The visual means may be a simple amber light or it may need to be a red warning light tied to the master warning system depending on the criticality of the door. The door closed, latched and locked functions must be monitored, but only one indicator is needed to signal that the door is in the closed, latched and locked condition. Indications should be reliable to ensure they remain credible. The probability of erroneous closed, latched, and locked indication should be no greater than remote ($1x10^{-5}$/flight hour) for:

— each door subject to pressurisation and for which the initial opening movement is not inward; and for

— each door that could be a hazard if unlatched.

(e)(4) There must be an aural warning to the pilots prior to or during the initial portion of take-off roll if any door is not fully closed, latched, and locked and its opening would prevent a safe take-off and return to landing.

Where an unlatched door could open and prevent a safe take-off and return to landing, a more conspicuous aural warning is needed. It is intended that this system should function in a manner similar to the take-off configuration warning systems of CS 25.703 [Take-off Warning system]. The visual display for these doors may be either a red light or a display on the master warning system. Examples of doors requiring these aural warnings are:

— doors for which the structural integrity of the fuselage would be compromised if the door is not fully closed, latched and locked, or

— doors that, if open, would prevent rotation or interfere with controllability to an unacceptable level.

CS 25.783(f) **Visual inspection provision**

Each door for which unlatching could be a hazard, must have provisions for direct visual inspection to determine, without ambiguity, if the door is fully closed, latched, and locked. The provision must be permanent and discernible under operational lighting conditions or by means of a flashlight or equivalent light source.

A provision is necessary for direct visual inspection of the closed position of the door and the status of each of the latches and locks, because dispatch of an aeroplane may be permitted in some circumstances when a flight deck or other remote indication of an unsafe door remains after all door closing, latching and locking operations have been completed. Because the visual indication is used in these circumstances to determine whether to permit flight with a remote indication of an unsafe door, the visual indication should have a higher level of integrity than, and be independent of, the remote indication.

(a) The provisions should:

1) allow direct viewing of the position of the locking mechanism to show, without ambiguity, whether or not each latch is latched and each lock is locked. For doors which do not have a lock for each latch, direct viewing of the position of the latches and restraining mechanism may be necessary for determining that all the latches are latched. Indirect viewing, such as by optical devices or indicator flags, may be acceptable provided that there is no failure mode that could allow a false latched or locked indication.

2) preclude false indication of the status of the latches and locks as a result of changes in the viewing angle. The status should be obvious without the need for any deductive processes by the person making the assessment.

3) be of a robust design so that, following correct rigging, no unscheduled adjustment is required. Furthermore, the design should be resistant to unauthorised adjustment.

4) preclude mis-assembly that could result in a false latched and locked indication.

(b) If markings are used to assist the identification of the status of the latches and locks, such markings must include permanent physical features to ensure that the markings will remain accurately positioned.

(c) Although the visual means should be unambiguous in itself, placards and instructions may be necessary to interpret the status of the latches and locks.

(d) If optical devices or windows are used to view the latches and locks, it should be demonstrated that they provide a clear view and are not subject to fogging, obstruction from dislodged material or giving a false indication of the position of each latch and lock. Such optical devices and window materials should be resistant to scratching, crazing and any other damage from all materials and fluids commonly used in the operation and cleaning of aeroplanes.

CS 25.783(g) **Certain maintenance doors, removable emergency exits, and access panels**

Some doors not normally opened except for maintenance purposes or emergency evacuation and some access panels need not comply with certain sub-paragraphs of this paragraph as follows:

(1) Access panels that are not subject to cabin pressurisation and would not be a hazard if open during flight need not comply with sub-paragraphs (a) through (f) of this paragraph, but must have a means to prevent inadvertent opening during flight.

(2) Inward-opening removable emergency exits that are not normally removed, except for maintenance purposes or emergency evacuation, and flight deck-openable windows need not comply with sub-paragraphs (c) and (f) of this paragraph.

(3) Maintenance doors that meet the conditions of sub-paragraph (h) of this paragraph, and for which a placard is provided limiting use to maintenance access, need not comply with sub-paragraphs (c) and (f) of this paragraph.

Some doors not normally opened except for maintenance purposes or emergency evacuation and some access panels are not required to comply with certain sub-paragraphs of CS 25.783 as described in CS 25.783(g). This generally pertains to access panels outside pressurised compartments whose opening is of little or no consequence to safety and doors that are not used in normal operation and so are less subject to human errors or operational damage.

