

**Proposed Equivalent Safety Finding D-28/MAX on CS 25.807(g) at Amdt 17,
JAR 25.807(d) at Ch 15, CS 25.813(a)(b) at Amdt 17, JAR 25.813(a)(b) at Ch 15**

Applicable to Boeing 737-8200/-900ER/-9

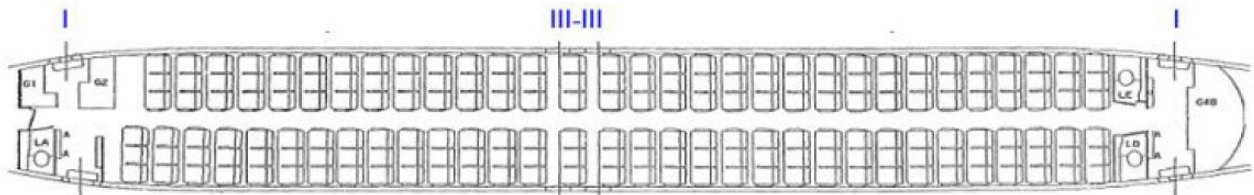
Introductory Note:

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:

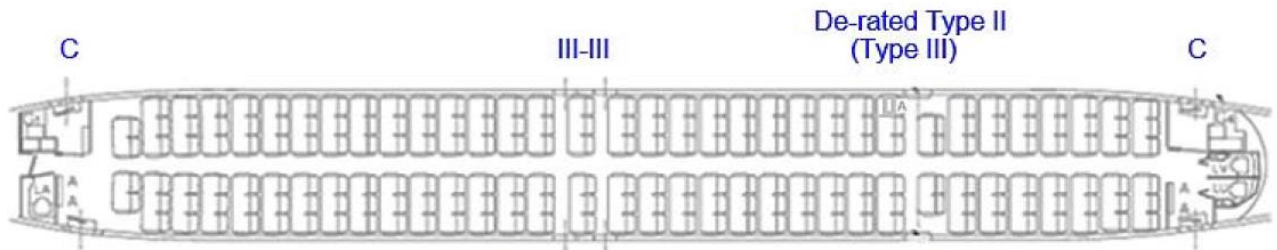
The Boeing 737-8200/-9/-900ER models are each configured with the same baseline emergency exit arrangement, which consists of two pairs of oversized Type C exits (same rating than Type I) and two pairs of overwing Type III exits. Each of these models includes an option for an additional pair of mid-cabin exits positioned between the overwing and aft exit pairs. All of the above airplanes are eligible for up to 189 passenger seats when these optional mid-cabin exits are not activated.



737-8200 (with Deactivated Mid-Cabin Exits)
189 passengers

Activating the additional pair of oversized, floor-level mid-cabin Type II exits that have escape slides significantly improves the evacuation capability of these airplanes. For airplane configurations that do not require a full Type II exit rating, there would be significant advantages if these exits could be classified as Type III exits due to their reduced passageway width requirements and no requirement for assist spaces at the exits. However, since the airplane is already configured with two pairs of Type III exits over the wing (65 passenger limitation), classifying the Mid-Cabin exits as Type III exits is effectively precluded due to the 70 passenger seat limitation for all Type III exits in CS 25.807(g)(7).

Therefore, Boeing requests that the additional pair of de-rated Type II (Type III) exits allow the 737-8200/-9/-900ER airplanes to be configured with up to 210 passenger seats based on the compensating features as outlined below.



737-8200 (with De-Rated Type II (Type III) Mid-Cabin Exits)
200 passenger configuration shown (210 exit limit)

The design of the 737-8200, 737-9, and 737-900ER aeroplanes with exit arrangements including a pair of MED emergency exits as de-rated Type II (Type III) does not comply with the following requirements unless an Equivalent Safety Finding is granted by EASA:

CS 25.807(g), Amdt 17 (737-8200):

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...

JAR 25.807(d), Change 15 (737-9, 737-900ER):

An increase in the passenger seating configuration above the maximum permitted under sub-paragraph (c) (1) of this paragraph but not to exceed a total of 299 seats may be allowed in accordance with the following table for each additional pair of emergency exits...

