



**THE NETHERLANDS  
MILITARY AVIATION REGULATIONS**

**Military Certification Specifications for  
Occupant Safety of Large Transport  
Aeroplanes**

**NLD-MCS-OS 25**

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# Preamble

## Background

The first issue of the Military Certification Specifications for Occupant Safety for Large Transport Aeroplanes, NLD-MCS-OS 25, is limited to the scope of the JAR-25 Change 15 requirements originally listed in Airworthiness Directive Occupant Safety (AD-OS) MAA-NLD 12-001, Table 1 “Occupant Safety requirements for KDC-10 and C-130H-30”.

This NLD-MCS-OS 25 supersedes AD MAA-NLD 12-001.

Future amendments to NLD-MCS-OS 25 will be documented in this Preamble.

In 2012, the Military Aviation Authority The Netherlands (MAA-NLD) issued an Airworthiness Directive Occupant Safety (AD-OS) MAA-NLD 12-001 to establish, amongst others, the formal certification requirements regarding occupant safety for Dutch military large transport aircraft. The requirements consisted of a subset of the civil certification requirements per JAR-25 Change 15 for aeroplanes and a subset of the civil certification requirements per JAR-29 Amendment 3 for rotorcraft. Equivalent sets of FAR-25 and FAR 29 requirements were also provided.

The AD-OS has been used to support Cabin Safety Improvement Programs (CSIMP) to improve occupant safety in specific types of Dutch military large transport aeroplanes and rotorcraft. This has led to the identification of various non-compliances with the minimum certification requirements listed in the AD-OS. Subsequently, those non-compliances have been processed as Certification Review Items (CRI).

Some of the conclusions from the CRIs are considered by the MAA-NLD to be not only relevant for the specific aircraft for which the CRIs were initiated, but also for new to be certified Dutch military large transport aircraft. This is the case when these conclusions result from specific military needs not considered in the civil requirements. Therefore, the MAA-NLD has decided to update the requirements referred to in the AD-OS in line with the relevant conclusions of the CRIs and issue them, for aeroplanes, as the Military Certification Specifications for Occupant Safety for Large Transport Aeroplanes NLD-MCS-OS 25 (this document). CRIs for rotorcraft as well as for aeroplanes were taken into account based on the applicability of the subject.

NLD-MCS-OS 25 must be used when establishing the type certification base for a Dutch military large transport aeroplane for which the certification project for the initial MTC is applied for after the date of entry in to force of NLD-MCS-OS 25. Use of NLD-MCS-OS 25 is not mandatory for certification of changes to existing MTCs. Changes to existing MTCs may be based on the existing type certification base stated on the MTCDS of the type, except for significant changes.

As stated above, the NLD-MCS-OS 25 is based on requirements taken from JAR 25 Change 15 which became effective on 1-10-2000. When a new Dutch military large transport aeroplane is introduced that has previously been certified by a recognized authority against a more recent civil type certification base, the amendment level of that more recent civil type certification base should be maintained in the type certification base for the MTC. Where the requirements in the NLD-MCS-OS 25 are adapted for military use (presented in [blue text](#), see under ‘Presentation’), it must be determined per requirement how this will be implemented in the type certification base. Any deviations in the type certification base relative to the requirements in NLD-MCS-OS 25 must be agreed with the MAA-NLD in a CRI-process.

This NLD-MCS-OS 25 includes Acceptable Means of Compliance (AMC) that are related to changes in the certification requirements relative to the original civil certification requirements. In addition, some AMC are provided to state specific MAA-NLD policy in cases where the original civil requirements themselves were not changed. However, if not in conflict, the Acceptable Means of Compliance as published by EASA and FAA for the original civil certification requirements may be used too. For each certification project the means of compliance are subject to agreement with the MAA-NLD.

## Presentation

The format of this NLD-MCS-OS 25 is primarily based on the format of JAR-25 Change 15, including naming and numbering conventions and paragraph numbering. Subparagraph numbering is maintained to the extent practical.

Each paragraph number and subject in this NLD-MCS-OS 25 corresponds with the same paragraph number and subject in JAR 25, Change 15. It should be noted that using this NLD-MCS-OS 25 in combination with other civil certification codes of different origin (e.g. CS, FAR) or amendment level could result in mismatches in (sub)paragraph numbers and subjects.

Text in Section 2, 3 and 4 which is identical to the corresponding JAR-25 paragraphs is written in black. Text in Section 2, 3 and 4 which is altered based on CRIs and new insights, is written in blue.

References to JAR-25 paragraphs refer to JAR 25 Change 15.

Definitions and abbreviations of terms used in this NLD-MCS-OS 25 are contained in NLD-MAD-1.

## Section 1 – General

### **NLD-MCS-OS 25.1      Entry into force**

This NLD-MCS-OS 25 version 1.0 enters into force starting 1 August 2025.

### **NLD-MCS-OS 25.2      Applicability**

(a) This NLD-MCS-OS 25 –

- (1) Prescribes airworthiness requirements for the issue of military type certificates, and changes to those certificates, for transport aeroplanes with a maximum weight greater than 5700 kg (12500 lbs);
- (2) Is limited to airworthiness requirements regarding Occupant Safety only. This also applies for the generic requirements (e.g. NLD-MCS-OS 25.603), which only apply within the context of the specific Occupant Safety requirements in this NLD-MCS-OS 25.

## Section 2 – Airworthiness requirements

### - SUBPART C – STRUCTURE

#### - - EMERGENCY LANDING CONDITIONS

##### **NLD-MCS-OS 25.561      General**

- (a) The aeroplane, although it may be damaged in emergency landing conditions on land or water, must be designed as prescribed in this paragraph to protect each occupant under those conditions.
- (b) The structure must be designed to give each occupant every reasonable chance of escaping serious injury in a minor crash landing when –
  - (1) Proper use is made of seats, belts, and all other safety design provisions;
  - (2) The wheels are retracted (where applicable); and
  - (3) The occupant experiences the following ultimate inertia forces acting separately relative to the surrounding structure:
    - (i) Upward, 3g
    - (ii) Forward, 9g
    - (iii) Sideward, 3g on the airframe and 4g on the seats and their attachments
    - (iv) Downward, 6g
    - (v) Rearward, 1.5g
- (c) [For equipment and any other large masses, the following apply \(See AMC-OS 25.561 Emergency landing conditions - General\(c\)\):](#)
  - (1) These items must be positioned so that if they break loose they will be unlikely to:
    - (i) Cause direct injury to occupants;
    - (ii) Penetrate fuel tanks or lines or cause fire or explosion hazard by damage to adjacent systems; or
    - (iii) Nullify any of the escape facilities provided for use after an emergency landing.
  - (2) When such positioning is not practical (e.g. fuselage mounted engines or auxiliary power units) each such item of mass shall be restrained under all loads up to those specified in paragraph (b)(3) of this section. The local attachments for these items should be designed to withstand 1.33 times the specified loads if these items are subject to severe wear and tear through frequent removal (e.g. quick change interior items). [\(See AMC-OS 25.625 Fitting factors and visual inspection of attachments\(d\)\(2\)\).](#)
- (d) Seats and items of mass (and their supporting structure) must not deform under any loads up to those specified in sub-paragraph (b)(3) of this paragraph in any manner that would impede subsequent rapid evacuation of occupants.



