CS-25 AMENDMENT 9 - CHANGE INFORMATION

The Agency publishes amendments to Certification Specifications as consolidated documents. These documents are used for establishing the certification basis for applications made after the date of entry into force of the amendment.

Consequently, except for a note "Amdt. 25/9" under the amended paragraph, the consolidated text of CS-25 does not allow readers to see the detailed changes introduced by the new amendment. To allow readers to also see these detailed changes this document has been created. The same format as for publication of Notices of Proposed Amendments has been used to show the changes:

1. text not affected by the new amendment remains the same: unchanged
2. deleted text is shown with a strike through: ~~deleted~~
3. new text is highlighted with grey shading: new
4. ....
   Indicates that remaining text is unchanged in front of or following the reflected amendment.
   ....

Preamble
Reordering of amendment information

Book 1 Airworthiness Code

SUBPART B – AUXILIARY POWER UNIT INSTALLATIONS

1. Revise CS 25.113(b)(2) to read:

"[…] determined under CS 25.111 for a wet runway.
(See AMC 25.113(a)(2), (b)(2) and (c)(2).)"

SUBPART D - DESIGN AND CONSTRUCTION

1. Amend CS 25.603 to read:

CS 25.603 **Materials** (For Composite Materials see ~~AMC No. 1 and No. 2 to 25.603.~~ AMC 20-29)

2. Revise CS 25.795 to read:

CS 25.795 **Security considerations~~.~~**
(see AMC 25.795)

(a) Protection of flight deck. If a secure flight deck door is required by operating rules, the bulkhead, door, and any other accessible boundary separating the flight crew compartment from occupied areas ~~installation~~ must be designed to:

(1) Resist forcible intrusion by unauthori~~z~~sed persons and be capable of withstanding impacts of 300 Joules (221.3 footpounds) ~~at the critical locations on the door~~, as well as a 1113 Newton (250 pound) ~~constant~~ tensile load on accessible handholds, including the doorknob or handle ~~(See AMC 25.795(a)(1))~~, and

(2) Resist penetration by small arms fire and fragmentation devices by meeting the following projectile definitions and projectile speeds ~~(See AMC 25.795(a)(2))~~.

(i) Demonstration Projectile #1. A 9 mm full metal jacket, round nose (FMJ RN) bullet with nominal mass of 8.0 g (124 grain) and reference velocity 436 m/s (1430 ft/s)

(ii) Demonstration Projectile #2. A .44 Magnum, jacketed hollow point (JHP) bullet with nominal mass of 15.6 g (240 grain) and reference velocity 436 m/s (1430 ft/s)

(b) Aeroplanes with a certificated passenger seating capacity of more than 60 persons or a maximum take-off weight of over 45 500 Kg (100 000 lb) must be designed to limit the effects of an explosive or incendiary device as follows:

(1) Flight deck smoke protection. Means must be provided to limit entry of smoke, fumes, and noxious gases into the flight deck.

(2) Passenger cabin smoke protection. Except for aeroplanes intended to be used

solely for the transport of cargo, means must be provided to prevent passenger incapacitation in the cabin resulting from smoke, fumes, and noxious gases as represented by the initial combined volumetric concentrations of 0.59% carbon monoxide and 1.23% carbon dioxide.

(3) Cargo compartment fire suppression. An extinguishing agent must be capable of suppressing a fire. All cargo-compartment fire suppression-system components must be designed to withstand the following effects, including support structure displacements or adjacent materials displacing against the distribution system:

(i) Impact or damage from a 13 mm (0.5-inch) -diameter aluminium sphere travelling at 131 m/s (430 feet per second);

(ii) A 103 kPa (15 psi) pressure load if the projected surface area of the component is greater than 0,4 square meter (4 square feet). Any single dimension greater than 1,2 meters (4 feet) may be assumed to be 1,2 meters (4 feet) in length; and

(iii) A 15 cm (6-inch) displacement, except where limited by the fuselage contour, from a single point force applied anywhere along the distribution system where relative movement between the system and its attachment can occur.

(iv) Paragraphs (b)(3)(i) through (iii) of this paragraph do not apply to components that are redundant and separated in accordance with paragraph (c)(2) of this paragraph or are installed remotely from the cargo compartment.

(c) An aeroplane with a certificated passenger seating capacity of more than 60 persons or a maximum take-off weight of over 45 500 Kg (100,000 lbs) must comply with the following:

(1) Least risk bomb location. Except for aeroplanes intended to be used solely for the transport of cargo, an aeroplane must be designed with a designated location where a bomb or other explosive device could be placed to best protect integrity of the structure and flight-critical systems from damage in the case of detonation.

