



COMMENT RESPONSE DOCUMENT

EASA SC on installation of mini-suite type seating

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Commenter 1: Boeing Commercial Airplane – Mr. Carlos Guzman– 23 November 2016

Comment # 1 : Page: 2 - SC requirement #5

The SC requirement #5 states : *“5. The design of the doors and surrounding "furniture" above the cabin floor in the aisles must be such that each passenger's actions and demeanour can be readily observed by cabin crew members with stature as low as the 5th percentile female, when walking along the aisle.”*

The final wording *‘when walking along the aisle.’* is deemed prescriptive and could limit the design options to address this.

It is proposed to be deleted, as follows:

“5. The design of the doors and surrounding "furniture" above the cabin floor in the aisles must be such that each passenger's actions and demeanour can be readily observed by cabin crew members with stature as low as the 5th percentile female, ~~when walking along the aisle.~~”

EASA response: EASA agrees

SC 5 will be revised as indicated in the comment.

Comment # 2 : Page:2 - SC requirement #10

The SC requirement #10 states : *“10. There must be means to prevent the seated mini-suite occupant from operating the doors. This means is envisaged to be used in particular to secure the TTOL phases of the flight.”*

The wording proposed here below aims improving clarity :

*“10. There must be means to prevent the seated mini-suite occupant from operating the doors **and thus ensure that the doors remain open during** ~~–This means is envisaged to be used in particular to secure~~ the TTOL phases of the flight.”*



EASA response: EASA agrees

SC 10 will be revised as indicated in the comment.

Comment # 3 - Page:2 - SC requirement #14 (+ IM)

The SC requirement #14 states : *“14. In addition, the mini-suite must have an Emergency Passage Feature (EPF) to allow for evacuation of the mini-suite occupant in the event a door closes and becomes jammed during an emergency landing. The EPF must provide a free aperture for passage into the aisle consistent with SC 13 or meeting the requirements of CS 25.807 applicable to a Type IV emergency exit.”*

The wording proposed here below aims improving clarity :

*“14. In addition, the mini-suite must have an Emergency Passage Feature (EPF) to allow for evacuation of the mini-suite occupant in the event a door closes and becomes jammed during an emergency landing. The EPF must provide a free aperture for passage into the aisle consistent with SC 13 or meeting the requirements of CS 25.807 applicable to a Type IV **size** emergency exit.”*

In addition, it is suggested to adding interpretative material (IM) to appendix 1 item b as follows: ***“When the EPF is provided by an opening of a Type IV size exit, it does not necessarily need to meet the “step up” and “step down” dimensions defined in CS 25.807, but the EPF must be demonstrated to be useable by the range of occupants from a 5th percentile female to a 95th percentile male.”*** because the size of the EPF is the critical requirement rather than all the requirements of a Type IV exit which includes “step up”, “step down” and corner radii.

Since mini-suite designs will vary and this is for egress of only one individual, flexibility is necessary in the remaining elements of the egress path and as long as the egress path is shown to be usable by the range of occupants this is sufficient.

EASA response: EASA agrees

SC 14 and the related IM will be revised as indicated in the comment.

Comment # 4 - Page:2 - SC requirement #14

The SC requirement #14 states : *“14. ... If the EPF consists of frangible and/or removable elements they must be easily broken/removed by the occupant of the mini-suite when a door becomes jammed. ...”*

Performance standards for frangible or removable EPFs should be required. Traditional doors have operational standards for their hold open retention mechanisms (CS 25.561(b) emergency landing conditions), yet the proposed wording does not provide any sort of minimum performance criteria for the required egress path. CS



25.561(b) already applies to all of the structure but in this case, the elements of the EPF must remain operable and removable after the loads are applied. The wording proposed here below supports this consideration :

*If the EPF consists of frangible and/or removable elements they must **remain intact and operable when subjected to the emergency landing loads of 25.561(b). In addition, the frangible and/or removable elements must** be easily broken/removed by the occupant of the mini-suite when a door becomes jammed.*

EASA response: EASA disagrees

Although the intent of the comment is to increase the level of safety of the design of the EPF, EASA finds that accepting the comment would create an undue compliance burden for the Applicants. In fact, the EPF is supposed to be operated only in case the door is not retained in the fully open position by the hold open mechanisms required by SC 7 and SC 8, which must be shown to withstand individually the inertia loads of 25.561(b). Showing that the EPF elements remain intact and operable when subjected to the emergency landing loads of 25.561(b), i.e. when the door is latched in the fully open position, would not demonstrate that the EPF is operable when the door jams in any other position. Therefore the text proposed by the Commenter will not be introduced in SC 14.