- (c) The following performance measures must not be exceeded during the dynamic tests conducted in accordance with sub-paragraph (b) of this paragraph:
- (1) Where upper torso straps are used tension loads in individual straps must not exceed 1750 pounds (793.78 kg). If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2000 pounds (907.18 kg).
  - (2) The maximum compressive load measured between the pelvis and the lumbar column of the anthropomorphic dummy must not exceed 1500 pounds (680.38 kg).
  - (3) The upper torso restraint straps (where installed) must remain on the occupant's shoulder during the impact.
  - (4) The lap safety belt must remain on the occupant's pelvis during the impact.
  - (5) Each occupant must be protected from serious head injury under the conditions prescribed in sub-paragraph (b) of this paragraph. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a Head Injury Criterion (HIC) of 1000 units. The level of HIC is defined by the equation –

$$HIC = \left\{ (t_2 - t_1) \left[ \frac{1}{(t_2 - t_1)} \int_{t_1}^{t_2} a(t) dt \right]^{2.5} \right\}_{\max}$$

Where –

t1 is the initial integration time, t2 is the final integration time, and a(t) is the total acceleration vs. time curve for the head strike, and where (t) is in seconds, and (a) is in units of gravity (g).

- (6) Where leg injuries may result from contact with seats or other structure, protection must be provided to prevent axially compressive loads exceeding 2250 pounds (1020.58 kg) in each femur.
- (7) The seat must remain attached at all points of attachment, although the structure may have yielded.
- (8) Seats must not yield under the tests specified in sub-paragraphs (b)(1) and (b)(2) of this paragraph to the extent they would impede rapid evacuation of the aeroplane occupants.

#### **NLD-MCS-OS 25.563      Structural ditching provisions**

Structural strength considerations of ditching provisions must be in accordance with [NLD-MCS-OS 25.801\(e\)](#).

## - SUBPART D – DESIGN AND CONSTRUCTION

### -- GENERAL

#### **NLD-MCS-OS 25.601      General**

The aeroplane may not have design features or details that experience has shown to be hazardous or unreliable. The suitability of each questionable design detail and part must be established by tests.

#### **NLD-MCS-OS 25.603      Material**

The suitability and durability of materials used for parts, the failure of which could adversely affect safety, must –

- (a) Be established on the basis of experience or tests;
- (b) Conform to approved specifications (such as industry or military specifications, or Technical Standard Orders) that ensure their having the strength and other properties assumed in the design data; and
- (c) Take into account the effects of environmental conditions, such as temperature and humidity, expected in service.

#### **NLD-MCS-OS 25.625      Fitting factors**

For each fitting (part or terminal used to join one structural member to another) the following apply:

- (a) For each fitting whose strength is not proven by limit and ultimate load tests in which actual stress conditions are simulated in the fitting and surrounding structures, and that if it came loose could cause direct injury to the occupants, or penetrate fuel tanks or lines or cause fire or explosion hazard by damage to adjacent systems, or nullify any of the escape facilities provided after an emergency landing, a fitting factor of at least 1.15 must be applied to each part of –
  - (1) The fitting;
  - (2) The means of attachment; and
  - (3) The bearing on the joined members.
- (b) No fitting factor need be used –
  - (1) For joints made under approved practices and based on comprehensive test data (such as continuous joints in metal plating, welded joints, and scarf joints in wood); and
  - (2) With respect to any bearing surface for which a larger special factor is used.
- (c) For each integral fitting, the part must be treated as a fitting up to the point at which the section properties become typical of the member.
- (d) Each seat, berth, safety belt and harness attachment to the structure, and each attachment to the structure concerning an item in the cabin that can be optionally installed, and that if it came loose could cause direct injury to the occupants, or penetrate fuel tanks or lines or

cause fire or explosion hazard by damage to adjacent systems, or nullify any of the escape facilities provided after an emergency landing (see AMC-OS 25.625 Fitting factors and visual inspection of attachments(d)), -

- (1) Must be shown by analysis, tests, or both, to be able to withstand the inertia forces prescribed in NLD-MCS-OS 25.561(b)(3) multiplied by a fitting factor of 1.33; and
- (2) If the attachment is subject to wear and tear, a visual inspection as to its condition must be incorporated in the installation instructions of the concerning item. (See AMC-OS 25.625 Fitting factors and visual inspection of attachments(d)(2))

## -- PERSONNEL AND CARGO ACCOMMODATIONS

### **NLD-MCS-OS 25.772 Pilot compartment doors**

For an aeroplane that has a maximum passenger seating configuration of more than 20 seats and that has a lockable door installed between the pilot compartment and the passenger compartment –

- (a) The emergency exit configuration must be designed so that neither crew members nor passengers need use that door in order to reach the emergency exits provided for them; and
- (b) Means must be provided to enable flightcrew members to directly enter the passenger compartment from the pilot compartment if the cockpit door becomes jammed.

### **NLD-MCS-OS 25.783 Doors**

- (a) Each closed cabin must have at least one easily accessible external door
- (b) There must be a means to lock and safeguard each external door against opening in flight (either inadvertently by persons or as a result of mechanical failure or failure of a single structural element either during or after closure). Each external door that is designated as an emergency exit must be openable from both the inside and the outside, even though persons may be crowded against the door on the inside of the aeroplane. Inward opening doors may be used if there are means to prevent occupants from crowding against the door to an extent that would interfere with the opening of the door. The means of opening must be simple and obvious and must be arranged and marked so that it can be readily located and operated, even in darkness. Auxiliary locking devices may be used. (See AMC-OS 25.783 Doors(b))
- (c) Each external door must be reasonably free from jamming as a result of fuselage deformation in a minor crash.
- (d) Each external door must be located where persons using them will not be endangered by the propeller when appropriate operating procedures are used.
- (e) There must be provision for direct visual inspection of the locking mechanism to determine if external doors, for which the initial opening movement is not inward (including passenger, crew, service, and cargo doors), are fully closed and locked. The provision must be discernible under operational lighting conditions by appropriate crew members using a flashlight or equivalent lighting source. In addition there must be a visual warning means to signal the appropriate flight-crew members if any external door is not fully closed and locked. The means must be designed such that any failure or combination of failures that would result in an erroneous closed and locked indication is improbable for doors for which the initial opening movement is not inward.
- (f) External doors must have provisions to prevent the initiation of pressurisation of the aeroplane to an unsafe level if the door is not fully closed and locked. In addition, it must be shown by safety analysis that inadvertent opening is extremely improbable.
- (g) Cargo and service doors not suitable for use as emergency exits need only meet subparagraphs (e) and (f) of this paragraph and be safeguarded against opening in flight as a result of mechanical failure or failure of a single structural element.
- (h) Deleted.

- (i) If an integral stair is installed in a passenger entry door that is qualified as a passenger emergency exit, the stair must be designed so that under the following conditions the effectiveness of passenger emergency egress will not be impaired:
  - (1) The door, integral stair, and operating mechanism have been subjected to the inertia forces specified in [NLD-MCS-OS 25.561\(b\)\(3\)](#), acting separately relative to the surrounding structure.
  - (2) The aeroplane is in the normal ground attitude and in each of the attitudes corresponding to collapse of one or more legs of the landing gear.
- (j) All lavatory doors must be designed to preclude anyone from becoming trapped inside the lavatory, and if a locking mechanism is installed, it must be capable of being unlocked from the outside without the aid of special tools.

