

Equivalent Safety Finding on Emergency exits : CS 25.807g(1) and g(7) at Amdt 15 : “Increase of Maximum Passenger Seating Capacity for Type III exit”

Applicable to Airbus A321-27xNX/-25xNX

Introductory note:

The hereby presented Equivalent Safety Finding has been classified as an important Equivalent Safety Finding 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

The design of the Airbus A321-27xNX/-25xNX models envisions the installation of two pairs of over wing exits (OWE) equipped with off-wing slides. This feature, complemented with the shift of the door 3 four frames aft, compared to the A321-27xN/-25xN models, is aimed at supporting the increase of the Maximum Passenger Seating Capacity (MPSC) from the currently certified value of 220.

The applicant has requested an Equivalent Safety Finding to increase the credit of seats permitted for OWE either used as single or as a pair.

The change is classified as Major Significant and in the frame of this change, one of the affected requirements according to the Change Product Rule assessment (CPR) is CS 25.807(g) at Amdt 15.

The CS 25.807[g(1)] at Amdt 15 requires that:

“Type and number required. The maximum number of passenger seats permitted depends on the type and number of exits installed on each side of the fuselage. Except as further restricted in subparagraphs (g)(1) through (g)(9) of this paragraph, the maximum number of passenger seats permitted for each exit of a specific type installed on each side of the fuselage is as follows:

<i>Type A</i>	<i>110</i>
<i>Type B</i>	<i>75</i>
<i>Type C</i>	<i>55</i>
<i>Type I</i>	<i>45</i>
<i>Type II</i>	<i>40</i>
<i>Type III</i>	<i>35</i>
<i>Type IV</i>	<i>9</i>
<i>[...]</i>	

and CS 25.807[g(7)] at Amdt 15 requires that:

“[...] and the combined maximum number of passenger seats permitted for two Type III exits on each side of the fuselage that are separated by fewer than three passenger seat rows is 65.”

Equivalent Safety Finding on Emergency exits CS 25.807g(1) and g(7) at Amdt 15

The equivalence justification below details the means and provisions (i.e. the compensating factors) that the applicant intends to use to demonstrate an equivalent level of safety. The new design will be compared with the currently required exit performance. By this approach it will be demonstrated that the performance will be reached or exceeded to allow the desired increase in maximum number of passenger seats permitted for the single and the dual OWE configuration.

Design / Analysis proposal

- The design features characterizing the new over-performing Type III exit are:
 - an exit opening size of 20"x41" (unobstructed opening) being 5" higher than the minimum requirements
 - a door
 - fully compliant to CS 25.813[c(6)] at Amdt 15
 - which actuation is power assisted
 - with an opening time significantly less than what prescribed by CS 25.809[b(2)] at Amdt 15 (i.e.: 10 seconds)
 - with a mechanism for immediate activation of the slide
 - an escape route (regardless of the number of the exits)
 - with a dual lane feature
 - with a width in excess of the requirements prescribed by CS 25.810[c(1)] at Amdt 15
 - with an over wing illumination level in excess of the requirements prescribed by CS 25.812[g(1)(i)] and CS 25.812[g(1)(ii)] at Amdt 15
- For the purpose of demonstrating the individual and overall increased evacuation performance the applicant will conduct:
 - door operations test to substantiate the enhanced door readiness time
 - tests to demonstrate the compatibility between the door opening time and the slide availability
 - testing and/or analysis to compare the evacuation performance of the standard Type III exit as defined by the regulation at Amdt 15 and the proposed design
 - partial evacuation test
 - for the single OWE configuration
 - for the dual OWE configuration (could be combined with the D#3 partial evacuation testing)
 - on an operationally representative aircraft configured with the minimum exit access path width in accordance with CS 25.813[c(2)(i)] and CS 25.813[c(2)(ii)]
- The outcomes of the above testing shall be combined and analysed to demonstrate the desired increased rating

Conditions for the acceptance of the ESF

The applicant should demonstrate the following conditions:

- The applicant should demonstrate through testing, with statistically significant results, that the OWE exit configuration provides a proportionate increase in evacuation performance over the standard Type III defined by the following requirements at Amdt 15:
 - CS 25.807[g(3)] – geometry
 - CS 25.809[b(2)] – opening time
 - CS 25.813[b(6)] – automatic disposal
 - CS 25.813[c(2)(i)] – access to the exit

to justify the desired increase of maximum number of passenger seats permitted for each of the OWE pair (i.e. more than 35 for single OWE and more than 65 for dual OWE configuration), achieved under a conservative approach.

- The applicant should demonstrate through an acceptable number of partial evacuation tests or a full scale evacuation demonstration, under the conditions set in CS 25 Appendix J, that the new configuration will increase the evacuation performance of the Type III emergency exits to an extent that the evacuation performance at aircraft level, considering the new desired MPSC, will meet the requirements of CS25.803(c) including the safety margins described in the associated guidance material.
- Any increase of the dimensions of the emergency exit access area (i.e. passageway, access space, main aisle, etc.) above the minimum values required by the regulations to demonstrate the desired evacuation performance will constitute a limitation of the design of the new over-performing Type III emergency exit.
- For the single OWE configuration, should the tests demonstrate an evacuation performance which would lead to a passenger credit above 40, the credit of the new over-performing Type III emergency exit will be in any case limited to 40.
- For the dual OWE configuration, should the tests demonstrate an evacuation performance which would lead to a passenger credit above 75, the credit of the new over-performing Type III emergency exit will be in any case limited to 75.