

Cabin Interior requirements for Business Jets

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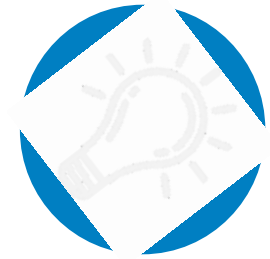
Business Jets Workshop

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Contents



- Appendix S
 - Background;
 - Structure;
 - Content.
- Flight Crew distance from Emergency Exits.
- Oversize Class B cargo compartment.

Appendix S Background

- Alternative criteria to the basic CS-25 requirements, for executive interiors to take into account the specificities of privately operated and “low-occupancy” aeroplanes’ interiors and the intended type of operations of such aeroplanes:
 - to maintain a high, uniform and proportionate level of safety, while facilitating the development and certification of executive interiors.
 - to clarify CS-25 requirements and interpretations thereof, based on feedback from certification projects, whilst reducing costs and certification burden on applicants and the Agency (avoiding repetitive issuance of CRIs);
- Executive Interior Requirements (EIR) rulemaking NPA 2015-19
- CS25 revised at Amendments 19 and 21.

S25.1 General

Applicability, and Aeroplane Flight Manual (AFM) Limitation

- Appendix S introduces the definition of “non-commercially operated” and “low-occupancy” aeroplanes.
- Non commercially are linked to the type of operation.
- low-occupancy definition is irrespective of the type of operations (commercial or non-commercial).
- If the aeroplane is limited to non commercial operations by any part of Appendix S this must be specified in the AFM.



S25.1 General

Applicability, and Aeroplane Flight Manual (AFM) Limitation

→ Non commercially operated aeroplanes

- Max 19 passengers, or
- up to and including one half of maximum Type certified seating capacity with absolute max of 150;

→ low-occupancy aeroplanes

- commercially or non-commercially operated.
- Max 19 passengers, or
- up to and including one third of maximum Type certified seating capacity with absolute max of 100;
- One third limit applies also to zonal capacity

Appendix S Structure

Requirements			Aeroplane Effectivity	
Details	Description		Non-Commercial	Low Occupancy
S25.1 General				
(a)(1)	Applicability	Definition Non Commercial	✓	✗
(a)(2)		Definition Low Occupancy	✗	✓
(b)	AFM Limitation	Required if any non-commercial limitation is imposed by Appendix S	✓	✗
S25.10 General Cabin Arrangement				
(a)	Interior Doors Non Commercial	CS 25.813(e) Allowance to have a door in the passenger evacuation route	✓	✗
(b)	Interior Doors Commercially	CS 25.813(e) Allowance to have a door in the passenger evacuation route	✗	✓ pax≤19
(c)	Isolated Compartment	Fire Protection requirements.	✓ pax>19 or Cabin Length>60ft	✓ pax>19 or Cabin Length>60ft
(d)	Deactivation of existing Emergency Exits	CS 25.807(e) Emergency Exits non-uniformity	✓	✓
(e)	Distance between Emergency Exits	CS 25.807(f)(4) Allowance for Exit-Exit >60ft.	✓	✓

Appendix S Structure

Requirements			Aeroplane Effectivity	
Deatails	Description		Non-Commercial	Low Occupancy
S25.20 Emergency Evacuation				
(a)(1)	Flammability Requirements	CS 25.853(c) OBT exemption for permanent bed mattresses in isolated compartment.	✓	✓
(a)(2)		CS 25.853(d) Heat Release exemption if evacuation performances ≤ 45 sec.	✓	✗ pax ≤ 19 CS25.853(d)
(b)	Access to Type III and IV Emergency Exits	CS 25.813 (c) Allowance for in-flight partial exits obstruction (e.g Seats Adjustments, Tables,...).	✓	✓ pax ≤ 19
S25.30 Circulation Inside Cabin During Flight				
(a)	Width of Aisle	CS 25.815 Allowance for in-flight aisle reduction if all area are still accessible	✓	✓ pax ≤ 19
(b)	Firm Handholds	CS 25.785(j) Handhold reduced requirements	✓	✓