**NLD-MCS-OS 25.785      Seats, berths, safety belts and harnesses**

(See [AMC-OS 25.785 Seats, berths, safety belts and harnesses](#))

- (a) A seat (or berth for a non-ambulant person) must be provided for each occupant who has reached his or her second birthday.  
 For the purposes of this paragraph, a litter is defined as a device designed to carry a non-ambulatory person, primarily in a recumbent position, into and on the aeroplane. A litter designed as part of the aeroplane type design must be designed in accordance with the requirements for berths in this paragraph (see [AMC-OS 25.785 Seats, berths, safety belts and harnesses\(a\)](#)).
- (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 [NLD-MCS-OS 25.561](#) and [NLD-MCS-OS 25.562](#) (See [AMC-OS 25.785 Seats, berths, safety belts and harnesses\(b\)](#)).
- (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 centreline 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 (see [AMC-OS 25.785 Seats, berths, safety belts and harnesses\(d\)](#)):
  - (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) Deleted
- (f) Each seat and its supporting structure, and each safety belt or harness and its anchorage must be designed for an occupant weight as agreed with the MAA-NLD (see [AMC-OS 25.785 Seats, berths, safety belts and harnesses\(f\)](#)) and shall consider 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 [NLD-MCS-OS 25.561\(b\)](#)). In addition –

- (1) The structural analysis and testing of the seats 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.
- (2) Each pilot seat must be designed for the reactions resulting from the application of the limit pilot control forces.
- (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 [NLD-MCS-OS 25.625](#) should be used for the inertia forces specified in [NLD-MCS-OS 25.561](#). (For the lateral forces according to [NLD-MCS-OS 25.561\(b\)\(3\)](#) 1.33 times 3.0 g should be used.)
- (g) Each crew member seat at a flight-deck station must have a shoulder harness. These seats must meet the strength requirements of subparagraph (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.
- (h) Each seat located in the passenger compartment and designated for use during take-off and landing by a cabin crew member required by [any applicable operating rule](#) 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 crew member seat must be located adjacent to each Type A emergency exit. Other cabin crew member 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 crew member is responsible.
  - (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.
- (m) When a headrest is used, the headrest and its supporting structure must be designed to resist the inertia forces specified in NLD-MCS-OS 25.561, with a 1.33 fitting factor and a head weight, including helmet, as agreed with the MAA-NLD.
- (n) Each berth must be designed to withstand the load reaction of an occupant weight agreed under sub-paragraph (f) when the occupant is subjected to the forward inertial load factors specified in NLD-MCS-OS 25.561(b). A berth installed within 15° or less of the longitudinal axis of the aeroplane must be provided with a padded end-board, cloth diaphragm, or equivalent means that can withstand the forward load reaction. A berth oriented greater than 15° with the longitudinal axis of the aeroplane must be equipped with appropriate restraints, such as straps or safety belts, to withstand the forward reaction.  
In addition -
  - (1) The berth must have a restraint system and must not have corners or other protuberances likely to cause serious injury to a person occupying it during emergency landing conditions; and
  - (2) The berth attachment to the structure and the occupant restraint system attachments to the berth or the structure must be designed to withstand the critical loads resulting from flight and ground load conditions and from the conditions prescribed in NLD-MCS-OS 25.561(b). The fitting factor required by NLD-MCS-OS 25.625(d) shall be applied.
- (o) For structural provisions designed for installation of NATO standard litters complying with STANAG 2040 and STANAG 3204, the following applies:
  - (1) The Flight Manual must mention that the provisions are designed for use with NATO standard litters that comply with STANAG 2040 and STANAG 3204.
  - (2) Regardless of the actual strength of the NATO standard litter and its occupant restraint system the structural provisions in the aeroplane must be designed to withstand the critical loads resulting from flight and ground load conditions and from the conditions prescribed in NLD-MCS-OS 25.561(b). The fitting factor required by NLD-MCS-OS 25.625(d) and the occupant weight agreed under sub-paragraph (f) shall be applied.
- (p) If the combined transport of occupants and cargo in the same compartment is to be allowed, the Flight Manual must include head strike envelope geometry data for any allowed seating position next to a cargo or baggage stowing position, taking into account the installed type of seat and occupant restraint system (See AMC-OS 25.785 Seats, berths, safety belts and harnesses).

**NLD-MCS-OS 25.787 Stowage compartments**

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

**NLD-MCS-OS 25.789      Retention of items of mass in passenger and crew compartments and galleys**

- (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 [NLD-MCS-OS 25.561\(b\)](#).
- (b) Each interphone restraint system must be designed so that when subjected to the load factors specified [NLD-MCS-OS 25.561\(b\)\(3\)](#), the interphone will remain in its stowed position.

**NLD-MCS-OS 25.791      Passenger information signs and placards**

- (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 [any applicable operating rule](#) 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.](#)

**NLD-MCS-OS 25.793      Floor surfaces**

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

## -- EMERGENCY PROVISIONS

### **NLD-MCS-OS 25.801      Ditching**

- (a) If certification with ditching provisions is requested, the aeroplane must meet the requirements of this paragraph and [NLD-MCS-OS 25.807\(e\)](#), [NLD-MCS-OS 25.1411](#) and [NLD-MCS-OS 25.1415\(a\)](#).
- (b) Each practicable design measure, compatible with the general characteristics of the aeroplane, must be taken to minimise the probability that in an emergency landing on water, the behaviour of the aeroplane would cause immediate injury to the occupants or would make it impossible for them to escape.
- (c) The probable behaviour of the aeroplane in a water landing must be investigated by model tests or by comparison with aeroplanes of similar configuration for which the ditching characteristics are known. Scoops, wing-flaps, projections, and any other factor likely to affect the hydrodynamic characteristics of the aeroplane, must be considered.
- (d) It must be shown that, under reasonably probable water conditions, the flotation time and trim of the aeroplane will allow the occupants to leave the aeroplane and enter the liferafts required by [NLD-MCS-OS 25.1415](#). If compliance with this provision is shown by buoyancy and trim computations, appropriate allowances must be made for probable structural damage and leakage. If the aeroplane has fuel tanks (with fuel jettisoning provisions) that can reasonably be expected to withstand a ditching without leakage, the jettisonable volume of fuel may be considered as buoyancy volume.
- (e) Unless the effects of the collapse of external doors and windows are accounted for in the investigation of the probable behaviour of the aeroplane in a water landing (as prescribed in subparagraphs (c) and (d) of this paragraph), the external doors and windows must be designed to withstand the probable maximum local pressures.

