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.

9 Minor obstructions

An item may be acceptable as meeting the intent of a minor obstruction in accordance with CS 25.813(c)(4)(ii) provided that, as soon as an occupant begins to open the emergency exit using only the required and visible operating handle, the obstruction moves such that the occupant instinctively understands how to complete removal of the obstructive item. Examples of such items are unattached (or loosely attached) soft seat back cushions on side-facing divans, provided that the cushion may be readily moved away and the emergency exit then easily fully opened. Ease of opening from the outside should also be assessed with the minor obstruction in place. Neither the emergency exit sign nor the operating handle should be obscured at any point.

[Amdt 25/9]
[Amdt 25/19]

AMC 25.813(e) Interior Doors

ED Decision 2017/015/R

Doors separating occupiable areas of the aeroplane cabin that do not obstruct a possible passenger egress path when closed are not prohibited by CS 25 813(e).

Any such door should be openable from both sides without the use of any tool, which means without the need to use any item; it is not acceptable to require the use of even common items such as coins, credit cards, pens etc. (note: lavatory doors must comply with CS 25.820).

It is acceptable to have a door between a passenger compartment and a passenger emergency exit in contradiction with the prohibition of CS 25.813(e), provided that this door is secured in the open position by means acceptable to EASA that cannot be overridden except by a maintenance action (i.e. the necessary actions should be such that aeroplane occupants are unlikely to be equipped to perform them).

[Amdt 25/19]

CS 25.815 Width of aisle

ED Decision 2003/2/RM

(See AMC 25.815)

The passenger aisle width at any point between seats must equal or exceed the values in the following table:

Passenger seating capacity	Minimum passenger aisle width (cm (inches))	
	Less than 64 cm (25 inches) from floor	64 cm (25 inches) and more from floor
10 or less	30 (12)*	38 (15)
11 to 19	30 (12)	51 (20)
20 or more	38 (15)	51 (20)

* A narrower width not less than 23 cm (9 inches) may be approved when substantiated by tests found necessary by the Agency.

AMC 25.815 Width of aisle

ED Decision 2020/024/R

The relevant parts of FAA Advisory Circular (AC) 25-17A Change 1, *Transport Airplane Cabin Interiors Crashworthiness Handbook*, dated 24.5.2016, are accepted by the Agency as providing acceptable means of compliance with CS 25.815.

Note: 'The relevant parts' means 'the parts of AC 25-17A Change 1 that address the applicable FAR/CS-25 paragraph'.

[Amdt 25/11]
[Amdt 25/26]

CS 25.817 Maximum number of seats abreast

ED Decision 2003/2/RM

On aeroplanes having only one passenger aisle, no more than 3 seats abreast may be placed on each side of the aisle in any one row.

CS 25.819 Lower deck service compartments (including galleys)

ED Decision 2015/019/R

(See AMC 25.819)

For aeroplanes with a service compartment located below the main deck, which may be occupied during the taxi or flight but not during take-off or landing, the following apply:

(a) There must be at least two emergency evacuation routes, one at each end of each lower deck service compartment or two having sufficient separation within each compartment, which could be used by each occupant of the lower deck service compartment to rapidly evacuate to the main deck under normal and emergency lighting conditions. The routes must provide for the evacuation of incapacitated persons, with assistance. The use of the evacuation routes may not be dependent on any powered device. The routes must be designed to minimise the possibility of blockage, which might result from fire, mechanical or structural failure, or persons standing on top of or against the escape routes. In the event the aeroplane's main power system or compartment main lighting system should fail, emergency illumination for each lower deck service compartment must be automatically provided.

(b) There must be a means for two-way voice communication between the flight deck and each lower deck service compartment, which remains available following loss of normal electrical power generating system.

(c) There must be an aural emergency alarm system, audible during normal and emergency conditions, to enable crew members on the flight deck and at each required floor level emergency exit to alert occupants of each lower deck service compartment of an emergency situation.

(d) There must be a means, readily detectable by occupants of each lower deck service compartment that indicates when seat belts should be fastened.

(e) If a public address system is installed in the aeroplane, speakers must be provided in each lower deck service compartment.