CS 25.813(a) and (b), Amdt 17 (737-8200), JAR 25.813(a) and (b), Change 15 (737-9, 737-900ER):

- (a) *There must be a passageway leading from the nearest main aisle to each Type A, Type B, Type C, Type I, or Type II emergency exit and between individual passenger areas. ... Passageways between individual passenger areas and those leading to Type I, Type II, or Type C emergency exits must be unobstructed and at least 51 cm (20 inches) wide.*
- (b) *Adequate space to allow crew member(s) to assist in the evacuation of passengers must be provided as follows:*
 - (1) *Each assist space must be a rectangle on the floor, of sufficient size to enable a crew member, standing erect, to effectively assist evacuees. The assist space must not reduce the unobstructed width of the passageway below that required for the exit.*
 - ...
 - (3) *For each Type C, I or II exit installed in an aeroplane with seating for more than 80 passengers, an assist space must be provided at one side of the passageway regardless of whether an assisting means is required by CS 25.810(a).*
 - (4) *For each Type C, I or II exit, an assist space must be provided at one side of the passageway if an assisting means is required by CS 25.810(a).*

**Proposed Equivalent Safety Finding D-28/MAX on CS 25.807(g) at Amdt 17,
JAR 25.807(d) at Ch 15, CS 25.813(a)(b) at Amdt 17, JAR 25.813(a)(b) at Ch 15**

Applicable to Boeing 737-8200/-900ER/-9

Applicant Proposal:

The already very good evacuation capability of the Boeing 737-8200, 737-9, and 737-900ER aeroplanes is further improved by adding the pair of proposed de-rated Type II (Type III) exits in the middle of the largest passenger cabin zone. This combination of 10 emergency exits and each of them exceeding the regulatory standards for their associated exit ratings justifies the proposed 210 airplane passenger limit.

The proposed de-rated Type II (Type III) exits (MED exits) are floor-level exits with a clear opening that is larger than that required for Type I exits. The access to these exits will be consistent with that allowed for Type III exits, except the seat adjacent to the exits will always be removed. As a de-rated Type II exit, an attendant seat will be provided near these exits. As a result, this combination of a relatively large and accessible exit with a flight attendant stationed nearby will provide evacuation capability that is more than commensurate with the relatively small increase in passenger limit (35 passengers or less).

Applicant Safety Equivalency Demonstration:

The compensating factors proposed by Boeing are summarized hereafter.

- 1) The de-rated Type II (Type III) exits are floor-level exits measuring over 50" high by 25" wide, having typical passageways associated with Type III exits, and having a flight attendant stationed near the exit pair. The design and performance of the de-rated Type II (Type III) exits will be shown to justify the elimination of the assist space and the use of the reduced passageways that are consistent with that normally allowed for a pair of Type III exits with a 35 passenger rating. This will be demonstrated with system-level evacuation testing.
- 2) Although the MED exits are designed to be operated by passengers, a flight attendant will be stationed near them and will be able to focus on managing the evacuation of passengers throughout the mid-cabin area. This mid-cabin guidance will help ensure good utilization of all exits, especially in the event one or more of the exits is unusable. The presence of a cabin crew member at the MED exits will result in an appreciable increase in the level of safety for the proposed emergency exits arrangement. In fact, the presence of the cabin crew member will reduce the risk that:
 - a MED is opened when an external post-crash fire may endanger the occupants;
 - evacuation from the MED starts before the escape slide is ready for use;
 - passengers make efficient use of all the available emergency exits.

The MED cabin attendant seat part number and installation location will be identical to the cabin attendant seat that is currently certified on the 737-900ER and 737-9 airplanes when the MED is rated as a Type II exit.