(2) Survivability of systems.

(i) Except where impracticable, redundant aeroplane systems necessary for continued safe flight and landing must be physically separated, at a minimum, by an amount equal to a sphere of diameter

$$D = 2\sqrt{(H_0 / \pi)}$$

(where H_0 is defined under paragraph 25.365(e)(2) and D need not exceed 1,54 meters (5.05 feet).

The sphere is applied everywhere within the fuselage-limited by the forward bulkhead and the aft bulkhead of the passenger cabin and cargo compartment beyond which only one-half the sphere is applied.

(ii) Where compliance with sub-paragraph (c)(2)(i) of this paragraph is impracticable, other design precautions must be taken to maximise the survivability of those systems.

(3) Interior design to facilitate searches. Except for aeroplanes intended to be used solely for the transport of cargo, design features must be incorporated that will deter concealment or promote discovery of weapons, explosives, or other objects from a simple inspection in the following areas of the aeroplane cabin:

(i) Areas above the overhead bins must be designed to prevent objects from

being hidden from view in a simple search from the aisle. Designs that prevent concealment of objects with volumes 0.33 cubic decimetre (20 cubic inches) and greater satisfy this requirement.

(ii) Toilets must be designed to prevent the passage of solid objects greater than 5 cm (2.0 inches) in diameter.

(iii) Life preservers or their storage locations must be designed so that tampering is evident.

3. Revise CS 25.813 to read:

CS 25.813 Emergency exit access and ease of operation
(See AMC to 25.807 and 25.813 and AMC 25.813(c))

....

(c) ~~There must be access from each aisle to each Type III or Type IV exit, and –~~

The following must be provided for each Type III or Type IV exit -

(1) There must be access from the nearest aisle to each exit.

(2) In addition, for each Type III exit in an aeroplane that has a passenger-seating configuration of 20 or more and which has only seats installed immediately to the forward and aft of the access route(s) -

(i) Except as provided in sub-paragraph (c)(2)(ii) of this paragraph, the access must be provided by an unobstructed passageway that is at least 25.4 cm (10 inches) in width for interior arrangements in which the adjacent seat rows on the exit side of the aisle contain two seats, or 33 cm (13 inches) in width for interior arrangements in which those rows contain three seats. The width of the passageway must be measured with adjacent seats adjusted to their most adverse positions. At least 25.4 cm (10 inches) of the required passageway width must be within the required projected opening width of the exit.

(ii) In lieu of one 25.4 or 33 cm (10 or 13 inches) passageway, there may be two unobstructed passageways, that must be at least 15.2 cm (6 inches) in width and lead to an unobstructed space adjacent to each exit. Adjacent exits must not share a common passageway. The width of the passageways must be measured with adjacent seats adjusted to their most adverse positions. The unobstructed space adjacent to the exit must extend vertically from the floor to the ceiling (or to the bottom of upper side wall stowage bins), inboard from the exit for a distance not less than the width of the narrowest passenger seat installed on the aeroplane and from the forward edge of the forward passageway to the aft edge of the aft passageway. The exit opening must be totally within the fore and aft bounds of the unobstructed space.

(3) Each Type III exit in an aeroplane that has a passenger seating configuration of 20 or more and which has an access route bounded by any item(s) other than only seats (e.g. bulkhead/wall, class divider, curtain) to its forward and/or aft side, must be provided with an unobstructed passageway that is at least 50.8 cm (20

inches) in width. The width of the passageway must be measured with any adjacent seats, or other movable features, adjusted to their most adverse positions.

(4) In addition to the access -

~~(1)~~(i) For aeroplanes that have a passenger seating configuration~~, excluding pilot's seats,~~ of 20 or more, the projected opening of the exit provided must be unobstructed and there must be no interference in opening the exit by seats, berths, or other protrusions (including ~~seatbacks in any position~~ adjacent seats adjusted to their most adverse positions) for a distance from that exit not less than the width of the narrowest passenger seat installed on the aeroplane.

~~(2)~~(ii) For aeroplanes that have a passenger-seating configuration~~, excluding pilot's seats,~~ of 19 or fewer, there may be minor obstructions in this region, if there are compensating factors to maintain the effectiveness of the exit.