CS 25.783(h) **Doors that are not a hazard**

For the purpose of this paragraph, a door is considered not to be a hazard in the unlatched condition during flight, provided it can be shown to meet all of the conditions as mentioned in CS 25.783(h).

CS 25.783 recognises four categories of doors:

— Doors for which the initial opening is not inward, and are presumed to be hazardous if they become unlatched.

— Doors for which the initial opening is inward, and could be a hazard if they become unlatched.

— Doors for which the initial opening is inward, and would not be a hazard if they become unlatched.

— Small access panels outside pressurised compartments for which opening is of little or no consequence to safety.

— CS 25.783(h) describes those attributes that are essential before a door in the normal (unfailed) condition can be considered not to be a hazard during flight.

6. STRUCTURAL REQUIREMENTS.

In accordance with CS 25.571, the door structure, including its mechanical features (such as hinges, stops, and latches), that can be subjected to airframe loading conditions, should be designed to be damage tolerant. In assessing the extent of damage under CS 25.571 and CS 25.783 consideration should be given to single element failures in the primary door structure, such as frames, stringers, intercostals, latches, hinges, stops and stop supports.

The skin panels on doors should be designed to be damage tolerant with a high probability of detecting any crack before the crack causes door failure or cabin decompression.

Note: This paragraph applies only to aircraft with a certification basis including CS 25.571 or equivalent requirements for damage tolerance.

[Amdt 25/4]
[Amdt 25/6]
[Amdt 25/8]
[Amdt 25/11]

CS 25.785 Seats, berths, safety belts and harnesses

ED Decision 2017/015/R

(See AMC 25.785)

(a) A seat (or berth for a non-ambulant person) must be provided for each occupant who has reached his or her second birthday.

(b) Each seat, berth, safety belt, harness, and adjacent part of the aeroplane at each station designated as occupiable during take-off and landing must be designed so that a person making proper use of these facilities will not suffer serious injury in an emergency landing as a result of the inertia forces specified in CS 25.561 and CS 25.562. However, berths intended only for the carriage of medical patients (e.g. stretchers) need not comply with the requirements of CS 25.562.

(c) Each seat or berth must be approved.

(d) Each occupant of a seat that makes more than an 18-degree angle with the vertical plane containing the aeroplane centre line must be protected from head injury by a safety belt and an energy absorbing rest that will support the arms, shoulders, head and spine, or by a safety belt and shoulder harness that will prevent the head from contacting any injurious object. Each occupant of any other seat must be protected from head injury by a safety belt and, as

appropriate to the type, location, and angle of facing of each seat, by one or more of the following:

(1) A shoulder harness that will prevent the head from contacting any injurious object.

(2) The elimination of any injurious object within striking radius of the head.

(3) An energy absorbing rest that will support the arms, shoulders, head and spine.

(e) Each berth must be designed so that the forward part has a padded end board, canvas diaphragm, or equivalent means, that can withstand the static load reaction of the occupant when subjected to the forward inertia force specified in CS 25.561. Berths must be free from corners and protuberances likely to cause injury to a person occupying the berth during emergency conditions.

(f) Each seat or berth, and its supporting structure, and each safety belt or harness and its anchorage must be designed for an occupant weight of 77 kg (170 pounds), considering the maximum load factors, inertia forces, and reactions among the occupant, seat, safety belt, and harness for each relevant flight and ground load condition (including the emergency landing conditions prescribed in CS 25.561). In addition –

(1) The structural analysis and testing of the seats, berths, and their supporting structures may be determined by assuming that the critical load in the forward, sideward, downward, upward, and rearward directions (as determined from the prescribed flight, ground, and emergency landing conditions) acts separately or using selected combinations of loads if the required strength in each specified direction is substantiated. The forward load factor need not be applied to safety belts for berths.

(2) Each pilot seat must be designed for the reactions resulting from the application of the pilot forces prescribed in CS 25.395.

(3) For the determination of the strength of the local attachments of –

(i) Each seat to the structure; and

(ii) Each belt or harness to the seat or structure; a multiplication factor of 1·33 instead of the fitting factor as defined in CS 25.625 should be used for the inertia forces specified in CS 25.561. (For the lateral forces according to CS 25.561(b)(3) 1·33 times 3·0 g should be used.)

