



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2012-0984; Special Conditions No. 25-468-SC]

Special Conditions: Embraer S.A., Models EMB-135 and EMB-145 Series; Airplane Seats with Non-Traditional, Large, Non-Metallic Panels

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Embraer S.A. Models EMB-135 and EMB-145 series airplanes. These airplanes will have a novel or unusual design feature associated with the airplane seats that have non-traditional, large, non-metallic panels that would affect survivability during a post-crash fire event. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: The effective date of these special conditions is September 11, 2012. We must receive your comments by **[Insert date 45 days after date of publication in the *Federal Register*]**.

ADDRESSES: Send comments identified by docket number [FAA-2012-0984] using any of the following methods:

- Federal eRegulations Portal: Go to <http://www.regulations.gov/> and follow the online instructions for sending your comments electronically.

Mail: Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE, Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.

Hand Delivery or Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue SE, Washington, D.C., between 8 a.m. and 5 p.m., Monday through Friday, except federal holidays.

Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://www.regulations.gov/>, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478), as well as at <http://DocketsInfo.dot.gov/>.

Docket: Background documents or comments received may be read at <http://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, D.C., between 9 a.m. and 5 p.m., Monday through Friday, except federal holidays.

FOR FURTHER INFORMATION CONTACT: Jayson Claar, FAA, Airframe and Cabin Safety Branch, ANM-115, Transport Airplane Directorate, Aircraft Certification Service, 1601

Lind Avenue SW., Renton, Washington 98057-3356; telephone 425-227-2194; facsimile 425-227-1232.

SUPPLEMENTARY INFORMATION:

The FAA has determined that notice of, and opportunity for prior public comment on, these special conditions are impracticable because these procedures would significantly delay issuance of the design approval and thus delivery of the affected aircraft. In addition, the substance of these special conditions has been subject to the public comment process in several prior instances with no substantive comments received. The FAA therefore finds that good cause exists for making these special conditions effective upon issuance.

We anticipate that seats with non-traditional, large, non-metallic panels will be installed in other makes and models of airplanes. We have made the determination to require special conditions for all applications requesting the installation of seats with non-traditional, large, non-metallic panels until the airworthiness requirements can be revised to address this issue. Having the same standards across the range of airplane makes and models will ensure consistent ruling for the aviation industry.

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive by the closing date for comments. We may change these special conditions based on the comments we receive.

Background

On April 17, 2012, Embraer S.A. applied for a change to Type Certificate No. T00011AT to offer a new passenger seat type that, according to the applicant, is lightweight, comfortable, and slim in profile, maximizing passenger space in the Models EMB-135 and EMB-145 series airplanes. The Embraer S.A. Models EMB-135 and EMB-145 series airplanes are pressurized, low-wing, “T” tail, transport category airplanes with tricycle landing gear. They are powered by two Rolls Royce model AE3007A series engines, and carry a maximum of 50 passengers.

The applicable regulations, Title 14, Code of Federal Regulations (14 CFR) part 25, do not require seats to meet the more stringent flammability standards required of large, non-metallic panels in the cabin interior. At the time the applicable rules were written, seats were designed with a metal frame covered by fabric, not with large, non-metallic panels. Seats also met the then-recently adopted standards for flammability of seat cushions. With the seat design being mostly fabric and metal, the contribution to a fire in the cabin had been minimized and was not considered a threat. For these reasons, seats did not need to be tested to heat-release and smoke-emission requirements.

Seat designs have now evolved to occasionally include non-traditional, large, non-metallic panels. Taken in total, the surface area of these panels is on the same order as the sidewall and overhead stowage bin interior panels. To provide the level of passenger protection intended by the airworthiness standards, these non-traditional, large, non-metallic panels in the cabin must meet the standards of part 25, Appendix F, parts IV and V, heat-release and smoke-emission requirements.

Type Certification Basis

Under the provisions of 14 CFR 21.101, Embraer S.A. must show that the Model EMB-135 and EMB145 series airplanes, as changed, continue to meet the applicable provisions of the regulations incorporated by reference in Type Certificate No. T00011AT or the applicable regulations in effect on the date of application for the change. The regulations incorporated by reference in the type certificate are commonly referred to as the “original type certification basis.” Refer to Type Certificate No. T00011AT for the certification basis.

Only airplanes associated with new seat certification programs approved after the effective date of these special conditions will be affected by the requirements in these special conditions. Previously certificated interiors on the existing airplane fleet and follow-on deliveries of airplanes with previously certificated interiors are not affected.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Embraer S.A. Models EMB-135 and EMB-145 series airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Embraer S.A. Models EMB-135 and EMB-145 series airplanes must comply with the fuel vent

and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.101.

