

International Aircraft Materials Fire Test Working Group

Special Conditions for Passenger Airplanes, Seats with Non-Traditional, Large Non-Metallic Panels

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Federal Aviation
Administration



Example: Notice 25-06-13-SC for 737 airplanes, although FAA intends to issue Special Conditions for all transport category airplane types with more than 19 passengers.



History

1980's, research on postcrash cabin fire; development of 2 new standards, one for seat cushion flammability, another for large surface area interior panels.

Heat release rate corollary to postcrash fire survival time. Materials that comply with the new standard extend survival time by approximately 2 minutes.

At the time these new standards were being written, the application of the heat release and smoke emission requirements to seats was investigated.

It was determined that the overall effect on survivability was negligible, therefore the requirements did not address seats. One primary reason seats were excluded was because of the recently-adopted standards for flammability of seat cushions would greatly inhibit involvement of the seats.

Background

August 8, 2005, Boeing applied for a design change to Type Certificate No. A16WE for installation of seats that include non-traditional, large, non-metallic panels in Boeing Model 737-700 series airplanes.

Type Certificate No. A16WE does not require seats to meet the more stringent flammability standards required of large, non-metallic panels in the cabin interior.

At the time applicable Rules were written, seats were designed with a metal frame covered by fabric, not with large, non-metallic panels. Seats also met the recently adopted oil burner test for cushions.

With seats designed mostly of fabric and metal, their contribution to a cabin fire had been minimized and not considered a threat.

For these reasons, seats did not need to be tested to the HRR and smoke emission requirements.

Background

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 stow 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 Title 14 CFR, Part 25, Appendix F, parts IV and V.

Example of Seat with Non-Traditional Large, Non-Metallic Panel



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Memorandum 97-112-39, Guidance for Flammability Testing of Seat/Console Installations, Oct 17, 1997

Memo issued when it became clear that 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.

Memo noted that large surface area panels must comply with heat release and smoke emission requirements, even if they were attached to a seat. In the absence of this policy, the use of panels on seat structures would have been a loophole in the airworthiness standards that would result in an unacceptable decrease in survivability during a cabin fire event.

Definition of Non-Traditional, Large, Non-Metallic Panel

A non-traditional, large, non-metallic panel 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 seat parts where these non-traditional panels are installed include, but are not limited to: seat backs, seat bottoms, 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 those panels 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. Non-traditional, large, non-metallic panels covered with traditional fabrics or leathers will be tested without their coverings or covering attachments.

Final Rule at Amendment 25-83

Final Rule at Amendment 25-83 clarified the definition of minimum panel size:

“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 can be made”.

Final, Special Conditions

...the following special conditions are issued as part of the type certification basis for Boeing Model 737 series airplanes.

1. Except as provided in paragraph 3 of these special conditions, compliance with Title 14 FR part 25, Appendix F, parts IV and V, heat release and smoke emission, is required for seats that incorporate non-traditional, large, non-metallic 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 non-metallic panel material per seat place that does not have to comply with special condition 1, above. 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 square foot, middle 1 square foot, and inboard 2.5 square feet).

Final, Special Conditions

3. Seats do not have to meet the test requirements of Title 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 Sec. 25.853, Amendment 25-61 or later, in their certification basis and are not subject to the requirements of 14 CFR 121.312,
 - c. Airplanes exempted from Sec. 25.853, Amendment 25-61 or later.

4. Only airplanes associated with new seat certification programs applied for 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.