(f) For each occupant permitted in a lower deck service compartment, there must be a forward or aft facing seat, which meets the requirements of CS 25.785(d) and must be able to withstand maximum flight loads when occupied.

(g) For each powered lift system installed between a lower deck service compartment and the main deck for the carriage of persons or equipment, or both, the system must meet the following requirements:

(1) Each lift control switch outside the lift, except emergency stop buttons, must be designed to prevent the activation of the lift if the lift door, or the hatch required by sub-paragraph (g)(3) of this paragraph, or both are open.

(2) An emergency stop button, that when activated will immediately stop the lift, must be installed within the lift and at each entrance to the lift.

(3) There must be a hatch capable of being used for evacuating persons from the lift that is openable from inside and outside the lift without tools, with the lift in any position.

[Amdt 25/17]

AMC 25.819 Lower deck service compartments (including galleys)

ED Decision 2020/024/R

The relevant parts of FAA Advisory Circular (AC) 25-17A Change 1, *Transport Airplane Cabin Interiors Crashworthiness Handbook*, dated 24.5.2016, are accepted by the Agency as providing an acceptable means of compliance with CS 25.819.

Note: 'The relevant parts' means 'the parts of AC 25-17A Change 1 that address the applicable FAR/CS-25 paragraph'.

[Amdt 25/17]
[Amdt 25/26]

CS 25.820 Lavatory doors

ED Decision 2007/020/R

All lavatory doors must be designed to preclude anyone from becoming trapped inside the lavatory. If a locking mechanism is installed, it must be capable of being unlocked from the outside without the aid of special tools.

[Amdt 25/4]

VENTILATION AND HEATING

CS 25.831 Ventilation

ED Decision 2019/013/R

(See AMC 25.831)

(a) Under normal operating conditions and in the event of any probable failure conditions of any system that would adversely affect the ventilating air, the ventilation system must be designed to provide a sufficient amount of uncontaminated air to enable the crew members to perform their duties without undue discomfort or fatigue, and to provide reasonable passenger comfort. For normal operating conditions, the ventilation system must be designed to provide each occupant with an airflow that contains at least 0.25 Kg (0.55 lb) of fresh air per minute. (See AMC 25.831(a).)

(b) Crew and passenger compartment air must be free from harmful or hazardous concentrations of gases or vapours. In meeting this requirement, the following apply:

(1) Carbon monoxide concentrations in excess of one part in 20 000 parts of air are considered hazardous. For test purposes, any acceptable carbon monoxide detection method may be used.

(2) Carbon dioxide concentration during flight must be shown not to exceed 0·5% by volume (sea level equivalent) in compartments normally occupied by passengers or crewmembers. For the purpose of this subparagraph, "sea level equivalent" refers to conditions of 25° C (77° F) and 1 013·2 hPa (760 millimetres of mercury) pressure.

(c) There must be provisions made to ensure that the conditions prescribed in sub-paragraph (b) of this paragraph are met after reasonably probable failures or malfunctioning of the ventilating, heating, pressurisation or other systems and equipment. (See AMC 25.831(c).)

(d) If accumulation of hazardous quantities of smoke in the cockpit area is reasonably probable, smoke evacuation must be readily accomplished, starting with full pressurisation and without depressurising beyond safe limits.

(e) Except as provided in sub-paragraph (f) of this paragraph, means must be provided to enable the occupants of the following compartments and areas to control the temperature and quantity of ventilating air supplied to their compartment or area independently of the temperature and quantity of air supplied to other compartments and areas:

(1) The flight-crew compartment.

(2) Crew-member compartments and areas other than the flight-crew compartment unless the crewmember compartment or area is ventilated by air interchange with other compartments or areas under all operating conditions.

(f) Means to enable the flight crew to control the temperature and quantity of ventilating air supplied to the flight-crew compartment independently of the temperature and quantity of ventilating air supplied to other compartments are not required if all of the following conditions are met:

(1) The total volume of the flight-crew and passenger compartments is 22.65m^3 (800 cubic ft) or less.

(2) The air inlets and passages for air to flow between flight-crew and passenger compartments are arrange to provide compartment temperatures within 2.8°C (5°F) of each other and adequate ventilation to occupants in both compartments.