(5) For each Type III and Type IV exit there must be placards that –

(i) are readable by each person seated adjacent to and facing a passageway to the exit, one in their normal field of view; and one adjacent to or on the exit;

(ii) accurately state or illustrate the proper method of opening the exit, including the correct use of controls, handles, handholds etc.;

(iii) if the exit is a removable hatch, state the weight of the hatch and indicate an appropriate location to place the hatch after removal.

(6) For aeroplanes with a passenger seating configuration of 41 or more, each Type III exit must be designed such that when operated to the fully open position, the hatch/door is automatically disposed so that it can neither reduce the size of the exit opening, the passageway(s) leading to the exit, nor the unobstructed space specified in sub-paragraph (c)(2)(ii) of this paragraph, to below the required minimum dimensions. In the fully open position it must also not obstruct egress from the exit via the escape route specified in CS 25.810(c).

(7) The design of each seat, bulkhead/partition or other feature, bounding the passageway leading to each Type III or Type IV exit must be such that -

(i) evacuees are hindered from climbing over in the course of evacuating.

(ii) any baggage stowage provisions (such as under seat stowage) would prevent baggage items entering the passageway under the inertia forces of CS 25.561(b)(3) unless placards are installed to indicate that no baggage shall be stowed under the seats bounding the passageway.

(iii) no protrusions (such as coat hooks) could impede evacuation.

(8) The design and arrangement of all seats bordering and facing a passageway to each Type III or Type IV exit, both with and without the bottom cushion in place, must be free from any gap, which might entrap a foot or other part of a person

standing or kneeling on a seat or moving on or along the seat row.

(9) The latch design of deployable features (such as tables, video monitors, telephones, leg/foot rest) mounted on seats or bulkheads/partitions bordering and facing a passageway to a Type III or Type IV exit, must be such that inadvertent release by evacuating passengers will not occur. The latch design of deployable features must also be such that cabin crew can easily check that the items are fully latched in the stowed position. Placards indicating that each such item must be stowed for taxi, take-off and landing must be installed in the normal field of view of, and be readable by each person seated in each seat bordering and facing a passageway to a Type III or Type IV exit.

(d) ….

SUBPART E – POWERPLANT

4. Revise CS 25.981 to read:

(c) *Reserved.*

(d) Critical design configuration control limitations (CDCCL), inspections, or other procedures must be established, as necessary, to prevent development of ignition sources within the fuel tank system pursuant to sub-paragraph (a) of this paragraph, to prevent increasing the flammability exposure of the tanks above that permitted under sub-paragraph (b) of this paragraph, and to prevent degradation of the performance and reliability of any means provided according to sub-paragraphs (a) or (b)(4) of this paragraph. These CDCCL, inspections, and procedures must be included in the Airworthiness Limitations Section of the instructions for continued airworthiness required by CS 25.1529. Visible means of identifying critical features of the design must be placed in areas of the aeroplane where foreseeable maintenance actions, repairs, or alterations may compromise the critical design configuration control limitations (e.g., colour-coding of wire to identify separation limitation). These visible means must also be identified as CDCCL.

Reformatting of Subpart J according to standards for CS-25.

SUBPART J – AUXILIARY POWER UNIT INSTALLATIONS

5. Revise CS 25J951 (c) to read:

(c) For essential APUs:
Each fuel system for an essential APU must be capable of sustained operation throughout its flow and pressure range with fuel initially saturated with water at 26.7 °C and having ~~0.10~~ 0.20 cm^3 of free water per liter added and cooled to the most critical condition for icing likely to be encountered in operation.

Book 2 Acceptable Means of Compliance

AMC - SUBPART D

6. Delete AMC No. 1 to 25.603 Composite Aircraft Structure

7. Delete AMC No. 2 to 25.603 Change of composite material

8. Amend AMC 25.795(a)(1) as follows:

AMC 25.795(a)(1)
Flight deck intrusion resistance~~.~~

Referenced Documentation:

- Federal Aviation Administration Advisory Circular (AC) 25.795-1A, Flight deck Intrusion Resistance, issue date ~~10 January 2002~~ 24 October 2008.

9. Amend AMC 25.795(a)(2) as follows:

AMC 25.795(a)(2)
Flight deck penetration resistance

Referenced Documentation:

- Federal Aviation Administration Advisory Circular (AC) 25.795-2A, Flight deck Penetration Resistance, issue date ~~10 January 2002~~ 24 October 2008.

- Level IIIA of the (US) National Institute of Justice, Ballistic Resistance of Personal Body Armor, NIJ Standard 0101.04, Office of Science and Technology, Washington, D.C. 20531, September 2000.

