

Proposed Special Condition on "Use of Magnesium Alloys for Passenger Seat Components"

Applicable to Airbus A350-941

Introductory note:

The following Special Condition has been classified as an important Special Condition and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of Issue

Magnesium and magnesium alloys have long been a fire safety concern, because magnesium is a flammable metal and generally difficult to extinguish once it ignites. Advances in alloys, particularly utilizing rare earth metals, appear to largely mitigate flammability issues and make magnesium alloys a potential option for use in the cabin. Airbus has proposed to install passenger seats that use magnesium alloys in many of the primary and secondary structural elements and highlighted that this deviates from the requirements of ETSO C127a (SAE ref. No. AS 8049A) which prohibit the embodiment of Magnesium materials into seat structure.

The Federal Aviation Administration conducted a series of full-scale tests simulating a survivable post-crash aircraft fire with a large external fuel fire in order to determine if the installation of seats having primary structural components (e.g., legs, spreaders, cross-tubes, seat back frame, and lower baggage bar) constructed of magnesium alloys would contribute to reduce time to flashover.

The FAA full scale aircraft fire test results demonstrate that when determined primary seat frame elements are made of good performing magnesium alloys, no additional fire hazard is introduced compared to traditional Aluminium seat frame elements.

Airbus proposes the use of magnesium alloys for the construction of the same primary seat structural components tested by the FAA during the full-scale fire test, with the addition of tray table arms having shape and dimensions acceptable to EASA.

Because Certification Specifications do not address the use of potentially flammable metal in the cabin, special conditions are needed to define the standards necessary to maintain the level of safety provided by CS-25.

Airbus A350-941 - Special Condition D-32

- Use of Magnesium Alloys for Passenger Seat Components -

- 1) It must be shown that the use of magnesium alloys in the proposed passenger seat components (legs, spreaders, cross-tubes, seat back frame, lower baggage bar, tray table arms) does not reduce post-crash or in-flight fire safety as compared with the use

of conventional aluminium alloys.

- 2) In addition, it must be shown that the magnesium alloy, when ignited, will not pose a hazard to fire fighters and/or evacuees, when using common fire suppression agents.