(3) The temperature and ventilation controls are accessible to the flight crew.

[Amdt No: 25/18]
[Amdt No: 25/23]

AMC 25.831(a) Ventilation

ED Decision 2020/024/R

1. General

CS 25.831(a) specifies that the ventilation system must be designed to provide a minimum of 0.25 kg (0.55 lb) of fresh air per minute per person (i.e. 10 cubic feet per minute of air at 8 000 feet pressure altitude and at a cabin temperature of 24°C (75°F)) for normal operations.

The applicant may demonstrate compliance with this specification by analysis, ground tests, and/or flight tests.

Because it is not practicable to measure the airflow at each occupant's location, the fresh air supplied per minute per occupant may be determined by averaging the total cabin fresh air supply and cockpit fresh air supply for the number of occupants that each area can accommodate, assuming a uniform ventilation distribution in each area.

2. Low airflow capability during some flight phases

If an applicant proposes not to provide the minimum required fresh airflow during the phases of flight that use low power levels, the applicant must show that the cabin air quality is not compromised during those flight phases.

3. Operations with the air conditioning system 'off'

The following provisions should be considered for the limited time periods, such as during take-off, during which the air conditioning system is 'off':

a. There should be a means to annunciate to the flight crew that the air conditioning system is selected to 'off'. When, in flight, after the end of the maximum allowed time period (e.g. typically after the take-off), the air conditioning system is still in the 'off' position, an alert should be triggered to inform the flight crew of the status of the air conditioning system.

b. It should be demonstrated that the ventilation system continues to provide an acceptable environment in the passenger cabin and the cockpit for the brief period when the air conditioning system is not operating.

c. Furthermore, the equipment environment should be evaluated during those periods to ensure that the reliability and performance of the equipment are not impaired. This evaluation should cover the extremes of ambient hot and cold air temperatures in which the aeroplane is expected to operate.

d. In addition, it should be demonstrated that no unsafe condition will result from operation for a limited time with the air conditioning system 'off', if a fire occurs. When demonstrating compliance with CS 25.831(d) (cockpit smoke removal), CS 25.857 (occupied areas smoke penetration), and CS 25.858 (smoke detection), the following should be considered:

i. During the operation of the aeroplane for any limited period of time with the air conditioning system 'off', the smoke detection systems should be effective.

ii. It should be possible for the air conditioning system to be turned 'on' and returned to the approved air conditioning system 'on' configuration to extract any hazardous quantities of smoke.

e. Finally, the period during which the aeroplane is operated with the air conditioning system 'off' is intended to be of short duration. Therefore, the maximum time period allowed for the operation of an aeroplane in this configuration should be defined by the applicant and specified in the appropriate operating manuals, along with any related operating procedures that are necessary to ensure that the above items are addressed.

4. Probable failure conditions

For probable failure conditions, the ventilation system should be designed to provide enough fresh air to prevent the accumulation of odours and pollutants such as carbon dioxide. Under these conditions, the supply of fresh air should not be less than 0.18 kg/min (0·4 lb/min) per person for any period exceeding five minutes. However, temporary reductions below this flow rate may be accepted provided that the compartment environment can be maintained at a level which is not hazardous to the occupant; for this purpose, the applicant may refer to international cabin air quality standards.

[Amdt 25/23]
[Amdt 25/26]

AMC 25.831(c) Ventilation

ED Decision 2003/2/RM

1 To avoid contamination the fresh air supply should be suitably ducted where it passes through any compartment inaccessible in flight.

2 Where the air supply is supplemented by a recirculating system, it should be possible to stop the recirculating system and –

a. Still maintain the fresh air supply prescribed, and

b. Still achieve 1.

CS 25.832 Cabin ozone concentration

ED Decision 2003/2/RM

(a) The aeroplane cabin ozone concentration during flight must be shown not to exceed –

(1) 0·25 parts per million by volume, sea level equivalent, at any time above flight level 320; and

(2) 0·1 parts per million by volume, sea level equivalent, time-weighted average during any 3-hour interval above flight level 270.

(b) For the purpose of this paragraph, “sea level equivalent” refers to conditions of 25° C (77° F) and 1 013·2 hPa (760 millimetres of mercury) pressure.