(g) Each crewmember seat at a flight-deck station must have a shoulder harness. These seats must meet the strength requirements of sub-paragraph (f) of this paragraph, except that where a seat forms part of the load path, the safety belt or shoulder harness attachments need only be proved to be not less strong than the actual strength of the seat. (See AMC 25.785(g).)

(h) Each seat located in the passenger compartment and designated for use during take-off and landing by a cabin crewmember required by the Operating Rules must be:

(1) Near a required floor level emergency exit, except that another location is acceptable if the emergency egress of passengers would be enhanced with that location. A cabin crewmember seat must be located adjacent to each Type A or B emergency exit. Other cabin crewmember seats must be evenly distributed among the required floor level emergency exits to the extent feasible.

(2) To the extent possible, without compromising proximity to a required floor level emergency exit, located to provide a direct view of the cabin area for which the cabin crewmember is responsible. (See AMC 25.785(h)(2))

(3) Positioned so that the seat will not interfere with the use of a passageway or exit when the seat is not in use.

(4) Located to minimise the probability that occupants would suffer injury by being struck by items dislodged from service areas, stowage compartments, or service equipment.

(5) Either forward or rearward facing with an energy absorbing rest that is designed to support the arms, shoulders, head and spine.

(6) Equipped with a restraint system consisting of a combined safety belt and shoulder harness unit with a single point release. There must be means to secure each restraint system when not in use to prevent interference with rapid egress in an emergency.

(i) Each safety belt must be equipped with a metal-to-metal latching device.

(j) If the seat backs do not provide a firm handhold, there must be a handgrip or rail along each aisle to enable persons to steady themselves while using the aisles in moderately rough air.

(k) Each projecting object that would injure persons seated or moving about the aeroplane in normal flight must be padded.

(l) Each forward observer's seat required by the operating rules must be shown to be suitable for use in conducting the necessary en-route inspections.

[Amdt 25/11]
[Amdt 25/12]
[Amdt 25/13]
[Amdt 25/17]
[Amdt 25/19]

AMC 25.785 Seats, Berths, Safety Belts and Harnesses

ED Decision 2020/024/R

FAA Advisory Circular (AC) 25.785-1B, *Flight Attendant Seat and Torso Restraint System Installations*, dated 11.5.2010, and the relevant parts of FAA 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 25.785.

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

Beds, berths, or divans convertible into a bed should be equipped with a restraint device (e.g. a belt) for use by the occupant(s) when sleeping. Beds, berths, etc. that may be occupied by more than one occupant may be equipped with a single belt.

[Amdt 25/17]
[Amdt 25/19]
[Amdt 25/26]

AMC 25.785(g) Seats, berths, safety belts and harnesses

ED Decision 2003/2/RM

Where there is a risk that a safety belt or harness might, when not in use, foul the controls or impede the crew, suitable stowage should be provided, unless it can be shown that the risk can be avoided by the application of suitable crew drills.

AMC 25.785(h)(2) Cabin Attendant Direct View

ED Decision 2017/015/R

If the total number of passenger seats approved for occupancy during taxiing, take-off, and landing is greater than the approved passenger seating configuration, the demonstration of compliance with the direct-view requirements should consider the most adverse combination of occupied seats, assuming the full passenger load on board.

[Amdt 25/19]

CS 25.787 Stowage compartments

ED Decision 2016/010/R

(See AMC 25.787)

(a) Each compartment for the stowage of cargo, baggage, carry-on articles and equipment (such as life rafts) and any other stowage compartment must be designed for its placarded maximum weight of contents and for the critical load distribution at the appropriate maximum load factors corresponding to the specified flight and ground load conditions and, where the breaking loose of the contents of such compartments could–

(1) Cause direct injury to occupants;

(2) Penetrate fuel tanks or lines or cause fire or explosion hazard by damage to adjacent systems; or

(3) Nullify any of the escape facilities provided for use after an emergency landing, to the emergency landing conditions of CS 25.561(b)(3).

If the aeroplane has a passenger-seating configuration, excluding pilot seats, of 10 seats or more, each stowage compartment in the passenger cabin, except for under seat and overhead compartments for passenger convenience, must be completely enclosed.

(b) There must be a means to prevent the contents in the compartments from becoming a hazard by shifting, under the loads specified in sub-paragraph (a) of this paragraph. (See AMC 25.787(b))

(c) If cargo compartment lamps are installed, each lamp must be installed so as to prevent contact between lamp bulb and cargo.

