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U.S. Department of Transportation Dockets
Docket No. FAA-2000-7909 -18
400 Seventh Street SW.,
Room Plaza 401
Washington, DC 20590

Subject: Comments regarding FAA NPRM, 14 CFR Part 25 et al., "Improved Flammability Standards for Thermal/Acoustic Materials Used in Transport Category Airplanes; Proposed Rule", issue date, September 20, 2000.

Ladies and Gentlemen:

We appreciate the opportunity to respond to the subject NPRM. As outlined in the text, the NPRM addresses two issues covering new flammability standards for aircraft thermal/acoustic insulation materials. These are:

- Flame Propagation
- Entry of an external fire into the aircraft. (Burnthrough)

1.0 General

Orcon is pleased to contribute to the research and development of new insulation materials to protect against flame propagation and external fire burnthrough in aircraft.

Orcon is in favor of the implementation of the proposed rule which contributes to enhanced airline passenger safety. We respectfully provide the following comments and recommendations for your consideration.

2.0 Flame Propagation

- 2.1 General – Orcon concurs with the NPRM that existing insulation films, while meeting existing FAR regulations, can contribute in some cases as fuel for an onboard fire. Improved materials are needed to enhance passenger safety.
- 2.2 Effectivity Date – We recommend one year from the date of the final rule for implementation of the flame propagation requirements because:
 - 2.2.1 Materials are currently in production that meet the flame propagation requirements.
 - 2.2.2 Manufacturing methods are in place to utilize these materials in insulation blanket production. In addition, no change in blanket design is required.
 - 2.2.3 Some airlines in the aviation industry are already making the changeover in the interest of aircraft safety.
 - 2.2.4 We suggest that the implementation time for new aircraft to be one year. This would also apply to the repair and replacement of blankets in existing aircraft as noted in the NPRM.
- 2.3 Costs – Costs for the new insulation films are estimated to somewhat higher than for current films.

2.0 Flame Propagation (Continued)

- 2.4 Test Method- We concur with FAA comments that Bunsen burner (12 second vertical burn) test methods are not adequate and that new criteria need to be established. The radiant panel test method as outlined in the NPRM appears to be a good supplemental flammability test. We believe the 12 second vertical burn test plus the “Q-tip” test for flame propagation referred to in the Handbook should be required. Further comments on test methodology as outlined in the NPRM are as follows:
- 2.4.1 Page 57010, paragraph (e) Calibration. (1) After...”install the holding frame.” insert “Also install an insulation board to cover the rest of the frame to assure replication of actual test conditions.”
 - 2.4.2 Page 57010, paragraph (f) Test procedure(2) Insert “Place an insulation board in the sliding platform holder to provide support for the test specimen.”
 - 2.4.3 Page 57011 paragraph (h) requirements (2); replace this paragraph with the following, “After flame may not exceed 3 seconds.” which would be applicable to each and every sample tested.

3.0 Burnthrough.

3.1 General –

- 3.1.1 We recommend the burnthrough time be 6 minutes. Six minutes of burnthrough protection can be achieved with little or no cost impact over that which would be required for the 4 minute burnthrough limit. Materials are currently available to achieve this performance.
- 3.1.2 The NPRM states that the lower half of the aircraft is to have protection. In the interests of clarity, definition of “Lower half” would be helpful. (i.e. from waterline X to waterline Y, or from stringer no. A to stringer no. B, or from top or bottom of windows to bottom of bilge)
- 3.1.3 Consideration should be given to requiring burnthrough protection for the entire aircraft. This would be in the interests of design consistency and reduction of installation errors during repair or replacement, which could result in gaps in fuselage burnthrough protection, adversely affecting passenger safety.

3.2 Effectivity Date – We recommend 2 years from the date of the final rule;

- 3.2.1 Materials are currently available that meet the burnthrough requirements.
- 3.2.2 Installation methods have been established.
- 3.2.3 New aircraft: We recommend two years from the date the rule is final.
- 3.2.4 Existing aircraft: We recommend that all blankets that are removed from the lower lobe for replacement during major maintenance checks two years after the final rule is issued, be replaced with blankets that meet the new burnthrough requirements.

- 3.3 Costs – Although material costs are expected to provide a very small increase in overall insulation system cost, actual costs will be finalized based on the final rule, and insulation blanket design criteria.

3.0 Burnthrough (Continued)

3.4 Test Method – Small scale tests have been established to reflect realistic fire conditions. In our testing utilizing the FAA recommended burnthrough test apparatus, we have observed the following:

- 3.4.1 We recommend reduction of allowable heat flux to 0.5 BTU ft²/sec. to curtail the chance of excessive heat buildup and possible flashover. Allowable heat flux of 2.0 BTU FT²/sec appears to be excessive as it allows substantial heat buildup in the rig area backface. The attached curves show a typical heat flux buildup with non-insulative burnthrough material (ceramic) vs. minimal heat buildup with insulative burnthrough protection materials (Curlon).
- 3.4.2 Distance of the calorimeter mount to the front face of the burn surface appears to be excessive. Heat flux should be measured in accordance with where the interior sidewall is located on the aircraft. This is usually no more that 4 inches away from the aircraft fuselage skin. The degree that heat can be trapped in the small space between the fuselage skin and aircraft sidewall should be considered in the small scale tests. Current test methods do not appear to address the flashover possibility when heat buildup occurs in a small space. We believe that a limit of 0.5 BTU ft²/sec. in combination with closer mounting of the calorimeter to the burn face will provide more realistic test parameters than currently suggested.
- 3.4.3 We suggest a test program be established to simulate the actual enclosed conditions representative of an aircraft fuselage section to determine if excessive heat buildup due to uninsulated heat flux can promote flashover of the aircraft sidewall panel

Thank you for your consideration.

Very truly yours,



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Burnthrough Performance of Refractories (Ceramic) vs. High Performance Insulation (Curlon®)