Comment # 5 - Page:3 - SC requirement #22

The SC requirement #22 states : “22. The seat of the Cabin Crew responsible for a suite area must be located to provide a direct view of the egress path from each suite and of each main aisle adjacent to the suites.”

The wording proposed here below aims clarifying the terminology for this special condition which is applicable to mini-suites and not other ‘suite’ designs:
“22. The seat of the Cabin Crew responsible for a **mini-suite** area must be located to provide a direct view of the egress path from each **mini-suite** and of each main aisle adjacent to the **mini-suites**.”

EASA response: EASA agrees

SC 22 will be revised as indicated in the comment.

Comment # 6 - Page:4 – IM to SC requirement #13

The IM to SC requirement #13 states : “a) IM to SC requirement 13: ...Permanent deformations of seats/ furniture/doors bounding the access to the aisle must be taken into account in the assessment, considering the inertia loads specified in CS 25.561, and, for seats, in CS 25.562.”

Permanent deformations of seats for egress is required under 25.562 with guidance provided in AMC 25.562 and the FAA AC 25.562-1B, Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes, dated 10.1.2006. The FAA AC also notes that the deformations are applicable to monuments under 25.561 inertia loads that bound the passageways in the main cabin at the exits which is appropriate considering this is the main evacuation path for all passengers. Permanent deformations of a wall for one passenger has not previously been considered.



In addition, the IM material only suggests that the deformations must be taken into account, but does not give sufficient information on what would be considered acceptable permanent deformations. Then the wording proposed here below aims addressing this issue :

"a) IM to SC requirement 13: ...Permanent deformations of seat ~~/furniture/doors bounding~~ projecting into the access to the aisle must be taken into account in the assessment, considering the inertia loads specified in ~~CS 25.561, and, for seats, in~~ CS 25.562."

If the comment is not accepted then additional guidance will be required to understand the acceptable permanent deformation of furniture consistent with existing guidance for 25.561.

EASA response: EASA partially agrees

The IM to SC 13 will be revised as indicated in the comment, except that seat permanent deformation under 25.561 inertia loads must be taken into account as required by 25.561(d).

The text of IM to SC requirement 13 will be modified as follows:

"a) IM to SC requirement 13: ...Permanent deformations of seat ~~/furniture/doors bounding~~ projecting into the access to the aisle must be taken into account in the assessment, considering the inertia loads specified in CS 25.561 and ~~, and, for seats, in~~ CS 25.562."

Comment # 7 - Page:4 – IM to SC requirement #14

The IM to SC requirement #14 states : *"b) IM to SC requirement 14: The EPF required by SC requirement 14 should be available in every position in which the door may jam, unless an opening meeting SC requirement 13 remains available without using the EPF. ..."*

The proposed IM allowing a condition that the SC 14 opening did not need to be made available for every position that the door could be jammed if there was an opening meeting SC 13, is counterintuitive. The only way there would still be an SC 13 opening is if the design started with two SC 13 sized openings and then one of them was blocked.

The proposed edits are effective at mitigating the concerns of an occupant becoming trapped in the suite due to the level of redundancy already in the proposed requirements covering the design. The level of redundancy supporting safe egress includes:

- A latch to hold the door open during emergency landing substantiated to 25.561(b)
- A second latch for redundancy in holding the door open during emergency landing substantiated to 25.561(b)
- Three egress paths for evacuation in an emergency:
 - The primary egress path required under SC 13
 - The secondary egress path required under SC 14
 - The tertiary egress path required under SC 15.
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The level of redundancy first ensure that the doors remain open during an emergency landing event with two independent latches to hold the door open. Before there is even a need to use the EPF, two latches must fail. SC 14 allows for dual sliding doors opening in opposite directions as one method to provide the EPF when one door is fully closed. This is based on the assumption (used for certification of all mini-suites to date) that the dual opposing doors move the same distance and to the point of one of the doors fully closing and thus the other door being fully opened. That same assumption should be applied to the door with a frangible feature meaning that if it jams, it does so in the fully closed position.

Further, should the assumption in either design case be not true, the third egress path (climb over) is available. Thus based on the level of redundancy in the design requirements and the historical assumptions made for compliance, considering an EFP with a frangible feature when the door is in the fully closed position is sufficient to ensure a an occupant will not become trapped.

