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January 16, 2001

U.S. Department of Transportation Dockets
Docket No. FAA-2000-7909 -16
400 Seventh Street SW
Room Plaza 401
Washington DC 20590

To Whom It May Concern:

In response to the Notice of Proposed Rulemaking Docket No. FAA-2000-7909: Notice No. 00-09, (referenced in this document as the Proposed Rule) we respectfully submit the following comments regarding Burnthrough Protection of aircraft.

Background Information 1:
In Appendix F, Part VI, the Proposed Rule describes the test method used to evaluate the flammability and flame propagation characteristics of thermal/acoustic insulation when exposed to both a radiant heat source and a flame. The Proposed Rule requires a minimum of three test specimens of each material is to be prepared and tested. The Proposed Rule further states that "Of the three specimens tested, only 1 specimen may have an afterflame. That afterflame may not exceed 3 seconds."

Comment 1:
While we support the intent of the proposed test method, we suggest the following change in the requirements. *Rather than allowing one specimen to have an afterflame of no more than 3 seconds we propose that the total afterflame times for the three samples not exceed 3 seconds.* The test is dependent on human factors *i.e.* the ability to remove the burner after exactly 15 seconds of burn time and the ability to accurately measure afterflame time length by visual observation and stopwatch timing. By allowing test results of, for example, 1, 0, and 2 seconds, rather than only 0, 0, and 3 seconds, the subjectivity of the test can be compensated for without jeopardizing the safety improvement intended by the test.

Background Information 2:
The Proposed Rule limits the requirement for burnthrough protection to newly manufactured airplanes that are manufactured more than 4 years after the effective date of the final rule. Yet the Proposed Rule recognizes that there are currently available materials that meet the proposed standard. The four-year delay after the effective date of the final rule was justified for the purposes of

effecting design changes, primarily in the area of fastening techniques, and for obtaining the necessary approvals for such design changes. However, the Proposed Rule states at page 56996 under the section titled *Installation Details* "Since research has shown practical fastening means are available for ensuring that the insulation material remains in place, it is proposed that fastening means be considered for newly manufactured airplanes." A fastening technique that holds flame resistant insulation materials in place is also illustrated in the Proposed Rule in Figure 7--Test Specimen Installation on Test Frame.

Comment 2:
Because materials and fastening techniques that will meet the burnthrough requirements already exist, the four-year delay *before implementation of the newly built aircraft must incorporate burnthrough protection for the fuselage seems too long.* This is particularly true in view of the statement on page 3 of the Proposed Rule that states that the "FAA has adopted an aggressive program to improve airplane fire safety."

Background Information 3:
The Proposed Rule cites the study of 140 worldwide fire related fatal accidents in the International Cabin Safety Research Technical Group's Survivable Accidents Database done by Cherry & Associates (post 1993.) The Proposed Rule cites Cherry's estimate of 10.1 lives saved per year worldwide and states that the FAA has adjusted this estimate downward due to the Proposed Rule's application to only new airplanes of U.S. registry. The Proposed Rules goes on to cite the expected increase in the number airplanes in the U.S. fleet and the number of passengers enplaned and states that the FAA estimates the number of lives saved per year would increase by 2.157 percent per year due to these increases. Therefore the FAA's estimate for the period 2000-2019 is "37.2 fatalities that would have occurred in planes of U.S. registry would be avoided over 20 years by the proposed rule's requirements." The Proposed Rule will require burnthrough protection for only airplanes operated under part 121 because airplanes operated under parts 91, 125, and 135 carry fewer passengers and can, as a result, be evacuated more quickly. However, the Proposed Rule also requires replacement of insulation materials that do not meet proposed flammability and flame propagation requirements for airplanes operating under parts, 91, 121, 125, and 135.

Comment 3:
The Proposed Rule should be expanded to include the addition of burnthrough protection to those aircraft already having the insulation removed to meet the requirements of AD14 CFR Part 39 and the requirements of the Flame Propagation section of the Proposed Rule. By doing so, additional lives can potentially be saved with a minimum increase in maintenance effort and cost. All

replacement blankets on any existing aircraft should be required to provide a minimum of 4 minutes of burnthrough protection. This would include blankets that, during maintenance, must be replaced due to deterioration of materials or damage from mishandling. *Replacement blankets should provide the best available technology for all aspects including burnthrough protection.*

Background Information 4:
The Proposed Rule requires that insulation blanket test specimens resist flame penetration for 240 seconds (4 minutes.) It is presumed that this number is based on the Cherry & Associates estimate that an additional 4 minutes of evacuation time would save an additional 10.1 lives per year in survivable accidents.

