2. Ball Impact Testing (only for display panels containing glass)

The test procedure and pass/fail criteria of the Underwriters Laboratories standard UL 61965, Mechanical safety for cathode ray tubes, Edition 2, 27 July 2004 or former UL 1418, Standard for safety cathode ray tubes, Edition 5, 31 December 1992, or other equivalent approved method, are the basis of the ball impact strength and no-hole tests described in this paragraph.

The large display panel should be installed in a test fixture representative of the actual installation in the cabin.

2.1. Strength Test

The large display panel should be subjected to a single impact applied in accordance with the test conditions of paragraph 2.3 below. The impact energy should be 7 J, caused by a 51-mm diameter ball or, alternatively, 5.5 J, caused by a 40-mm diameter ball, as specified in paragraph 2.3.2 below.

The test is passed if the expulsion of glass within a 1-min period after the initial impact satisfies the following criteria:

(a) there is no glass particle (a single piece of glass having a mass greater than 0.025 g) between the 0.90 and 1.50-m barriers (see paragraph 2.3.1);

(b) the total mass of all pieces of glass between the 0.90 and 1.50-m barriers (see paragraph 2.3.1) does not exceed 0.1 g; and

(c) there is no glass expelled beyond the 1.50-m barrier (see paragraph 2.3.1).

2.2 No-Hole Test

The large display panel should be subjected to a single impact applied in accordance with the test conditions of paragraph 2.3 below. The impact energy should be 3.5 J, caused by a 51-mm diameter ball as specified in P 2.3.2 below.

The test is passed if the large display panel does not develop any opening that may allow a 3-mm diameter rod to enter. Cracking of the panel is permitted.

Note: If the large display panel does not develop any opening that would allow a 3-mm rod to enter when subjected to the strength test defined in paragraph 2.1 above, the no-hole test defined in this paragraph does not need to be performed.

2.3 Test Conditions

2.3.1 Test Apparatus and Setup

The centre of the large glass item should be 1.00 ± 0.05 m above the floor.

For the strength test (see paragraph 2.1 above), two barriers, each one made of material 10–20 mm thick, 250 mm high, and 2.00 m long, should be placed on the floor in front of the test item (or on both sides in case of a glass partition) at the specified location, measured horizontally from the front surface of the large glass item to the near surface of the barrier. The barriers may be less than 2.00 m long, provided that they extend to the walls of the test room. A non-skid surface such as a blanket or rug may be placed on the floor.

A solid, smooth, steel ball of the size specified in paragraph 2.3.2 below should be suspended by suitable means such as a fine wire or chain and allowed to fall freely as a pendulum and strike the large glass item with the specified impact energy. The large glass item should be placed in a way that its surface is vertical and in the same

vertical plane as the suspension point of the pendulum. A single impact should be applied to any point on the surface of the large glass item at a distance of at least 25 mm from the edge of the surface.

2.3.2 Impact Objects

The 51-mm diameter steel ball used as an impact object should have a mass of approximately 0.5 kg and a minimum Scale C Rockwell Hardness of 60.

The 40-mm diameter steel ball used as an impact object should have a mass of approximately 0.23 kg and a minimum Scale C Rockwell Hardness of 60.

3. Abuse Load Tests (all large display panels)

Large display panels should withstand a 133 daN (300 lbf) static abuse load applied, in separate tests, in 5 different locations: in the centre, at the opposite corners (two separate tests), along the perimeter, at the midpoints of the short and long sides (two separate tests), or at an equivalent set of locations acceptable to EASA (see Figure 2 below).

For all the tests to be performed, the display panels should be mounted in a test fixture representative of the actual installation in the cabin.

For the above-mentioned load applications, it is acceptable to use any loading pad with a shape and dimensions that fit into a 15.24-cm (6-in.) diameter circle.

The display panels should withstand the applied loads without any adverse effect (e.g. glass elements, if present, cracking or breaking, the unit becoming dislodged from its mounts, substances released through cracks or openings, or sharp edges created).

During the test, it is acceptable for the display to suffer minor failures, such as minor cracks, provided that no parts are detached and the surface does not become a hazard to occupants.

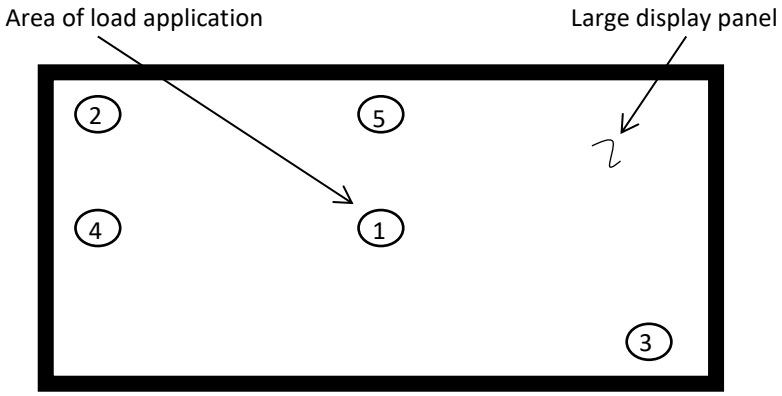

Figure 2 — Load Cases

1) centre loading;

2) corner loading;

3) opposite-corner loading;

4) short-side-midpoint perimeter loading; and

5) long-side-midpoint perimeter loading.