### **NLD-MCS-OS 25.803      Emergency evacuation**

- (a) Each crew and passenger area must have emergency means to allow rapid evacuation in crash landings, with the landing gear extended as well as with the landing gear retracted, considering the possibility of the aeroplane being on fire.
- (b) [Passenger entrance, crew, and service doors may be considered as emergency exits if they meet the requirements of this paragraph and of NLD-MCS-OS 25.807 to NLD-MCS-OS 25.815.](#)
- (c) [Except as provided in sub-paragraph \(d\) of this paragraph, the aeroplane must be tested in accordance with the requirements of Appendix A of this NLD-MCS-OS to demonstrate that the maximum allowed number of occupants, including the crew-members required by the operating rules, can be evacuated from the aeroplane to the ground within 90 seconds, for each allowed configuration and each allowed cargo loading condition, using only the accessible side-of-fuselage and ramp emergency exits, if installed, and taking into account the following \(see AMC-OS 25.803      Emergency evacuation\(c\)\):](#)
  - (1) [The evacuation capacity of each individual emergency exit must be demonstrated by test with occupants wearing typical clothing \(see AMC-OS 25.803      Emergency evacuation\(c\)\(1\)\); and](#)
  - (2) [Where any emergency exit is obstructed due to installation of equipment, it must be regarded as inoperable unless it can be cleared by an occupant to make it operable in a simple and obvious manner and without requiring exceptional effort. The time required to clear the exit and the effects due to any remaining obstruction left must be taken into](#)

account in establishing the evacuation capacity of that emergency exit (see AMC-OS 25.803 Emergency evacuation(c)(2)); and

- (3) Placards must be installed that accurately state or illustrate the method of operation of devices needed for evacuation, if these are not considered simple and obvious by themselves. The placards must be displayed in a conspicuous place, and their adequacy must be shown by test; and
  - (4) Exits, other than ramp exits, must be grouped into exit pairs, where each pair consists of an exit on the left hand side and the nearest exit on the right hand side. Exits of an exit pair need not be diametrically opposite each other nor of the same size. However, the evacuation capacity allocated to the exit pair must be the lowest evacuation capacity of the two exits; and
  - (5) The allocated evacuation capacity for a ramp exit shall be the lowest of –
    - (i) The evacuation capacity established under point (1); and
    - (ii) 40 for ramp exits with dimensions equal to or larger than 2300 mm (90.5 inch) wide and 800 mm (31.5 inch) high, and
    - (iii) 20 for ramp exits with smaller dimensions, and;
  - (6) The maximum allowed number of occupants during taxi, take-off or landing in any compartment may not be higher than the sum of the under points (4) and (5) allocated evacuation capacities of the available exit pairs and the ramp exit, if installed, in that compartment (see AMC-OS 25.803 Emergency evacuation(c)(6)); and
  - (7) The maximum allowed number of occupants during taxi, take-off or landing in any compartment that has either only a single ramp exit or a single exit pair, may not be higher than 20 (see AMC-OS 25.803 Emergency evacuation(c)(7)).
- (d) A combination of analysis and tests may be used to show that the aeroplane is capable of being evacuated within 90 seconds under the conditions specified in NLD-MCS-OS 25.803(c) if the MAA-NLD finds that the combination of analysis and tests will provide data, with respect to the emergency evacuation capability of the aeroplane, equivalent to that which would be obtained by actual demonstration.
- (e) Compliance with the time constraint of 90 seconds as stated in NLD-MCS-OS 25.803(c) is not applicable to medevac configurations for the evacuation of patients with reduced mobility. Otherwise, rapid evacuation of such patients must remain possible through simple and obvious means.

#### **NLD-MCS-OS 25.807 Emergency exits**

- (a) *Type*. For the purpose of this NLD-MCS-OS-25, the types of exits are defined as follows:
- (1) *Type I*. This type is a floor level exit with a rectangular opening of not less than 24 inches (609.6 mm) wide by 48 inches (1.219 m) high, with corner radii not greater than one-third the width of the exit.
  - (2) *Type II*. This type is a rectangular opening of not less than 20 inches (508 mm) wide by 44 inches (1.12 m) high, with corner radii not greater than one-third the width of the exit. Type II exits must be floor level exits unless located over the wing, in which case they may not have a step-up inside the aeroplane of more than 10 inches (254 mm) nor a step-down outside the aeroplane of more than 17 inches (431.8 mm).

- (3) *Type III*. This type is a rectangular opening of not less than 20 inches (508 mm) wide by 36 inches (914.4 mm) high, with corner radii not greater than one-third the width of the exit, and with a step-up inside the aeroplane of not more than 20 inches (508 mm). If the exit is located over the wing, the step-down outside the aeroplane may not exceed 27 inches (685.8 mm).
- (4) *Type IV*. This type is a rectangular opening of not less than 19 inches (482.6 mm) wide by 26 inches (660.4 mm) high, with corner radii not greater than one-third the width of the exit, located over the wing, with a step-up inside the aeroplane of not more than 29 inches (736.6 mm) and a step-down outside the aeroplane of not more than 36 inches (914.4 mm).
- (5) Deleted.
- (6) Deleted.
- (7) *Type A*. This type is a floor level exit with a rectangular opening of not less than 42 inches (1.067 m) wide by 72 inches (1.829 m) high with corner radii not greater than one-sixth of the width of the exit.
- (8) *Ramp exits*. A ramp exit is an exit at the rear end of the cabin near the centreline of the fuselage that can be used with the landing gear extended and with the landing gear retracted. Ramp exits need not be part of an exit pair.
- (b) *Step down distance*. Step down distance, as used in this paragraph, means the actual distance between the bottom of the required opening and a usable foot hold, extending out from the fuselage, that is large enough to be effective without searching by sight or feel.
- (c) *Over-sized exits*. Openings larger than those specified in this paragraph, whether or not of rectangular shape, may be used if the specified rectangular opening can be inscribed within the opening and the base of the inscribed rectangular opening meets the specified step-up and stepdown heights.
- (d) Deleted
- (e) Ditching emergency exits for passengers. Ditching emergency exits must be provided in accordance with the following requirements whether or not certification with ditching provisions is requested:
- (1) For aeroplanes that have a passenger seating configuration of nine seats or less, excluding pilots seats, one exit above the waterline in each side of the aeroplane, meeting at least the dimensions of a Type IV exit.
- (2) For aeroplanes that have a passenger seating configuration of 10 seats or more, excluding pilots seats, one exit above the waterline in a side of the aeroplane, meeting at least the dimensions of a Type III exit for each unit (or part of a unit) of 35 passenger seats, but no less than two such exits in the passenger cabin, with one on each side of the aeroplane. The passenger seat/exit ratio may be increased through the use of larger exits, or other means, provided it is shown that the evacuation capability during ditching has been improved accordingly.
- (3) If it is impractical to locate side exits above the waterline, the side exits must be replaced by an equal number of readily accessible overhead hatches of not less than the dimensions of a Type III exit, except that for aeroplanes with a passenger configuration of 35 seats or less, excluding pilots seats, the two required Type III side exits need be replaced by only one overhead hatch.
- (f) Flight crew emergency exits. For aeroplanes in which the proximity of passenger emergency exits to the flight crew area does not offer a convenient and readily accessible means of evacuation of the flight crew, and for all aeroplanes having a passenger seating capacity

greater than 20, flight crew exits shall be located in the flight crew area. Such exits shall be of sufficient size and so located as to permit rapid evacuation by the crew. One exit shall be provided on each side of the aeroplane; or, alternatively, a top hatch shall be provided. Each exit must encompass an unobstructed rectangular opening of at least 19 by 20 inches (482.6 by 508 mm) unless satisfactory exit utility can be demonstrated by a typical crew member