[Amdt 25/18]

AMC 25.787(b) Stowage compartments

ED Decision 2017/015/R

For stowage compartments in the passenger and crew compartments it must be shown by analysis and/or tests that under the load conditions as specified in CS 25.561(b)(3), the retention items such as doors, swivels, latches etc., are still performing their retention function. In the analysis and/or tests the expected wear and deterioration should be taken into account.

Stowage Compartment Latching Mechanisms:

(1) The following areas shall be considered in a special cabin interior for the purpose of designing latching mechanisms:

— Cabin crew member areas:

Cabin crew member areas are those areas in the passenger cabin where cabin crew members may be seated during taxiing, take-off, and landing (these are typically zones in proximity to floor level emergency exits, although other areas may exist).

To protect flight attendants from being struck by items dislodged from galley stowage compartments, it is common practice to install additional restraint devices (dual latching) to each stowage compartment located within a longitudinal distance equal to three rows of seats fore and aft of the cabin attendant seats. However, the following additional considerations may be used:

- A longitudinal distance of 2 metres (6.6 ft) may be used in case the 'three rows' criterion is difficult to assess due to widely spaced seating,
- Underseat and overhead stowage bins do not need to be considered, and
- A stowage compartment located in a closed unoccupied area during taxiing, take-off, and landing or behind a partition in the passenger cabin does not need to be considered.

— Passenger Areas:

Passengers Areas are zones in which passenger seats designed for occupancy during taxiing, take-off, and landing are installed. In such cabin areas, if the means used to prevent the contents of the compartments from becoming a hazard by shifting is a latched door, the design should take into consideration the wear and deterioration expected in service.

— Non TTOL Areas:

Non-TTOL areas are zones, separated from the remainder of the cabin by means of a door during taxiing, take-off, and landing (TTOL), in which no seat is installed (passenger or crew member) that may be occupied during taxiing, take-off, and landing, and which do not include any part of any possible egress route from the aeroplane (such areas may be for example lavatories, washrooms, bedrooms, closed galleys, etc.).

In such areas, a single latch mechanism for stowage compartments is acceptable, provided that the door separating this area from the rest of the cabin is shown to be capable of staying securely closed under the applicable emergency landing conditions of CS 25.561 with an additional inertia load, uniformly distributed on the door, equating to the highest placarded allowable single compartment contents mass inside that area. Such single latch mechanisms do not need to be designed to account for the wear and deterioration expected in service.

(2) The following is provided as a clarification of the considerations to be followed when designing latching mechanisms, as well as of the means by which wear and deterioration expected in service may be substantiated:

— Single latch:

A single latch is a latching mechanism capable of retaining a load derived from the specified maximum flight, ground and emergency landing load conditions.

— Dual latch:

A dual latch is a latching mechanism composed of two independent single latching mechanisms each of which is capable of retaining a load determined by the specified maximum flight, ground and emergency landing load conditions. It is acceptable that a single operating mechanism (e.g. handle) operates with two independent latching mechanisms at the same time.

— Latch fail indication

Latch fail indication is any means that permits clear visual confirmation that a latch is not properly engaged. In the case of a dual latching system, a single indication may serve for the two latches if it is ensured that the failure of either latch to properly engage will result in latch fail indication. All latches, whether single or dual, should include a latch fail indication.

— Wear and Deterioration

  — Dual latching is a means of compliance to the wear and deterioration requirement. Where dual latches are installed there is no need to further demonstrate wear and tear.

  — Consideration of wear and deterioration for single latches should be substantiated by test evidence, or analysis based on test evidence, showing that latch operation as intended by the design will be maintained following a simulation of full service life, with an appropriate scatter factor. A design life of 20 000 latch cycles may be used except if EASA finds the expected use of the aeroplane justifies more endurance substantiation. Demonstration of a 20 000 cycle design life can be accomplished by submitting the latch to a 100 000 cycle test representative of operational use, and verifying after the test that the latch is still able to operate as intended and is capable of withstanding ultimate load without failure.

(3) The above considerations regarding latching mechanisms, do not apply to compartments not accessible in flight for which a special tool is needed to gain access to (e.g. maintenance panel, access panels, etc.).