[Amdt 25/19]

CS 25.789 Retention of items of mass in passenger and crew compartments and galleys

ED Decision 2003/2/RM

(a) Means must be provided to prevent each item of mass (that is part of the aeroplane type design) in a passenger or crew compartment or galley from becoming a hazard by shifting under the appropriate maximum load factors corresponding to the specified flight and ground load conditions, and to the emergency landing conditions of CS 25.561(b).

(b) Each interphone restraint system must be designed so that when subjected to the load factors specified in CS 25.561(b)(3), the interphone will remain in its stowed position.

CS 25.791 Passenger information signs and placards

ED Decision 2019/013/R

(See AMC 25.791)

(a) If smoking is to be prohibited, there must be at least one placard so stating that is legible to each person seated in the cabin. If smoking is to be allowed, and if the crew compartment is separated from the passenger compartment, there must be at least one sign notifying when smoking is prohibited. Signs, which notify when smoking is prohibited, must be installed so as to be operable from either pilot's seat and, when illuminated, must be legible under all probable conditions of cabin illumination to each person seated in the cabin.

(b) Signs that notify when seat belts should be fastened and that are installed to comply with the Operating Rules must be installed so as to be operable from either pilot's seat and, when illuminated, must be legible under all probable conditions of cabin illumination to each person seated in the cabin.

(c) A placard must be located on or adjacent to the door of each receptacle used for the disposal of flammable waste materials to indicate that use of the receptacle for disposal of cigarettes, etc., is prohibited.

(d) Lavatories must have 'No Smoking' or 'No Smoking in Lavatory' placards conspicuously located on or adjacent to each side of the entry door.

(e) Symbols that clearly express the intent of the sign or placard may be used in lieu of letters.

[Amdt No: 25/23]

AMC 25.791 Passenger information signs and placards

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 25.791.

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 25.793 Floor surfaces

ED Decision 2015/019/R

(See AMC to CS 25.793 and 25.810(c))

The floor surface of all areas, which are likely to become wet in service, must have slip resistant properties.

[Amdt 25/17]

AMC 25.793 and 25.810(c) Floor surfaces

ED Decision 2020/024/R

The slip-resistant properties of floor surface material should be tested wet with the type of slippery liquid expected during operation. In addition, dry testing should also be conducted to provide reference friction values. In all the test conditions, the dynamic coefficient of friction (DCOF) should be at least 0.45.

The following standard methods, using rubber and leather test devices, are acceptable (within their limitations) to conduct the testing:

— Military Specifications MIL-W-5044B (dated 24 February 1964) and MIL-W-5044C (dated 25 August 1970), titled 'Walkway Compound, Nonslip and Walkway Matting, Nonslip',

— DIN 51131:2014-02, titled 'Testing of floor coverings - Determination of the anti-slip property - Method for measurement of the sliding friction coefficient',

— ISO 8295:1995, titled 'Plastics - Film and sheeting - Determination of coefficients of friction',

— EN 13893:2002, titled 'Resilient, laminate and textile floor coverings - Measurement of dynamic coefficient of friction on dry floor surfaces',

ANSI/NFSI B101.3-2012, titled 'Test Method for Measuring Wet DCOF of Common Hard-Surface Floor Materials'.

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

CS 25.795 Security considerations

ED Decision 2016/010/R

(see AMC 25.795)

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

(1) Resist forcible intrusion by unauthorised persons and be capable of withstanding impacts of 300 Joules (221.3 footpounds) as well as a 1113 Newton (250 pound) 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.

(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 (1,430 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 (1,430 ft/s). (See AMC 25.795(a)(2))

(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. (See AMC 25.795(b)(1))

(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. (See AMC 25.795(b)(2))

(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. (See AMC 25.795(b)(3))

(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. (See AMC 25.795(c)(1))

(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. (See AMC 25.795(c)(2))

(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. (See AMC 25.795(c)(3))

(d) Each chemical oxygen generator or its installation must be designed to be secure from deliberate manipulation by one of the following:

(1) By providing effective resistance to tampering;

(2) By providing an effective combination of resistance to tampering and active tamper-evident features;

(3) By installation in a location or manner whereby any attempt to access the generator would be immediately obvious; or

(4) By a combination of approaches specified in subparagraphs (d)(1), (d)(2) and (d)(3) of this paragraph. (See AMC 25.795(d))

[Amdt 25/9]
[Amdt 25/17]
[Amdt 25/18]

AMC 25.795 Security considerations

ED Decision 2003/2/RM

Referenced Documentation:

— FAA memorandum, Subject Information: Certification of strengthened Flight Deck Doors on Transport Category Airplanes, Original release 6 November 2001.