10. Add new AMC 25.795(b)(1), AMC 25.795(b)(2), AMC 25.795(b)(3), AMC 25.795(c)(1), AMC 25.795(c)(2), AMC 25.795(c)(3) as follows:

AMC 25.795(b)(1)
Flight deck smoke protection

Referenced Documentation:

- Federal Aviation Administration Advisory Circular (AC) 25.795-3, Flight deck Protection (smoke and fumes), issue date 24 October 2008.

AMC 25.795(b)(2)
Passenger cabin smoke protection

Referenced Documentation:

- Federal Aviation Administration Advisory Circular (AC) 25.795-4, Passenger Cabin Smoke

Protection, issue date 24 October 2008.

AMC 25.795(b)(3)
Cargo compartment fire suppression

Referenced Documentation:
- Federal Aviation Administration Advisory Circular (AC) 25.795-5, Cargo Compartment Fire Suppression, issue date 24 October 2008.

AMC 25.795(c)(1)
Least risk bomb location

Referenced Documentation:
- Federal Aviation Administration Advisory Circular (AC) 25.795-6, Least Risk Bomb Location, issue date 24 October 2008.

AMC 25.795(c)(2)
Survivability of systems

Referenced Documentation:
- Federal Aviation Administration Advisory Circular (AC) 25.795-7, Survivability of Systems, issue date 24 October 2008.

AMC 25.795(c)(3)
Interior design to facilitate searches

Referenced Documentation:
- Federal Aviation Administration Advisory Circular (AC) 25.795-8, Interior design to facilitate searches, issue date 24 October 2008.

11. Add new AMC 25.813 as follows:

AMC 25.813(c)
Emergency Exit Access and Ease of Operation

1 Post crash seat deformation

The requirement for an "unobstructed" passageway is not intended to preclude some deformation of seat structure into the required minimum passageway dimension due to emergency landing dynamic loading.

Seat permanent deformation of up to 3 inches (as recorded in the tests required by CS 25.562) into the minimum passageway dimensions defined in CS 25.813(c) is acceptable, provided no part of the seat intrudes into the minimum required projected opening of the exit and provided the exit operating characteristics are not compromised. Relevant parts of FAA Advisory Circular 25.562-1B provide further details.

2 Deployable features

Features mounted on seats, bulkheads or other cabin features, under passenger control and which deploy into the required minimum passageway, may be accepted as not contravening the "unobstructed passageway" requirements of CS 25.813(c) provided they are easily and instinctively pushed out of the passageway by escapees in the event that they remain deployed prior to, or become deployed during, an evacuation. This may include, but not be limited to, items such as handsets, tray tables, in-armrest video monitors. Items such as footrests which would not be within easy reach of escapees' hands and/or not easily visible during an evacuation will not be accepted as being easily and instinctively re-stowed.

Such designs will be assessed on their individual merits.

It must be noted that none of the above reduces the requirement to design latching means that will prevent inadvertent release by evacuating passengers. A "Lock out device" will not be acceptable as part of a means of compliance to the minimum unobstructed passageway dimensions. "Lock out device" means a mechanism actuated by a cabin crew member to prevent passengers deploying items into an access passageway during taxi, take-off and landing.

Features (e.g. seat recline, footrests, video screens, tables) may still be unsafe, even if they do not deploy into a defined minimum 15.2, 25.4 or 33 cm (6, 10 or 13 inches) passageway (as applicable). Deployable items may create snagging/tripping hazards and in the case where a wider passageway than the minimum is provided, it cannot be assumed that escaping passengers will constrain themselves to passing along one side or the centre. Features which deploy into the actual passageway provided (in vertical projection from floor level to the upper ceiling/over head bin constraint) will be assessed in the same way as if they deployed into the minimum passageway, i.e. they can be accepted if they can be easily and instinctively pushed out of the passageway as described above.

3 Automatic disposal of hatch/door

The intent, in CS 25.813(c)(6), of requiring "automatic" disposal of a Type III hatch/door on aeroplanes with passenger seating configurations of 41 or more is to remove the risk of passenger confusion, difficulty or error once the opening handle movement has been initiated.

In this context, "automatic" is intended to convey the requirement that this type of Type III exit should be by its design as simple, instinctive and easy to operate as any other type of exit.

Markings, controls and kinematics of the design should be so that with minimal instruction (i.e. from a study of the placards required by CS 25.813(c)(5) a naïve subject, with the ranges of size and strength found in the 5^{th} percentile female to the 95^{th} percentile male, would be expected to be able to swiftly and correctly operate the exit to its fully open and secured position.