**NLD-MCS-OS 25.809      Emergency exit arrangement**

- (a) Each emergency exit, including a flight crew emergency exit, must be a movable door or hatch in the external walls of the fuselage, allowing unobstructed opening to the outside.
- (b) Each emergency exit must be openable from the inside and the outside except that sliding window emergency exits in the flight crew area need not be openable from the outside if other approved exits are convenient and readily accessible to the flight crew area. Each emergency exit must be capable of being opened, when there is no fuselage deformation –
  - (1) With the aeroplane in the normal ground attitude and in each of the attitudes corresponding to collapse of one or more legs of the landing gear; and
  - (2) Within 10 seconds measured from the time when the opening means is actuated to the time when the exit is fully opened.
- (c) The means of opening emergency exits must be simple and obvious and may not require exceptional effort. Internal exit-opening means involving sequence operations (such as operation of two handles or latches or the release of safety catches) may be used for flight crew emergency exits if it can be reasonably established that these means are simple and obvious to crew members trained in their use. (See AMC-OS 25.809 Emergency exit arrangement(c))
- (d) If a single power-boost or single power-operated system is the primary system for operating more than one exit in an emergency, each exit must be capable of meeting the requirements of sub-paragraph (b) of this paragraph in the event of failure of the primary system. Manual operation of the exit (after failure of the primary system) is acceptable.
- (e) Each emergency exit must be shown by tests, or by a combination of analysis and tests, to meet the requirements of sub-paragraphs (b) and (c) of this paragraph.
- (f) There must be a means to lock each emergency exit and to safeguard against its opening in flight, either inadvertently by persons or as a result of mechanical failure. In addition, there must be a means for direct visual inspection of the locking mechanism by crew members to determine that each emergency exit, for which the initial opening movement is outward, is fully locked.
- (g) There must be provisions to minimise the probability of jamming of the emergency exits resulting from fuselage deformation in a minor crash landing. (See AMC-OS 25.809 Emergency exit arrangement(g))
- (h) *Not required for NLD-MCS-OS 25.*

**NLD-MCS-OS 25.810      Emergency egress assist means and escape routes**

- (a) Each non-over-wing landplane emergency exit more than 6 feet (1.829 m) from the ground with the aeroplane on the ground and the landing gear extended and each non-over-wing Type A exit must have an approved means to assist the occupants in descending to the ground.

- (1) The assisting means for each passenger emergency exit must be a self-supporting slide or equivalent; and, in the case of a Type A exit, it must be capable of carrying simultaneously two parallel lines of evacuees. In addition, the assisting means must be designed to meet the following requirements.
  - (i) It must be automatically deployed and deployment must begin during the interval between the time the exit opening means is actuated from inside the aeroplane and the time the exit is fully opened. However, each passenger emergency exit which is also a passenger entrance door or a service door must be provided with means to prevent deployment of the assisting means when it is opened from either the inside or the outside under non-emergency conditions for normal use.
  - (ii) It must be automatically erected within 10 seconds after deployment is begun.
  - (iii) It must be of such length after full deployment that the lower end is self-supporting on the ground and provides safe evacuation of occupants to the ground after collapse of one or more legs of the landing gear.
  - (iv) It must have the capability, in 25-knot winds directed from the most critical angle, to deploy and, with the assistance of only one person, to remain usable after full deployment to evacuate occupants safely to the ground.
  - (v) For each system installation (mock-up or aeroplane installed), five consecutive deployment and inflation tests must be conducted (per exit) without failure, and at least three tests of each such five-test series must be conducted using a single representative sample of the device. The sample devices must be deployed and inflated by the system's primary means after being subjected to the inertia forces specified in [NLD-MCS-OS 25.561\(b\)](#). If any part of the system fails or does not function properly during the required tests, the cause of the failure or malfunction must be corrected by positive means and after that, the full series of five consecutive deployment and inflation tests must be conducted without failure.
- (2) The assisting means for flight crew emergency exits may be a rope or any other means demonstrated to be suitable for the purpose. If the assisting means is a rope, or an approved device equivalent to a rope, it must be –
  - (i) Attached to the fuselage structure at or above the top of the emergency exit opening, or, for a device at a pilot's emergency exit window, at another approved location if the stowed device, or its attachment, would reduce the pilot's view in flight.
  - (ii) Able (with its attachment) to withstand a 400-lb (181.6 kg) static load.
- (b) Assist means from the cabin to the wing are required for each Type A exit located above the wing and having a step-down unless the exit without an assist means can be shown to have a rate of passenger egress at least equal to that of the same type of non-over-wing exit. If an assist means is required, it must be automatically deployed and automatically erected, concurrent with the opening of the exit and self-supporting within 10 seconds.
- (c) An escape route must be established from each over-wing emergency exit, and (except for flap surfaces suitable as slides) covered with a slip resistant surface. Except where a means for channelling the flow of evacuees is provided –
  - (1) The escape route must be at least 42 inches (1.067 m) wide at Type A passenger emergency exits and must be at least 2 feet (609.6 mm) wide at all other passenger emergency exits, and
  - (2) The escape route surface must have a reflectance of at least 80%, and must be defined by markings with a surface-to-marking contrast ratio of at least 5:1.

- (d) If the place on the aeroplane structure at which the escape route required in sub-paragraph (c) of this paragraph terminates, is more than 6 feet (1.829 m) from the ground with the aeroplane on the ground and the landing gear extended, means to reach the ground must be provided to assist evacuees who have used the escape route. If the escape route is over a flap, the height of the terminal edge must be measured with the flap in the take-off or landing position, whichever is higher from the ground. The assisting means must be usable and self-supporting with one or more landing gear legs collapsed and under a 25-knot wind directed from the most critical angle. The assisting means provided for each escape route leading from a Type A emergency exit must be capable of carrying simultaneously two parallel lines of evacuees. For other than Type A exits, the assist means must be capable of carrying simultaneously as many parallel lines of evacuees as there are required escape routes