AMC 25.795(a)(1) Flightdeck intrusion resistance

ED Decision 2010/005/R

Referenced Documentation:

— Federal Aviation Administration Advisory Circular (AC) 25.795-1A, Flightdeck Intrusion Resistance, issue date 24 October 2008.

[Amdt 25/9]

AMC 25.795(a)(2) Flightdeck penetration resistance

ED Decision 2010/005/R

Referenced Documentation:

— Federal Aviation Administration Advisory Circular (AC) 25.795-2A, Flightdeck Penetration Resistance, issue date 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.

[Amdt 25/9]

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

ED Decision 2010/005/R

Referenced Documentation:

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

[Amdt 25/9]

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

ED Decision 2010/005/R

Referenced Documentation:

— Federal Aviation Administration Advisory Circular (AC) 25.795-4, Passenger Cabin SmokeProtection, issue date 24 October 2008.

[Amdt 25/9]

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

ED Decision 2010/005/R

Referenced Documentation:

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

[Amdt 25/9]

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

ED Decision 2010/005/R

Referenced Documentation:

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

[Amdt 25/9]

AMC 25.795(c)(2) Survivability of systems

ED Decision 2010/005/R

Referenced Documentation:

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

[Amdt 25/9]

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

ED Decision 2010/005/R

Referenced Documentation:

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

[Amdt 25/9]

AMC 25.795(d) Security of chemical oxygen generators

ED Decision 2015/019/R

1. Purpose

CS 25.795(d) requires each Chemical Oxygen Generator (COG) or its installation to be designed so that it meets one of several criteria. The means of compliance described in this AMC provides guidance to supplement the engineering and operational judgment that should form the basis of any compliance findings related to a COG installed on an aeroplane.

2. Definition of terms

For this AMC, the following definitions apply:

(a) **Access:** The ability to manipulate the COG with the intent of making alterations for a purpose for which the COG was not originally designed. This includes gaining access to the area surrounding the COG.

(b) **Activation:** Release of the firing mechanism of the COG for the purpose of initiating the chemical reaction inside.

(c) **Alteration**: A change in the configuration of the COG once 'access' has been gained for the purpose of using the COG for a function other than the one it is intended for.

(d) **Chemical Oxygen Generator (COG):** A device that releases oxygen that is created from a chemical reaction.

(e) **Immediately obvious:** Where an attempt to gain 'access' to the COG would be readily recognised as suspicious (prior to gaining 'access'). This would only be in locations with 'unrestricted access' that are 'observable'.

(f) **Intervention**: The actions crew members must take to prevent damage to the aeroplane once an alert is activated indicating that the COG is being tampered with. The time it takes to intervene when the lavatory is occupied has not been determined; however, it can be assumed that it will take several minutes to resolve the issue.

(g) **Observable**: A crew member is able to see if a person attempts to gain 'access' to a COG installation during the course of the crew member's normal duties.

(h) **Tamper-evident feature:** A unique feature that provides an active and obvious contemporaneous alert to crew members that someone is trying to gain 'access' to the COG and immediate crew 'intervention' is necessary.

(i) **Tamper-resistance:** The level of deterrence for gaining 'access' to the COG.

(j) **Unrestricted access:** An area of the cabin passengers can enter without overcoming locks or other mechanical closure means.

3. Related Certification Specifications (CSs)

CS 25.795 Security considerations

CS 25.1301 Equipment — Function and installation

CS 25.1309 Equipment, systems, and installations

CS 25.1322 Flight crew alerting

CS 25.1450 Chemical oxygen generators

4. Compliance with CS 25.795(d)

(a) Acceptable means of determining if a COG or its installation is designed to be secure

Several criteria may be used for determining if a COG installation is secure or has a security vulnerability. COG installations with a security vulnerability must include design features to prevent potential misuse of the COG. Figure 1, Criteria for Assessing an Installation, includes assessment criteria that can be used for determining if a COG installation has a security vulnerability. Table 1 includes guidance to assist in answering the questions in Figure 1. For installations identified as having security vulnerabilities, such as those for which the answers to the assessment statements in Figure 1 result in the answer to question number 4 being yes, the design should be changed. Alternatively, the COG can be replaced with an acceptable oxygen source that is not a security threat.

Figure 1: Criteria for assessing an installation