(c) Compliance with this paragraph must be shown by analysis or tests based on aeroplane operational procedures and performance limitations, that demonstrated that either –

(1) The aeroplane cannot be operated at an altitude which would result in cabin ozone concentrations exceeding the limits prescribed by sub-paragraph (a) of this paragraph; or

(2) The aeroplane ventilation system, including any ozone control equipment, will maintain cabin ozone concentrations at or below the limits prescribed by sub-paragraph (a) of this paragraph.

CS 25.833 Combustion heating systems

ED Decision 2003/2/RM

Combustion heaters must be approved.

PRESSURISATION

CS 25.841 Pressurised cabins

ED Decision 2014/026/R

(a) Pressurised cabins and compartments to be occupied must be equipped to provide a cabin pressure altitude of not more than 2438 m (8000 ft) at the maximum operating altitude of the aeroplane under normal operating conditions. If certification for operation over 7620 m (25 000 ft) is requested, the aeroplane must be able to maintain a cabin pressure altitude of not more than 4572 m (15 000 ft) in the event of any reasonably probable failure or malfunction in the pressurisation system.

(b) Pressurised cabins must have at least the following valves, controls, and indicators for controlling cabin pressure:

(1) Two pressure relief valves to automatically limit the positive pressure differential to a predetermined value at the maximum rate of flow delivered by the pressure source. The combined capacity of the relief valves must be large enough so that the failure of any one valve would not cause an appreciable rise in the pressure differential. The pressure differential is positive when the internal pressure is greater than the external.

(2) Two reverse pressure differential relief valves (or their equivalents) to automatically prevent a negative pressure differential that would damage the structure. One valve is enough, however, if it is of a design that reasonably precludes it's malfunctioning.

(3) A means by which the pressure differential can be rapidly equalised.

(4) An automatic or manual regulator for controlling the intake or exhaust airflow, or both, for maintaining the required internal pressures and airflow rates.

(5) Instruments at the pilot or flight engineer station to show the pressure differential, the cabin pressure altitude, and the rate of change of the cabin pressure altitude.

(6) Warning indication at the pilot or flight engineer station to indicate when the safe or pre-set pressure differential and cabin pressure altitude limits are exceeded. Appropriate warning markings on the cabin pressure differential indicator meet the warning requirement for pressure differential limits and an aural or visual signal (in addition to cabin altitude indicating means) meets the warning requirement for cabin pressure altitude limits if it warns the flight crew when the cabin pressure altitude exceeds 3048 m (10 000 ft).

(7) A warning placard at the pilot or flight engineer station if the structure is not designed for pressure differentials up to the maximum relief valve setting in combination with landing loads.

(8) The pressure sensors necessary to meet the requirements of sub-paragraphs (b)(5) and (b)(6) of this paragraph and CS 25.1447(c), must be located and the sensing system designed so that, in the event of loss of cabin pressure in any passenger or crew compartment (including upper and lower lobe galleys), the warning and automatic presentation devices, required by those provisions, will be actuated without any delay that would significantly increase the hazards resulting from decompression.

[Amdt 25/15]

CS 25.843 Tests for pressurised cabins

ED Decision 2003/2/RM

(a) *Strength test.* The complete pressurised cabin, including doors, windows, and valves, must be tested as a pressure vessel for the pressure differential specified in CS 25.365(d).

(b) *Functional tests*. The following functional tests must be performed:

(1) Tests of the functioning and capacity of the positive and negative pressure differential valves, and of the emergency release valve, to simulate the effects of closed regulator valves.

(2) Tests of the pressurisation system to show proper functioning under each possible condition of pressure, temperature, and moisture, up to the maximum altitude for which certification is requested.

(3) Flight tests, to show the performance of the pressure supply, pressure and flow regulators, indicators, and warning signals, in steady and stepped climbs and descents at rates corresponding to the maximum attainable within the operating limitations of the aeroplane, up to the maximum altitude for which certification is requested.

(4) Tests of each door and emergency exit, to show that they operate properly after being subjected to the flight tests prescribed in sub-paragraph (b)(3) of this paragraph.