Comment 4:
We submit that passenger survival would also be dependent on the availability of breathable air and visibility allowing navigation to an evacuation cite. None of the test methods for evaluating flammability, flame propagation, or burnthrough resistance cited in the Proposed Rule monitor gaseous emissions or smoke density. We recommend the additional requirement that all burnthrough protection materials be required to pass a smoke rating test such as ASTM E-84 or ASTM E-662 with limits for this application to be established. During Round Robin Testing of candidate materials conducted in our laboratory as part of the International Aircraft Materials Fire Test Working Group (IAMFTWG) several candidate materials evolved smoke of such volume and density that the building in which the tests were conducted had to be evacuated. This building is designed for burn tests and the ventilation is adequate for other burn tests including E-119. The offending candidate materials met the requirements for flame penetration resistance and heat flux but based on smoke evolution do not make good candidate materials for burnthrough protection of aircraft.

Background Information 5:
The Proposed Rule states that the only the lower portion of the fuselage is required to contain enhanced burnthrough protection because the lower portion of

the fuselage is the area most likely to be impinged upon by an external fuel fire. The Proposed Rule also states that the additional costs associated with providing this same protection to the remainder of the airplane are not great. According to the Proposed Rule, the use of burnthrough resistant insulation materials is not required when replacing insulation materials in aircraft because: "If the fuselage is subjected to an external fire, it is unlikely that insulation complying with this standard that has been installed in a portion of the fuselage would significantly delay burnthrough if the rest of the fuselage contains insulation that does not comply with the new standard. As discussed previously, in order to be effective against burnthrough, new insulation materials would also have to be installed in a

manner that would allow them to remain in place when exposed to an external fire."

Comment 5:
Due to the orientation of the aircraft during the incident or the height of the flames, an aircraft may encounter fuel fed flame on other portions of the aircraft not requiring burnthrough protection under the Proposed Rule. *Therefore we believe the entire fuselage should be established to meet the burnthrough requirement to add an additional level of protection from external fuel fed fires. This would also provide an increased level of protection from other possible ignition sources such as lightning strike.*

Background 6:
In the section on Costs of Proposed Rule, the FAA cites the use of a blanket made of 2 inches of fiberglass batting and 1 inch of Curlon® batting as the model for cost calculations in calculating the impact of the Proposed Rule on cost. The Proposed Rule also states that "other materials may also be used, but these may be more expensive or add substantial weight to the blankets." It is also stated that the "FAA solicits information concerning the materials that would be used to comply with the proposed requirements."

Comment 6:
We would like to make known that 3M™ Nextel™ Flame Stopping Dot Paper has the following attributes pertinent to the Proposed Rule and the comments we have submitted:

- it is a currently available technology from established manufacturing facilities capable of meeting the quantity requirements anticipated in the NPRM. Six months is sufficient time to establish any required inventory of the product.
- it has been demonstrated to meet the requirements of the Proposed Rule in multiple test scenarios including a full scale burn test
- it is applicable to both new and retrofit aircraft insulation
- it can be incorporated into fuselage insulation blankets without changes to the fabrication methods
- it is an inorganic material and therefore does not evolve smoke or other volatile combustion products when in contact with flame

The FSDP weight is 80 grams per square meter. To install the material on a typical MD 80 aircraft, an estimated quantity of 3000 square feet of material would be required to cover the entire fuselage area. This would add additional weight of approximately 55 pounds for the FSDP product. A MD 11 requires

approximately 10,000 square feet to cover the entire fuselage adding approximately 185 pounds per aircraft.

We would be happy to furnish any additional information or respond to any additional questions that the Department of Transportation may have about anything in this letter. Please feel free to contact Suzanne Nelson at (651) 733-9488.

Sincerely,

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Executive Director, Research and Development