premature replacement of insulation blankets that have not been damaged. Should it be subsequently permitted for part of the STC embodied (for example if only insulation blankets around one door need replacement), the operator must maintain a database of insulation blankets for each affected aircraft. This must record which part numbers and in which locations superior blankets have been installed. Some aircraft types have several thousand individual blankets. This is an onerous task for operators to develop and maintain.

AIM Aviation is concerned that unless a simple fleet-wide certification approach is agreed in advance and published, these procedural difficulties could dissuade operators from replacing defective blankets on an attrition basis, resulting in no increase in safety. Would the FAA consider that replacement of insulation to meet the flame propagation requirement is a Minor Change?

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Burnthrough Protection

New Production

AIM Aviation supports the FAA's intent that all newly manufactured airplanes entering the part 121 fleet four years after publication of the final rule should have insulation complying with the proposed burnthrough test in the lower half of the fuselage.

However AIM Aviation is concerned that development and Certification of new (or replacement) insulation meeting the flame penetration requirement of the proposed 25.856 by the proposed effectivity date may be difficult. This is because of the lack of operational test apparatus available to the aircraft insulation blanket industry for certification tests. AIM Aviation is concerned that whilst the test method has apparently reached maturity at the FAA Technical Centre, other test houses are not able to reproduce the results and the cause of the lack of reproducibility is not understood. As it is not intended for the FAA Technical Center to be used for Certification tests a serious logistical problem exists.

Whilst it has been demonstrated to the IAMFTWG that at least three approaches to the burnthrough requirement can be successful, two of them have substantial cost and weight penalties and the third has cost plus inferior acoustic properties and potential corrosion problems. AIM Aviation believes these difficulties may be overcome through sustained research and development in the next two years, but this development will need unlimited access to "approved" test apparatus.

Replacement

Some airline operators who are AIM Aviation's customers have indicated that they intend to retrofit insulation meeting the proposed FAR 25.856 burnthrough test even though this is not proposed by the NPRM. (This is consistent with those operators commitment to safety. It is not uncommon for operator's commercial agreements with interior suppliers to invoke standards in excess of the minima required by the FAA/JAA.) In these instances the operator would replace the entire "lower half" insulation, involving design changes to comply with the "good practice" to be published in the proposed Advisory Material.

Some operators do not intend to wait until two or four years from the date of the final rule before implementing this policy. The availability of operational Certification test apparatus is therefore critical to satisfying this market demand.

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Costs of Proposed Rule

AIM Aviation does not agree with the FAA that: -

> "...some materials that would meet the proposed test requirements cost and weigh no more than materials currently being installed in newly-produced airplanes."

AIM Aviation has evaluated moisture barrier materials that are capable of meeting the proposed flame propagation test from all major material manufacturers. At this date all materials are more expensive than the materials that are in present widespread use, typically by a minimum of 34%. In addition the most commercially acceptable replacement materials are heavier than the materials that they would replace, typically by 39%.

AIM Aviation has evaluated construction approaches that would meet the proposed burnthrough test in addition to the proposed flame propagation test. At present all have cost, weight or reduced acoustic performance penalties.

We estimate that at present the lowest weight construction without performance degradation would add in excess of $25,000 in material costs alone to a typical single deck, twin aisle aircraft.

This construction would add in excess of 205 pounds to a typical single deck, twin aisle aircraft. Other likely successful approaches would add up to 600 pounds to the same aircraft.

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Minor Editorial Comments

Appendix F Part VII – Test Method to Determine the Burnthrough Resistance of Thermal/Acoustic Insulation Materials

***Paragraph (b)(8) Test Chamber* (and subsequent paragraphs and sub-paragraphs)**

Paragraph and sub-paragraph numbers appear to need some revision.

Paragraph (8)(i)(3)(iii) Moisture Barrier Film

After

"... if a polyimide film is used in conjunction with ..."

It appears that at least one line of the draft has been omitted.

This concludes the comments of AIM Aviation upon the Proposed Rule, Notice No.00-09.

Yours sincerely,

R John Heath

Head of Airworthiness, Certification, Research & Development

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