For that reason, the wording proposed here below aims addressing this issue :

“b) IM to SC requirement 14: ~~The EPF required by~~ **Only the fully closed position of the door has to be taken into consideration in the showing of compliance of the EPF with** SC requirement 14 ~~should be available in every position in which the door may jam, unless an opening meeting SC requirement 13 remains available without using the EPF...~~”

EASA response: EASA partially agrees

EASA agrees that the text of the IM to SC requirement 14 needs to be improved. First of all, the reference to SC 13 is appropriate only for minisuites equipped with dual screens. It is also important to clarify that the opening created through the operation of the EPF is not to be considered an egress route equivalent to the primary egress route required by SC 13. The presence of an effective EPF rather contributes to the reduction of the probability that an occupant may remain trapped inside the minisuite after an emergency landing. Similarly, the probability that the occupant may need to use the EPF depends on the level of performance of the hold open mechanisms required by SC 7 and SC 8. The sequence of events that must occur to be in a situation in which the EPF must be used has been highlighted by the commenter. However, EASA disagrees with the Commenter that the showing of compliance with SC 15 as the evidence that the occupant of the minisuite can climb over the walls in case the door jams in closed position.

The text of the IM to SC requirement 14 will be modified as follows:

b) IM to SC requirement 14: ~~For minisuites equipped with a single door, the EPF required by SC requirement 14 should be available in every position in which the door may jam, unless an opening meeting SC requirement 13 remains available without using the EPF~~ the hold open mechanisms of the minisuite door are demonstrated to have a level of performance that significantly exceeds the requirements of SC 7 and SC 8. For example, if the door hold open mechanisms are shown to withstand the inertia loads of 25.562, taking into account also wear and tear caused by door operation, then it is acceptable to limit the demonstration of availability of the EPF only to the scenario in which the door jams in the fully closed position.



Comment # 8 - Page:4 – IM to SC requirement #14

The IM to SC requirement #14 states : “b) IM to SC requirement 14: ...A smaller aperture than that specified in SC requirement 14, combined with an assessment of the possibility for an occupant to exit the suite by climbing over the surrounding wall (considering critical human physical abilities) might be considered acceptable. Use of this compliance approach must first be discussed and agreed with the Agency. ...”

Because the Industry practice is to consider 5th percentile female to a 95th percentile male for aircraft interior designs and compliance activity, the amended wording here below is proposed :

“b) IM to SC requirement 14: ... A smaller aperture than that specified in SC requirement 14, combined with an assessment of the possibility for an occupant to exit the suite by climbing over the surrounding wall (considering ~~critical human physical abilities~~ **the range of occupants from a 5th percentile female to a 95th percentile male**) might be considered acceptable. Use of this compliance approach must first be discussed and agreed with the Agency. ...”

EASA response: EASA disagrees

The intent of the IM in question is to ensure that the assessment of the possibility for an occupant to exit the suite by climbing over the surrounding wall is not conducted with subjects having human physical abilities above average. It is understood that in order for the assessment to be meaningful, the range of occupant sizes needs to be considered.

Comment # 9 - Page:4 – IM to SC requirement #14

The IM to SC requirement #14 states : ““b) IM to SC requirement 14: ... The design of the mini-suites will be reviewed to determine if a range of occupants can climb over the walls of the mini-suite and enter the aisle with acceptable ease and safety. Worst case permanent deformations resulting from required static and dynamic loading conditions of the components that will be used as steps, handholds etc. will need to be simulated or accounted for.
The number and size of occupants and variations in their physical strengths/abilities, to be considered in the evaluation of ease and safety of egress, will be those expected to be most critical, taking into account the geometry of the items to be negotiated and the free space provided for manoeuvre, and will be determined by the Agency.”

Because the Industry practice is to consider 5th percentile female to a 95th percentile male for aircraft interior designs and compliance activity, the amended wording here below is proposed :

“b) IM to SC requirement 14: ... The design of the mini-suites will be reviewed to determine if a ~~range of occupants~~ **5th percentile female to a 95th percentile male** can climb over the walls of the mini-suite and enter the aisle with acceptable ease and safety. Worst case permanent deformations resulting from required static and dynamic loading conditions of the components that will be used as steps, handholds etc. will need to be simulated or accounted for.
~~The number and size of occupants and variations in their physical strengths/abilities, to be considered in the evaluation of ease and safety of egress, will be those expected to be most critical, taking into account the geometry of the items to be negotiated and the free space provided for manoeuvre, and will be determined by the Agency.”~~



EASA response: EASA disagrees

See answer to comment # 8.