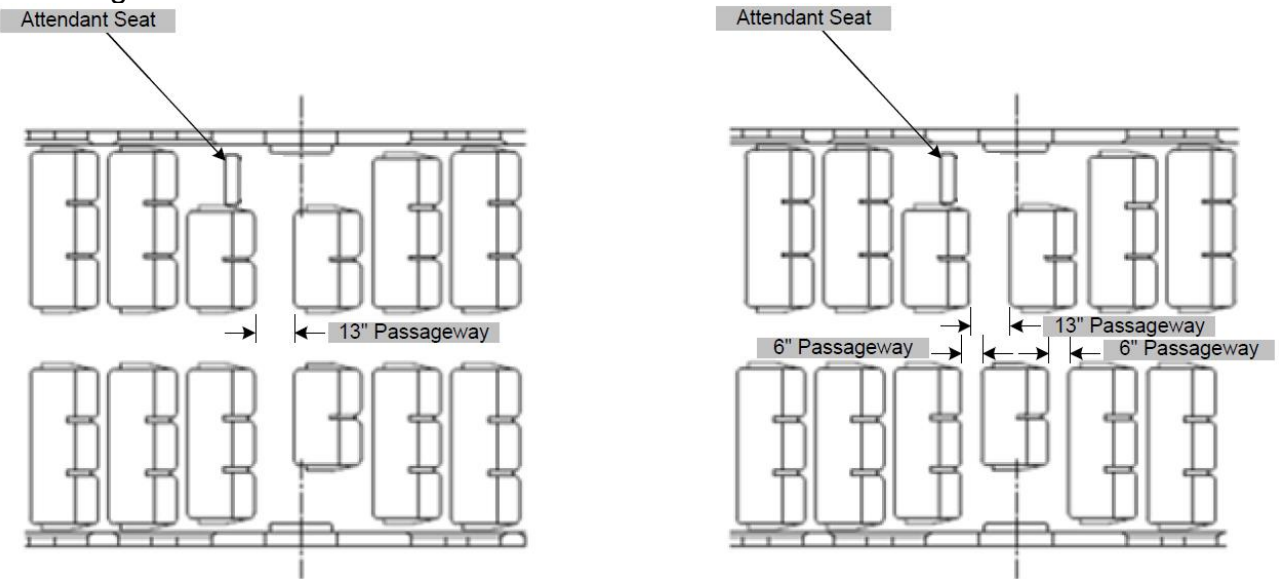
The cabin attendant seat will be located in the same forward position relative to the MED exit opening as the 737-900ER and 737-9 airplanes. See figure below for cabin attendant seat location.

There is no assist space adjacent to the MED de-rated Type II (Type III) exit. Therefore, at the initiation of evacuation, depending on the circumstances, the cabin crew member stationed at the MED may choose to open the adjacent exit or move to a position near the main aisle where they can effectively provide instructions to passengers at the MED exits on both sides of the airplane. From this position, the cabin crew member will not only be able to monitor the evacuation at both MED exits but the overall mid-cabin area, as well. They will be able to take steps to maintain balanced evacuee flow to all usable exits, and they will be able to better detect and take steps to prevent undesirable activity such as passengers attempting to retrieve bags from overhead stow bins.

- 3) The passageway(s) leading to the de-rated Type II (Type III) MED exits will comply with the requirements in CS 25.813(c), Amendment 17 and the related AMC 25.813(c). AMC 25.813(c) item 1 allows up to 3 inches of seat permanent deformation into the minimum passageway dimension.
 - a) When two 6-inch passageways leading to the de-rated Type II (Type III) exit are provided, the forward edge of the forward passageway and the aft edge of the aft passageway will be located such that the exit opening will be totally within the fore and aft bounds of the unobstructed space adjacent to the exit (i.e., the triple seats bounding the forward and aft end of the unobstructed space adjacent to the exit shall not encroach into the exit clear opening).
 - b) For two 6-inch passageway configurations, where the aft triple seat may be installed just aft of the MED opening, 3-inches of deformation should be allowed into the MED projected opening provided the exit operating characteristics are not compromised. This partial obstruction of the exit opening allowance is similar to that provided in AMC 25.813, item 5 related to de-rated and oversized exits. In addition, as this will be a de-rated Type II door functioning as a Type III exit which will include door operational instructional placards, deformations that may partially obscures the door handle directional symbol is acceptable.
 - c) When one 13-inch passageway leading to the de-rated Type II (Type III) exit is provided, CS 25.813(c)(2)(i) doesn't directly apply, since the outboard seat adjacent to the exit will always be removed. However, the intent of CS 25.813(c)(2)(i) will be applied, since at least 10 inches of the 13-inch passageway will be in the projected clear opening of the exit. As a result, the forward-most point of the double seat adjacent to the exit will always be less than 3 inches forward of the exit centerline, which will ensure at least 10 inches of the passageway is within the projected opening of the exit. In

addition to having the passageway in accordance with CS 25.813(c)(2)(i), and the outboard seat adjacent to the exit will always be removed when the exit is rated as a de-rated Type II (Type III) exit.

See Figure below for example MED de-rated Type II (Type III) passageway configurations:



One 13" Passageway
(Both Sides)

13" Passageway (RH)
Two 6" Passageways (LH)

NOTE: For the FAA, the Mid-Cabin exits will be classified as Type III exits when they meet all compensating features/factors outlined herein for this proposed EASA de-rated Type II exit. To avoid confusion with having two different exit ratings between the FAA and EASA for otherwise identical exits, it is proposed that EASA allow Boeing's documentation to refer to these de-rated Type II exits as Type III exits when meeting all the compensating features/factors outlined herein. This will help minimize confusion both internally and externally with airlines (e.g., the exit rating called out on LOPAs will refer to these exits as Type III exits).