#### **NLD-MCS-OS 25.811      Emergency exit marking**

- (a) Each passenger emergency exit, its means of access, and its means of opening must be conspicuously marked.
- (b) The identity and location of each passenger emergency exit must be recognizable from a distance equal to the width of the cabin.
- (c) Means must be provided to assist the occupants in locating the exits in conditions of dense smoke.
- (d) The location of each passenger emergency exit must be indicated by a sign visible to occupants approaching along the main passenger aisle (or aisles). There must be –
- (1) A passenger emergency exit locator sign above the aisle (or aisles) near each passenger emergency exit, or at another overhead location if it is more practical because of low headroom, except that one sign may serve more than one exit if each exit can be seen readily from the sign;
  - (2) A passenger emergency exit marking sign next to each passenger emergency exit, except that one sign may serve two such exits if they both can be seen readily from the sign; and
  - (3) A sign on each bulkhead or divider that prevents fore and aft vision along the passenger cabin to indicate emergency exits beyond and obscured by the bulkhead or divider, except that if this is not possible the sign may be placed at another appropriate location.
- (e) The location of the operating handle and instructions for opening exits from the inside of the aeroplane must be shown in the following manner:
- (1) Each passenger emergency exit must have, on or near the exit, a marking that is readable from a distance of 762 mm (30 inches). The marking must have a minimum letter height of 12.7 mm (0.5 inch).
  - (2) Each passenger emergency exit operating handle and the cover removal instructions, if the operating handle is covered, must –
    - (i) Be self-illuminated with an initial brightness of at least 160 microlamberts; or
    - (ii) Be conspicuously located and well illuminated by the emergency lighting even in conditions of occupant crowding at the exit.
  - (3) Reserved
  - (4) All Type II and larger passenger emergency exits with a locking mechanism released by motion of a handle, must be marked by an arrow with a shaft at least three quarters of an

inch (19 mm) wide, adjacent to the handle, that indicates the full extent and direction of the unlocking motion required. The word OPEN must be horizontally situated adjacent to the arrow head and must be in capital letters at least 1 inch (25 mm) high. The arrow and letters must be red on a white background, or vice versa. Alternatively, markings in yellow on a black background, or vice versa, may be used (See AMC-OS 25.811 Emergency exit marking(e)(4)).

- (f) Each emergency exit that is required to be openable from the outside, and its means of opening, must be marked on the outside of the aeroplane. In addition, the following apply (See AMC-OS 25.811 Emergency exit marking(f)):
- (1) Each emergency exit must be outlined by a continuous line around its periphery. The width, colour and contrast of the line must be chosen such that the emergency exits can be easily distinguished from a distance of 10m in dusk lighting conditions by average rescue personnel. Compliance with this requirement must be shown by actual demonstration unless the MAA-NLD finds that a combination of analysis and testing will provide data equivalent to that which would be obtained by actual demonstration. (See AMC-OS 25.811 Emergency exit marking(f)(1))
  - (2) The colour and contrast for the textual markings for each emergency exit shall be chosen such that the emergency opening instructions can be easily read from a distance of 1m in dusk lighting conditions by average rescue personnel. The selected colour shall be used for all textual markings and symbols related to the emergency exits, including those for the 'normal' operating controls, if applicable. Compliance with this requirement must be shown by actual demonstration unless the MAA-NLD finds that a combination of analysis and testing will provide data equivalent to that which would be obtained by actual demonstration. The exit marking must have a minimum letter height of 25.4 mm (1 inch) and the emergency opening instructions must have a minimum letter height of 12.7 mm (0.5 inch). (See AMC-OS 25.811 Emergency exit marking(f)(2))
  - (3) When in the case of exits other than those in the side of the fuselage, such as a ramp exit, the external means of opening is located on only one side of the fuselage, a conspicuous marking to that effect must be provided on the other side.
- (g) Each sign required by NLD-MCS-OS 25.811(d) may use the word 'exit' or equivalent symbology in their legend in place of the term 'emergency exit'.
- (h) For exits in excess of the required emergency exits as determined under NLD-MCS-OS 25.803(c), the following applies:
- (1) They need not meet the emergency exit requirements of NLD-MCS-OS 25.807 to 25.813.
  - (2) They may be marked as emergency exits when it is substantiated that any likely use of these excess emergency exits will not negatively interfere with the minimum emergency evacuation performance required by NLD-MCS-OS 25.803(c) or otherwise endanger the safety of the occupants (See AMC-OS 25.811 Emergency exit marking(h)).
  - (3) Other exits shall not be marked as emergency exits, and shall not use the word 'exit' or equivalent symbology in their markings.

#### **NLD-MCS-OS 25.812      Emergency lighting**

- (a) An emergency lighting system, independent of the main lighting system, must be installed. However, the sources of general cabin illumination may be common to both the emergency and the main lighting systems if the power supply to the emergency lighting system is independent of the power supply to the main lighting system. The emergency lighting system must include-

- (1) Illuminated emergency exit marking and locating signs, sources of general cabin illumination, interior lighting in emergency exit areas, and floor proximity escape path marking.
  - (2) Exterior emergency lighting.
- (b) Emergency exit signs –
- (1) For aeroplanes that have a passenger seating configuration, excluding pilot seats, of 10 seats or more must meet the following requirements:
    - (i) Each passenger emergency exit locator sign required by [NLD-MCS-OS 25.811\(d\)\(1\)](#) and each passenger emergency exit marking sign required by [NLD-MCS-OS 25.811\(d\)\(2\)](#) must have red letters at least 1.5 inches high on an illuminated white background, and must have an area of at least 21 square inches excluding the letters. The lighted background-to-letter contrast must be at least 10:1. The letter height to stroke-width ratio may not be more than 7:1 nor less than 6:1. These signs must be internally electrically illuminated with a background brightness of at least 25 foot-lamberts and a high-to-low background contrast no greater than 3:1.
    - (ii) Each passenger emergency exit sign required by [NLD-MCS-OS 25.811\(d\)\(3\)](#) must have red letters at least 1.5 inches high on a white background having an area of at least 21 square inches excluding the letters. These signs must be internally electrically illuminated or self-illuminated by other than electrical means and must have an initial brightness of at least 400 microlamberts. The colours may be reversed in the case of a sign that is self-illuminated by other than electrical means.
  - (2) For aeroplanes that have a passenger seating configuration, excluding pilot seats, of 9 seats or less, that are required by [NLD-MCS-OS 25.811\(d\)\(1\)](#), [\(2\)](#), and [\(3\)](#) must have red letters at least 1 inch high on a white background at least 2 inches high. These signs may be internally electrically illuminated, or self-illuminated by other than electrical means, with an initial brightness of at least 160 microlamberts. The colours may be reversed in the case of a sign that is self-illuminated by other than electrical means.
- (c) [General illumination must be installed to -](#)
- (1) [Passenger cabins. Provide enough general lighting in the passenger cabin so that when measured along the centreline of main passenger aisle\(s\), and cross aisle\(s\) between main aisles, at seat armrest height and at 40-inch intervals, the average illumination is not less than 0.05 foot-candle and the illumination at each 40-inch interval is not less than 0.01 foot-candle. A main passenger aisle is considered to extend along the fuselage from the most forward passenger emergency exit or cabin occupant seat, whichever is farther forward, to the most rearward passenger emergency exit or cabin occupant seat, whichever is farther aft.](#)
  - (2) [Compartments used for the combined transport of occupants and cargo. Provide enough general lighting in the cabin with lighting placed such that obstruction by internal cargo \(conform NLD-SMAR-3\) is not possible, so that the average illumination, when measured at 40-inch intervals at a height of 25 inch on the centreline of the evacuation route, is at least 0.05 foot-candle and the illumination at each 40-inch interval is not less than 0.01 foot-candle.](#)
- (d) The floor of the passageway leading to each floor-level passenger emergency exit, between the main aisles and the exit openings, must be provided with illumination that is not less than 0.02 foot-candle measured along a line that is within 6 inches of and parallel to the floor and is centre on the passenger evacuation path.
  - (e) Floor proximity emergency escape path marking must provide emergency evacuation guidance for passengers when all sources of illumination more than 4 ft above the cabin aisle

floor are totally obscured. In the dark of the night, the floor proximity emergency escape path marking must enable each passenger to –