[Amdt 25/19]

CS 25.788 Passenger amenities

ED Decision 2017/015/R

(See AMC 25.788)

(a) Showers: If a shower cubicle is installed (See AMC 25.788(a) and AMC 25.1447(c)(3)):

(1) audio and visual 'Return to seat' indications, readily audible and visible to a shower-cubicle occupant, and activated at the same time as the signs required by CS 25.791(b), must be provided;

(2) audio and visual indications of the need for oxygen use, readily audible and visible to a shower-cubicle occupant, and activated in the case of cabin depressurisation or deployment of the oxygen-dispensing units in the cabin, must be provided;

(3) placards must be installed to indicate that the shower cubicle must not be used for the stowage of cargo or passenger baggage;

(4) there must be means in the cubicle to steady oneself in moderately rough air; and

(5) the shower cubicle must be designed in a way to preclude anyone from being trapped inside. If a locking mechanism is installed, it must be capable of being unlocked from the inside and the outside without the aid of any tool.

(b) Large display panels: Any large display panel installed in the passenger compartment must not be a source of danger to occupants when submitted to any of the following conditions (See AMC 25.788(b)):

(1) each relevant flight and ground load conditions (including the emergency landing conditions prescribed in CS 25.561);

(2) any load to be expected in service; and

(3) a cabin depressurisation.

[Amdt 25/19]

AMC 25.788(a) Installation of Showers

ED Decision 2017/015/R

The following should be considered in the design of a shower installation:

(a) An analysis should be performed to identify possible failures leading to water leakage, and to show that appropriate mitigation features have been included in the design.

(b) The shower cubicle should be considered as a passenger compartment in terms of the need for ventilation. The applicant should justify that adequate ventilation is provided within the shower. The cabin air itself can be considered as a 'fresh air' source for the air supply of the shower.

(c) The shower cubicle air outflow should be directed into aeroplane areas that will not be adversely affected by the high water content of this air flow.

(d) A means to steady oneself could be either (a) firm handhold(s) specifically designed and provided for the purpose or an intrinsic design feature of the cubicle. For instance, if one or more of the cubicle wall-to-wall dimensions does not exceed 1 metre (3.3 feet), it may be assumed that an occupant can steady himself/herself by placing his/her hands on opposite wall surfaces.

(e) If electrical power outlets are installed in the room or area where the shower is present, all the following requirements should be fulfilled:

(i) the shower cubicle should be enclosed up to the ceiling;

(ii) there should be no electrical power outlet inside the shower cubicle; and

(iii) no power outlet should be placed closer than 0,6m from any point on the surface of the closed shower door.

[Amdt 25/19]

AMC 25.788(b) Large Display Panels

ED Decision 2017/015/R

1. General

This AMC does not apply to flight deck display panels. A display panel should be considered large if its diagonal is greater than 51 cm (20 in.).

Any large display panel should be shown not to be a hazard during events such as emergency landing and cabin depressurisation. It should meet the following requirements:

(a) the large display panel should withstand the differential pressures caused by a worst-case cabin depressurisation event without having any adverse effect (for instance no substances should be released through cracks or openings, no sharp edges should be created);

(b) the large display panel should be subjected to, and pass, abuse load testing (see paragraph 3 below);

(c) the installation should withstand the inertia loads outlined in CS 25.561(b)(3) without any adverse effect; and

(d) if the large display panel incorporates glass, it should be subjected to, and pass, ball impact testing (see paragraph 2 below).

With the exception of the ball impact testing, large display panels incorporating any glass element should withstand the above-defined loads with no more than minor cracks (i.e. no parts released nor the surface becoming a hazard) and without becoming dislodged from their mounts. Alternatively, the installation may still be found acceptable if some means, such as a protective cover, are provided to shield the passenger cabin from the glass monitor. The installation including its protective cover should meet all the relevant criteria identified in this AMC. Furthermore, the cover should not introduce additional hazardous characteristics of its own and should comply with all pertinent aeroplane certification requirements, e.g. flammability.

Unless it has been shown that the display panel withstands all the mechanical tests in paragraphs 1.(a) to (d) above without any damage that would result in the release of chemical substances into the cabin, documentation should be provided from medical authorities which substantiates that the type and amount of chemical substances released into the cabin in case of failure would not result in adverse health effects on cabin occupants. The specific cabin volume may be considered. Alternatively, it is acceptable to show that each installed glass screen complies with A 4(1) of Directive 2002/95/EC 'on the restriction of the use of certain hazardous substances in electrical and electronic equipment' (RoHS).