Novel or Unusual Design Features

The Embraer S.A. Models EMB-135 and EMB-145 series airplanes will incorporate the following novel or unusual design feature: These models offer interior arrangements that include passenger seats that incorporate non-traditional, large, non-metallic panels in lieu of the traditional metal frame covered by fabric. The flammability properties of these panels have been shown to significantly affect the survivability of the cabin in the case of fire. These seats are considered a novel design for transport-category airplanes that include Amendment 25-61 and Amendment 25-98 in the certification basis, and were not considered when those airworthiness standards were established.

The existing regulations do not provide adequate or appropriate safety standards for seat designs that incorporate non-traditional, large, non-metallic panels in their designs. To provide a level of safety that is equivalent to that afforded to the balance of the cabin, additional airworthiness standards, in the form of special conditions, are necessary. These special conditions supplement § 25.853. The requirements contained in these special conditions consist of applying the identical test conditions, required of all other large panels in the cabin, to seats with non-traditional, large, non-metallic panels.

A non-traditional, large, non-metallic panel, in this case, is defined as a panel with exposed surface areas greater than 1.5 square feet installed per seat place. The panel may consist

of either a single component or multiple components in a concentrated area. Examples of parts of the seat where these non-traditional panels are installed include, but are not limited to: seat backs, bottoms and leg/foot rests, kick panels, back shells, credenzas, and associated furniture. Examples of traditional exempted parts of the seat include: arm caps, armrest close-outs such as end bays and armrest-styled center consoles, food trays, video monitors, and shrouds.

Clarification of “Exposed”

“Exposed” is considered to include panels that are directly exposed to the passenger cabin in the traditional sense, and panels that are enveloped, such as by a dress cover. Traditional fabrics or leathers currently used on seats are excluded from these special conditions. These materials must still comply with §§ 25.853(a) and 25.853(c) if used as a covering for a seat cushion, or § 25.853(a) if installed elsewhere on the seat. Non-traditional, large, non-metallic panels covered with traditional fabrics or leathers will be tested without their coverings or covering attachments.

Discussion

In the early 1980s, the FAA extensively researched the effects of post-crash flammability in the passenger cabin. As a result of this research and service experience, the FAA adopted new rules for interior surfaces associated with large surface area parts. Specifically, the rules require measurement of heat release and smoke emission (part 25, Appendix F, parts IV and V) for the affected parts. Heat release has been shown to have a direct correlation with post-crash fire survival time. The materials that comply with the standards (i.e., § 25.853 titled “Compartment interiors” as amended by Amendments 25-61 and 25-66) extend survival time by approximately two minutes over materials that do not comply.

When Amendment 25-61 was written, the potential application of the requirement to seats was explored. The seat frame itself was not a concern because it was made primarily of aluminum, and there were only small amounts of non-metallic materials (e.g., a food tray table and armrest closeout, approximate total surface area of 1.5 square feet). The overall effect on survivability was negligible if these panels met the heat release and smoke requirements. Therefore the requirements did not address seats, and the preambles to both Notice of Proposed Rule Making (NPRM) 85-10 and the final rule (Amendment 25-61) specifically note that they were excluded because the recently-adopted standards for flammability of seat cushions will greatly inhibit involvement of the seats.

In the late 1990s, when seat designs were evolving to include large non-metallic panels with surface areas that would impact survivability during a cabin fire event comparable to partitions or galleys, the FAA issued Policy Memorandum 97-112-39, "Guidance for Flammability Testing of Seat/Console Installations," dated October 17, 1997. The memo noted that large surface area panels must comply with heat release and smoke emission requirements, even if they were attached to a seat. If the FAA had not issued such policy, seat designs could have been viewed as a loophole to the airworthiness standards that would result in an unacceptable decrease in survivability during a cabin fire event.

The following paragraphs are the pertinent regulatory information involving § 25.853.

NPRM 85-10 (50 FR 15038, April 16, 1985): "Seats would not be tested [to heat release and smoke emission] because the recently-adopted standards for flammability of seat cushions will greatly inhibit involvement of the seats."

Final Rule at Amendment 25-61 (51 FR 26206, August 20, 1986): “The primary purpose of the new flammability standards [heat release and smoke emission] is to ensure that interior materials with large outer surface areas will not become involved rapidly and contribute to a fire when exposed to flames.”

Final Rule at Amendment 25-66 (53 FR 32584, September 26, 1988): “Two commentors suggest editorial changes for clarity. One believes that a new [section] should be added to state that, ‘smaller items, such as windows, window shades, or curtains, as well as floor coverings, floor structure, seats, and service items, are not included and do not have to meet the requirements in (a-1) [heat release and smoke emission]. All of such materials have to meet the flammability requirements prescribed in paragraph (a) [Bunsen burner] of this part.’ As discussed in the preamble to Notice 85-10, these would be correct statements. It does not appear, however, that clarity would be enhanced by their addition. These items are clearly not required to comply with the new standards [heat release and smoke emission] due to their absence in Sec. 25.853(a-1).”