- (1) After leaving the passenger seat, visually identify the emergency escape path along the cabin aisle floor to the first exits or pair of exits forward and aft of the seat; and
  - (2) Readily identify each exit from the emergency escape path by reference only to markings and visual features not more than 4 ft above the cabin floor.
- (f) Except for sub-systems provided in accordance with sub-paragraph (h) of this paragraph that serve no more than one assist means, are independent of the aeroplane's main emergency lighting system, and are automatically activated when the assist means is erected, the emergency lighting system must be designed as follows:
- (1) The lights must be operable manually from the flight crew station and from a point in the passenger compartment that is readily accessible to a normal cabin crew member seat.
  - (2) There must be a flight crew warning light which illuminates when power is on in the aeroplane and the emergency lighting control device is not armed.
  - (3) The cockpit control device must have an 'on', 'off' and 'armed' position so that when armed in the cockpit or turned on at either the cockpit or cabin crew member station the lights will either light or remain lighted upon interruption (except an interruption caused by a transverse vertical separation of the fuselage during crash landing) of the aeroplane's normal electric power. There must be a means to safeguard against inadvertent operation of the control device from the 'armed' or 'on' positions. (see AMC-OS 25.812 Emergency lighting):
- (g) Exterior emergency lighting must be provided as follows (see AMC-OS 25.812 Emergency lighting):
- (1) At each overwing emergency exit the illumination must be –
    - (i) Not less than 0.03 foot-candle (measured normal to the direction of the incident light) on a two-square-foot area where an evacuee is likely to make his first step outside the cabin;
    - (ii) Not less than 0.05 foot-candle (measured normal to the direction of the incident light) for the minimum width of 42 inches for a Type A overwing emergency exit and of 2 ft for all other overwing emergency exits along the 30% of the slip-resistant portion of the escape route required in [NLD-MCS-OS 25.803\(e\)](#) that is farthest from the exit; and
    - (iii) Not less than 0.03 foot-candle on the ground surface with the landing gear extended (measured normal to the direction of the incident light) where an evacuee using the established escape route would normally make first contact with the ground.
  - (2) At each non-overwing emergency exit not required by [NLD-MCS-OS 25.810\(f\)](#) to have descent assist means the illumination must be not less than 0.03 foot-candle (measured normal to the direction of the incident light) on the ground surface with the landing gear extended where an evacuee is likely to make his first contact with the ground outside the cabin.
- (h) The means required in [NLD-MCS-OS 25.810\(a\)\(1\)](#) and (d) to assist the occupants in descending] to the ground must be illuminated so that the erected assist means is visible from the aeroplane (see AMC-OS 25.812 Emergency lighting). In addition –
- (1) If the assist means is illuminated by exterior emergency lighting, it must provide illumination of not less than 0.03 foot-candle (measured normal to the direction of the incident light) at the ground end of the erected assist means where an evacuee using the

established escape route would normally make first contact with the ground, with the aeroplane in each of the attitudes corresponding to the collapse of one or more legs of the landing gear.

- (2) If the emergency lighting subsystem illuminating the assist means serves no other assist means, is independent of the aeroplane's main emergency lighting system, and is automatically activated when the assist means is erected, the lighting provisions –
  - (i) May not be adversely affected by stowage; and
  - (ii) Must provide illumination of not less than 0.03 foot-candle (measured normal to the direction of the incident light) at the ground end of the erected assist means where an evacuee would normally make first contact with the ground, with the aeroplane in each of the attitudes corresponding to the collapse of one or more legs of the landing gear.
- (i) The energy supply to each emergency lighting unit must provide the required level of illumination for at least 10 minutes at the critical ambient conditions after emergency landing.
- (j) If storage batteries are used as the energy supply for the emergency lighting system, they may be recharged from the aeroplane's main electric power system: Provided, that the charging circuit is designed to preclude inadvertent battery discharge into charging circuit faults.
- (k) Components of the emergency lighting system, including batteries, wiring relays, lamps, and switches must be capable of normal operation after having been subjected to the inertia forces listed in [NLD-MCS-OS 25.561](#).
- (l) The emergency lighting system must be designed so that after any single transverse vertical separation of the fuselage during crash landing –
  - (1) Not more than 25% of all electrically illuminated emergency lights required by this section are rendered inoperative, in addition to the lights that are directly damaged by the separation;
  - (2) Each electrically illuminated exit sign required under [NLD-MCS-OS 25.811\(d\)\(2\)](#) remains operative exclusive of those that are directly damaged by the separation; and
  - (3) At least one required exterior emergency light for each side of the aeroplane remains operative exclusive of those that are directly damaged by the separation.

### **NLD-MCS-OS 25.813      Emergency exit access**

Each emergency exit required under [NLD-MCS-OS 25.803](#) for any occupiable compartment during taxi, take-off and landing must be accessible to the occupants of that compartment. In addition for each individual occupiable compartment established under [NLD-MCS-OS 25.803](#) the following applies:

- (a) [Passage ways and cross-aisles](#).
  - (1) [There must be a passageway leading from each main aisle to each Type I, Type II, or Type A emergency exit and between individual passenger areas. If two or more main aisles are provided, there must be a cross aisle leading directly to each passageway between the exit and the nearest main aisle. Each passageway leading to a Type A exit must be at least 36 inches \(914.4 mm\) wide. Other passageways and cross aisles must be at least 20 inches \(508 mm\) wide. Each passageway and each cross aisle must be unobstructed, unless, at the acceptance of the MAA-NLD, the obstruction can be immediately cleared by an occupant in case of an emergency, without the use of tooling,](#)

in a simple and obvious manner, and when its effect on egress is demonstrated or analysed in accordance with NLD-MCS-OS 25.803(c) or (d).

- (2) Compartments used for the combined transport of occupants and cargo. If a cargo loading system is installed, it must have provisions to enable the crew to furnish cross aisles or passageways to required exits in the cargo area. Cross-aisles located next to or in between cargo locations may be offset relative to the passageway or emergency exit they lead to by a maximum of 300 cm (118 inch). The cargo loading system and instructions in the manuals must enable correct positioning of the cargo taking into account likely deformation of the cargo under emergency landing conditions.
- (b) Adequate space to allow crew-member(s) to assist in the evacuation of passengers must be provided as follows:
- (1) The assist space must not reduce the unobstructed width of the passageway below that required for the exit.
  - (2) For each Type A exit, assist space must be provided at each side of the exit regardless of whether the exit is covered by NLD-MCS-OS 25.810(a).
  - (3) For any other type exit that is covered by NLD-MCS-OS 25.810(a), space must at least be provided at one side of the passageway.
- (c) There must be access from each aisle to each Type III or Type IV exit.
- (d) If it is necessary to pass through a passageway between passenger compartments to reach any required emergency exit from any seat in the passenger cabin, the passageway must be unobstructed. However, curtains may be used if they allow free entry through the passageway.
- (e) Deleted.
- (f) If it is necessary to pass through a doorway to reach any required emergency exit from any seat, the door must have a means to latch it in open position. The latching means must be able to withstand the loads imposed upon it when the door is subjected to the ultimate inertia forces, relative to the surrounding structure, listed in NLD-MCS-OS 25.561(b).