Appendix S Structure

Requirements			Aeroplane Effectivity	
Details	Description		Non-Commercially	Low Occupancy
S25.40 Markings and Placards				
(a)	"No Smoking" Placards and Lavatory Ashtrays:	CS 25.791/CS 25.853(g) Reduced number of No Smoking Placards and Lavatory Ashtrays	✓	✓
(b)	Briefing Card Placard	25.1541 Expanded briefing cards replacing some placards	✓	✗
(c)	Seats in Excess	Seat in excess placarding requirements.	✓	✓
S25.50 Cabin Attendant Direct View				
(a)	Cabin Attendant Direct view	CS 25.785(h)(2) Alleviation for Non-commercial	✓	✗
		CS 25.785(h)(2) Alleviation for Low Occupancy	✗	✓
(b)				
S25.60 Security				
	Design for Security	CS 25.795(b-d) Exemptions for non-commercially operated aeroplanes: Explosive or incendiary effects, least risk bomb location, survivability of systems, chemical oxygen generator installation	✓	✗

S25.10 General Cabin Arrangement

Interior Doors on Non-Commercially and Commercially Operated Aeroplanes

- From CS25 Amendment 12, almost all interior doors are prohibited.
- CS25 Amendment 19 (Appendix S) allows internal doors in certain circumstances.
- Non-commercially operated a/c
 - placarding - briefing - **timely** cockpit alert - dual latching - frangibility
- Commercially operated a/c (≤ 19 pax only)
 - As above + expanded placarding - auto opening or cabin crewmember on board mandated



S25.20 Emergency Evacuation

Access to Type III and IV Emergency Exits

- Unobstructed access to Type III/IV exits required by CS25.813(c).
- Desired comfort features may lead to desire for partial obstruction in flight.
- Appendix S allows this, provided:
 - Pax ≤ 19 (for Low Occupancy)
 - **Timely** alerting system, of “compelling” nature, is installed, or
 - ESF for evacuation of fewer than 19 pax, or
 - Cabin crewmember on board mandated.



Timely activation of cockpit/cabin alerts

- Alerts to flight crew/passengers, in the case of evacuation route obstruction (overwing exit or galley door) before TTO&L, need to be given in good time, i.e. “timely”.
- Before landing - “during descent” is required.
- Achieving this fully automatically is difficult.
- EASA accepts a cockpit switch, which is activated by AFM procedure, at appropriate point during descent, to arm alerting system.

S25.10 General Cabin Arrangement

Isolated Compartments

- Isolated Compartment = where fire would not be immediately and directly detected by a/c occupants in another compartment.
- Isol. Compt. is acceptable if;
 - Is in a/c of <20pax and <60ft cabin length. (matches new CS25.854)
 - Has smoke/fire detection system, with indication to cockpit or cabin crew.
 - Is occupied for majority of flight (with awake persons!).
- Occupied for majority of flight;
 - OK, if “crewed” compartment, or
 - Greater than X (defined in AMC see next slide) TTO&L pax seats in the compartment.
 - However, cannot be claimed for bedrooms, bathrooms, smoking rooms

S25.10 General Cabin Arrangement

Isolated Compartments

Total number of passenger seats installed on the aeroplane approved for occupancy during taxiing, take-off, and landing (including seats in excess)	An isolated compartment is accepted as being occupied for the majority of the flight time if it contains at least the following number of seats approved for occupancy during taxiing, take-off, and landing
Up to 19	2
20–23	3
24–29	4
30–36	5
37–43	6
44–49	7
50–56	8
57–63	9
64 and above	10

Note: the 'Up to 19' figure is included for the case of an aeroplane with a total cabin length in excess of 18.29 m (60 ft).

S25.10 General Cabin Arrangement

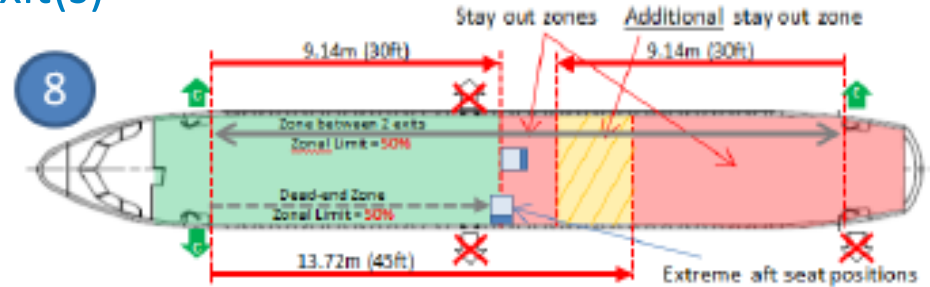
Deactivation of existing Emergency Exit(s)

→ Deactivation of emergency exits sometimes desired due to low VIP passenger capacity.

→ Remaining exit layout may contravene CS25.807(e) “uniformity” and/or CS25.807(f)(4) “60 feet”.