14 CFR 25.853, *Compartment interiors*, at Amendment 25-72 (55 FR 29774, July 20, 1990):

(c) For airplanes with passenger capacities of 20 or more, interior ceiling and wall panels (other than lighting lenses), partitions, and the outer surfaces of galleys, large cabinets and stowage compartments (other than under seat stowage compartments and compartments for stowing small items, such as magazines and maps) must also meet the test requirements of parts IV [heat release] and V [smoke emission] of Appendix F of this part, or other approved

equivalent method, in addition to the flammability requirements prescribed in paragraph (a) [Bunsen burner] of this section.

Final Rule at Amendment 25-83 (March 6, 1995):

“The distinction between parts with large surface areas, which must meet the new standards [heat release and smoke emission], and those with smaller surface areas is very difficult ... It is not possible to cite a specific size that will apply in all installations; however, as a general rule, components with exposed-surface areas of one square foot or less may be considered small enough that they do not have to meet the new standards. Components with exposed-surface areas greater than two square feet may be considered large enough that they do have to meet the new standards. Those with exposed-surface areas greater than one square foot, but less than two square feet, must be considered in conjunction with the areas of the cabin in which they are installed before a determination could be made.”

The intent of the heat release and smoke emission standards is to include minimum panel sizes on the order of one to two square feet. This panel size sets the acceptable level of safety in the cabin. Traditional seat designs have approximately 1.5 square feet of nonmetallic panel material per seat place (a food tray table and armrest closeout) and previously have been excluded from the heat release and smoke standards. For example, for a traditional economy class triple place seat assembly, the exclusion is 4.5 square feet. The intent of the Special Conditions is to maintain this accepted level of safety and be consistent with the average minimum panel size in the balance of the cabin interior. Therefore, we are allowing up to 1.5 square feet of nonmetallic panel material per seat place to be excluded from the heat release and smoke emission standards. However, this exclusion from heat release and smoke emission does

not provide the material additional relief from the other standards such as 14 CFR part 25 Appendix F, parts I and II. There are no changes to how those standards are applied.

The FAA recognizes that different manufacturing techniques have associated cost differences and therefore are allowing the applicant to designate which nonmetallic panels comprise the 1.5 square foot exclusion. This determination will allow for flexibility in design and a manufacturing cost savings.

Applicability

As discussed above, these special conditions are applicable to the Embraer S.A. Models EMB-135 and EMB-145 series airplanes. Should Embraer S.A. apply at a later date for a change to the type certificate to include another model on the same type certificate incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the *Federal Register*; however, as the certification date for the Embraer S.A. Models EMB-135 and EMB-145 series airplanes is imminent, the FAA finds that good cause exists to make these special conditions effective upon issuance.

Conclusion

This action affects only certain novel or unusual design features on the Embraer S.A. Models EMB-135 and EMB-145 series of airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Embraer S.A. Models EMB-135 and EMB-145 series airplanes.

1. Compliance with 14 CFR part 25 Appendix F, parts IV and V, heat release and smoke emission, is required for seats that incorporate non-traditional, large, nonmetallic panels that may either be a single component or multiple components in a concentrated area in their design.
2. The applicant may designate up to and including 1.5 square feet of non-traditional, nonmetallic panel material per seat place that does not have to comply with No. 1. A triple seat assembly may have a total of 4.5 square feet excluded on any portion of the assembly (e.g., outboard seat place 1 sq. ft., middle 1 sq. ft., and inboard 2.5 sq. ft.)
3. Seats need not meet the test requirements of 14 CFR part 25 Appendix F, parts IV and V when installed in compartments that are not otherwise required to meet these requirements. Examples include:
 - a. Airplanes with passenger capacities of 19 or less,
 - b. Airplanes that do not have smoke and heat release in their certification basis and do not need to comply with the requirements per 14 CFR 121.312,
 - c. Airplanes exempted from smoke and heat release requirements.

Definition of “non-traditional, large, nonmetallic panel” – A non-traditional, large, non-metallic panel, in this case, is defined as a panel with exposed surface areas greater than 1.5 square feet installed per seat place. The panel may consist of either a single component or

multiple components in a concentrated area. Examples of parts of the seat where these non-traditional areas are installed include, but are not limited to, seat backs, bottoms and leg/foot rests, kick panels, back shells, credenzas, and associated furniture. Examples of traditional exempted areas are: arm caps, armrest close-outs such as end bays and armrest-styled center consoles, food trays, video monitors and shrouds.

Clarification of “exposed” – Exposed is considered to include panels that are directly exposed to the passenger cabin in the traditional sense, plus those panels enveloped, such as by a dress cover. Traditional fabrics or leathers currently used on seats are excluded from these special conditions. These materials must still comply with §§ 25.853(a) and 25.853(c) if used as a covering for a seat cushion, or § 25.853(a) if installed elsewhere on the seat. Non-traditional large, non-metallic panels covered with traditional fabrics or leathers will be tested without their coverings or covering attachments.

Issued in Renton, Washington, on September 11, 2012

Ali Bahrami
Manager, Transport Airplane Directorate
Aircraft Certification Service

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