In this regard, the exit hatch/door should move from its closed to fully open position in one simple and continuous operator motion, e.g. avoiding discontinuities in required force/direction on the handle(s). The traditional practice of providing a removable hatch will not be accepted as meeting the requirements of CS 25.813(c)(6).

It is to be noted that the requirements of CS 25.809, which defines emergency exit operating characteristics, testing requirements, etc. are applicable to all exit types, including Type III and IV.

4 Very large exit access provision

In most cases it is expected that the cabin arrangement adjacent to a Type III or IV exit will be such that access provision and unobstructed space for operation will be towards the minimum dimensions required. However, this might not always be the case.

Some of the testing performed to substantiate the required dimensions has revealed that competition between escaping passengers can reduce a Type III exit's evacuation performance in cases where a large unobstructed passageway or adjacent area is provided.

Dependent on the details of a specific cabin layout, additional substantiation may therefore be necessary for a design providing a substantially larger passageway and/or clear area adjacent to the exit than the minimum required. This will also apply to Type IV exits.

5 "De-rated" and "oversized" exits

Two cases can be identified where some additional considerations may be needed when considering the provisions of CS 25.813(c)(4)(i), namely:

a. A larger exit type (e.g. Type II, I) which is declared as a Type III in order to, for instance, place a seat partially overlapping the exit opening (i.e. "de-rating" the exit).

b. The exit opening provided by the design is larger than the minimum required (i.e. an "oversize exit").

In such cases it may be acceptable that the exit opening provided is partially obstructed, at all times or perhaps when certain features are deployed, if the remaining exit aperture still provides the intended egress performance.

Each such case will be assessed on its own individual merits and, if accepted, would be so on the basis of Equivalent Safety.

6 Provisions to prevent escapees bypassing the intended evacuation route

CS 25.813(c)(7) (i) is intended to prevent cabin installations which would permit escaping passengers bypassing the intended evacuation route to the exit by climbing over seat backs or any other feature that may bound the required access passageway.

In the case of seat backs, the surface over which an escapee may attempt to climb should remain essentially upright, i.e. not exceeding 20 degrees rearward and 10 degrees forward relative to a plane normal to the cabin floor, when a load of up to 668 N (150 lbf) is applied horizontally in a fore/aft direction at the structurally most critical point.

In the case of features other than seat backs, the obstacle to climbing over should be assessed with the aim that it be comparable to the seat back example above, i.e. the angle and height of the item/surface in question.

7 Placards

The placards required by CS 25.813(c)(5) must accurately illustrate the proper method of opening the exit. This will require different “handed” placards for installation on the left and right sides of the cabin. Precautions should be taken to minimise the risk of a placard being installed on the incorrect side of the cabin.

The particular method illustrated on a placard, e.g. placement of body, hands etc. should be substantiated as being that most likely to result in successful operation.

8. Entrapment

The seat design should be free of any gaps into which it would be possible to place a foot, hand or arm in such a way as to delay or hamper free movement of passengers to the exit. Any opening/gap that is assessed as being positioned such that it poses a risk and which is more than 2.54 cm (one inch) in width will need to be the subject of particular scrutiny before being found acceptable.

AMC - SUBPART E

12. Amend AMC 25.981(a) as follows:

The first box of the chart “Fuel system ignition prevention” should be changed as follows:

NO TANK IGNITION SOURCES ~~EASA policy statement D 2005/~~ ~~CPRO/ (INT/POL /25/12)~~

AMC - SUBPART H

13. To amend AMC 25.1711 as follows:

7 CS 25.981(~~b~~ d) states that "~~...v~~Visible means ~~to identify~~ of identifying critical features of the design must be placed in areas of the aeroplane where foreseeable maintenance~~,~~ actions, repairs, or alterations may ~~be apt to violate~~ compromise the critical design configuration control limitations (e.g., colour-coding of wire to identify separation limitation). These visible means must also be identified as CDCCL." The design approval holder should define a method of ensuring that this essential information will:

- be communicated by statements in appropriate manuals, such as wiring diagram manuals, and
- be evident to those who may perform and approve such repairs and alterations.

An example of a critical design configuration control limitation that would result in a requirement for visible identification means would be a requirement to maintain wire separation between FQIS (fuel quantity indication system) wiring and other electrical circuits that could introduce unsafe levels of energy into the FQIS wires. Acceptable means of

providing visible identification means for this limitation would include colour-coding of the wiring or, for retrofit, placement of identification tabs at specific intervals along the wiring.

[…]