→ Appendix S allows deactivation, provided;

- 30ft/45ft exit distance principle (CS25.807(e)) is maintained, including during evacuation movement;
- 60ft exceeded only once per side - non-commercially operated a/c only;
- Zonal limits are half those of bounding exit ratings.



S25.20 Emergency Evacuation

Flammability Requirements

- S25.20(a)(1) allows bed mattresses, in permanent (not convertible) seats/beds in an isolated compartment, not traversed by any escape route, to not comply with the oil burner test (CS 25.853(c)).
- S25.20(a)(2) is an alleviation, for non-commercially operated aeroplanes only, to not comply with heat release/smoke density requirements provided a 45 sec evacuation capability is substantiated.



S25.30 Circulation Inside Cabin During Flight

Width of Aisle, and Firm Handhold

→ VIP layouts – providing firm handhold, and maintaining aisle during flight difficult.

→ Appendix S provides alleviations .

→ Aisle width can be reduced to zero in flight if access any area still OK (+30 sec max) and AFM procedures/placarding provided.

NOTE: Pax ≤ 19 (for Low Occupancy)

→ Firm handhold – where conventional solutions not easy, greater distances between handholds and use of sidewalls acceptable.



S25.40 Markings and Placards

No Smoking' Placards and Lavatory Ashtrays, and Briefing Card Placard

- S25.40(a) allows to have a single 'No smoking' placard visible to passengers when entering the aeroplane instead of a sign visible to each seated passenger (CS 25.791) and no ashtray in the lavatory (CS 25.853 (g)).
- S25.40(b) allows to reduce, for non-commercially operated aeroplanes only, the number of placards related to configuring the cabin for taxiing, take-off and landing.

S25.40 Markings and Placards

Seats in Excess

- If seats in excess exist, a placard indicating the approved passenger seating configuration must be installed adjacent to each door that can be used as a passenger boarding door.
- The AFM “Limitation” have to: state
 - state that there are excess seats installed, and
 - indicate the maximum number of passengers that may be transported.
- Seating location available for in-flight use only (including in-flight-only seats, beds, berths, and divans), must be identified by a placard, legible to the seated occupant, that indicate that the location is not to be occupied during taxiing, take-off, and landing.

S25.50 Cabin Attendant Direct View



- When cabin crewmembers are required, Appendix S provides alleviations;
 - Non-commercially operated a/c – half of installed crew member seats must face the passenger cabin.
 - Low occupancy a/c – alleviations to normal AMC (FAA AC 25.785-1B) are provided.

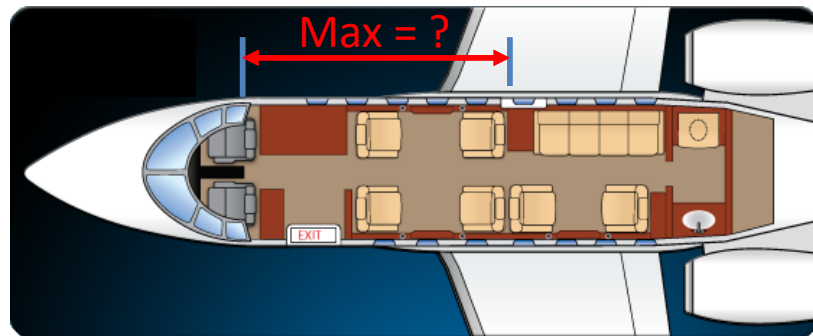
S25.60 Security

- Added at Amendment 21
- Non-commercially operated aeroplanes do not need to comply with the security specifications of:
 - Flight Deck Smoke and Cargo Fire Suppression system protection (CS 25.795(b)).
 - Least risk bomb location, Survivability of systems and Easy search (CS 25.795(c)).
 - Life preserver (CS 25.795(c)(iii)), and chemical oxygen generator prevention from tampering and manipulation.

CS25.807(j)

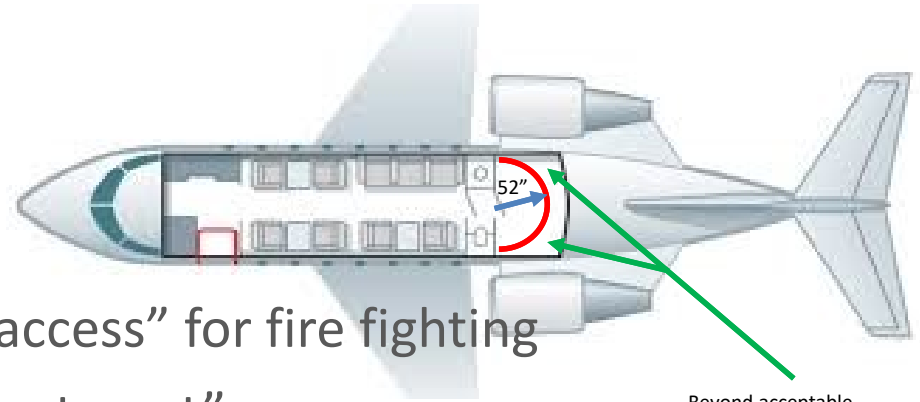
Flight Crew Emergency Exits – Convenient and Readily Accessible

- For <20 pax a/c, CS25.807(j) allows flight crew emergency exits to be in the passenger cabin, provided such exits are *convenient and readily accessible*.
- In the past this was not quantified.
- Some authorities have stated that this should mean <30ft.
- CATA task has worked on this and not reached full conclusion.
- Obstructing effect of observer seat is difficult to quantify.
- Interim position is that max 30 ft = no discussion, including with conventional observer seat (crew seat SRP, max aft adjustment, to exit forward edge).

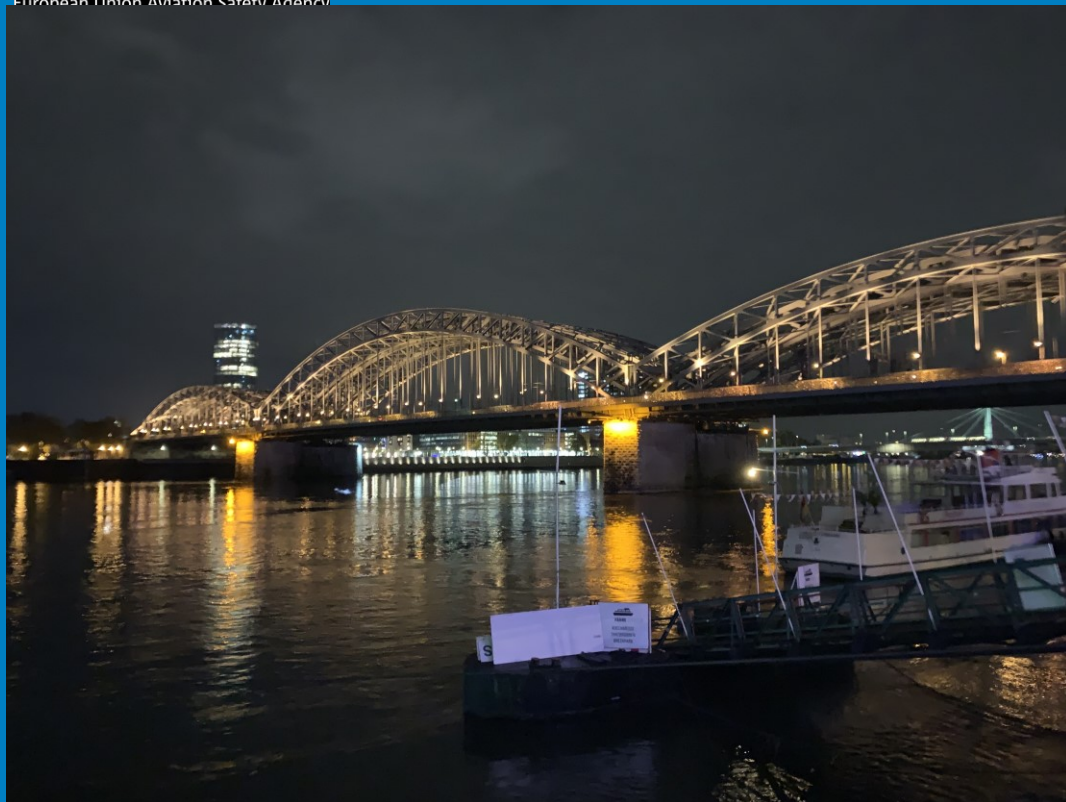


CS25.857(b)

Class B Cargo Compartment



- CS25.857(b) requires “sufficient access” for fire fighting “without stepping into the compartment”
- AMC to CS25.857(b) sets 132cm (52”) as max reach radius for the compartment.
- Some TC projects have exceeded this dimension.
- Certification approaches have been agreed, involving full scale fire testing.
- Experience to date is good.



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**Thank you for
your attention**

Questions?

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