**NLD-MCS-OS 25.815      Width of aisle**

- (a) 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	
	Less than 635 mm (25 in) from floor	635 mm (25 in) and more from floor
	mm (in)	mm (in)
10 or less	305 (12)*	381 (15)
11 to 19	305 (12)	508 (20)
20 or more	381 (15)	508 (20)

\* A narrower width not less than 9 inches may be approved when substantiated by tests found necessary by the MAA-NLD.

- (b) Sideways seating configurations which cannot meet the minimum aisle width as defined in NLD-MCS-OS 25.815(a) when the seats are occupied may be approved when;
- (1) They meet the minimum aisle width when the seats are unoccupied; and

- (2) Their effect on egress is demonstrated or analysed in accordance with NLD-MCS-OS 25.803(c) or (d).

**NLD-MCS-OS 25.817      Maximum number of seats abreast**

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 perpendicular to that aisle.

**NLD-MCS-OS 25.819      Lower deck service compartments (including galleys)**

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 [NLD-MCS-OS 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.



## -- VENTILATION AND HEATING

### NLD-MCS-OS 25.831 Ventilation

- (a) Each passenger and crew compartment must be ventilated and each crew compartment must have enough fresh air (but not less than 10 cubic ft per minute per crew member) to enable crew members to perform their duties without undue discomfort or fatigue.
- (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 sub-paragraph, "sea level equivalent" refers to conditions of 25°C (77° F) and 760 millimetres of mercury pressure (1013.2 hPa).
- (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.
- (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 de-pressurising 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 crew-member 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 800 cubic ft or less.
  - (2) The air inlets and passages for air to flow between flight-crew and passenger compartments are arranged to provide compartment temperatures within 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.
- (g) Reserved

## -- PRESSURISATION

### **NLD-MCS-OS 25.841      Pressurised cabins**

- (a) Pressurised cabins and compartments to be occupied must be equipped to provide a cabin pressure altitude of not more than 8,000 ft at the maximum operating altitude of the aeroplane under normal operating conditions. If certification for operation over 25,000 ft is requested, the aeroplane must be able to maintain a cabin pressure altitude of not more than 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 its 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 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 [NLD-MCS-OS 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.

### **NLD-MCS-OS 25.843      Test for pressurized cabins**

- (a) Deleted
- (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.

**-- FIRE PROTECTION**

**NLD-MCS-OS 25.851 Fire extinguishers**

(a) Hand fire extinguishers.

- (1) The number of hand fire extinguishers and the kinds and quantities of the extinguishing agents used must be appropriate for the kinds of fires likely to occur where the hand fire extinguishers are used, as a minimum the following applies (See AMC-OS 25.851 Fire extinguishers);
  - (i) The following minimum number of hand fire extinguishers with a minimum rating of 5B:C (UL711) or 34B (EN 3-7) each, must be conveniently located and evenly distributed in passenger compartments:

Passenger capacity	Number of extinguishers
7 to 30.....	1
31 to 60.....	2
61 to 200.....	3
201 to 300.....	4
301 to 400.....	5
401 to 500.....	6
501 to 600.....	7
601 to 700.....	8

- (ii) The following minimum number of hand fire extinguishers shall be conveniently located and evenly distributed in each compartment used for the combined transport of occupants and cargo:
    - (A) A minimum of 3 hand fire extinguishers with a Halon-free agent equivalent to Halon 1211 and a minimum rating of 2A:10B:C (UL711) each or 8A:70B (EN 3-7) each;
    - (B) A minimum of 2 hand fire extinguishers with a water based foam agent and a minimum rating of 2A:5B:C (UL711) each or 8A:34B (EN 3-7) each, and with a minimum total agent volume of 4 litres total
  - (iii) Subparagraphs (i) and (ii) may be complied with using the same hand fire extinguishers.
- (2) At least one hand fire extinguisher must be conveniently located in the pilot compartment with a Halon free agent equivalent to Halon 1211 and a minimum rating of 5B:C (UL711) or 34B (EN 3-7).
- (3) At least one readily accessible hand fire extinguisher must be available for use in each Class A or Class B cargo or baggage compartment and in each Class E cargo or baggage compartment that is accessible to crew members in flight.
- (4) At least one hand fire extinguisher must be located in, or readily accessible for use in, each galley located above or below the passenger compartment.
- (5) Each hand fire extinguisher must be approved (See AMC-OS 25.851 Fire extinguishers).
- (6) At least one of the required hand fire extinguishers located in the passenger compartment of an aeroplane with a passenger capacity of at least 31 and not more than

60, and at least two of the hand fire extinguishers located in the passenger compartment of an aeroplane with a passenger capacity of 61 or more must contain a Halon free agent equivalent to Halon 1211.

- (7) Deleted.
  - (8) Each hand fire extinguisher intended for use in a personnel compartment must be designed to minimise the hazard of toxic gas concentration.
  - (9) Each hand fire extinguishers must be suitable for use on electrically powered equipment (See AMC-OS 25.851 Fire extinguishers).
- (b) Built-in fire extinguishers. If a built-in fire extinguisher is provided –
- (1) Each built-in fire extinguishing system must be installed so that –
    - (i) No extinguishing agent likely to enter personnel compartments will be hazardous to the occupants; and
    - (ii) No discharge of the extinguisher can cause structural damage.
  - (2) The capacity of each required built-in fire extinguishing system must be adequate for any fire likely to occur in the compartment where used, considering the volume of the compartment and the ventilation rate.

#### **NLD-MCS-OS 25.853      Compartment interiors**

For each compartment occupied by the crew or passengers, the following apply:

- (a) Materials (including finishes or decorative surfaces applied to the materials) must meet the applicable test criteria prescribed in Part I of Appendix F of EASA CS-25 or other approved equivalent methods. (See AMC-OS 25.853 Compartment interiors(a))
- (b) In addition to meeting the requirements of sub-paragraph (a) of this paragraph, seat cushions, except those on flight crew member seats, must meet the test requirements of Part II of Appendix F of EASA CS-25, or equivalent.
- (c) For aeroplanes with passenger capacities of 20 or more, interior ceiling and wall panels (other than lighting lenses), partitions, and the outer surfaces of galleys, large cabinets and stowage compartments (other than underseat stowage compartments and compartments for stowing small items, such as magazines and maps) must also meet the test requirements of Parts IV and V of Appendix F of EASA CS-25, or other approved equivalent method, in addition to the flammability requirements prescribed in sub-paragraph (a) of this paragraph.
- (d) Smoking is not to be allowed in lavatories. If smoking is to be allowed in any compartment occupied by the crew or passengers, an adequate number of self-contained, removable ashtrays must be provided in designated smoking sections for all seated occupants; and
- (e) If smoking is to be allowed in any compartment occupied by the crew or passengers, lavatories must have self-contained removable ashtrays located conspicuously on or near the entry side of each lavatory door, except that one ashtray may serve more than one lavatory door if the ashtray can be seen readily from the cabin side of each lavatory served.
- (f) Each receptacle used for the disposal of flammable waste material must be fully enclosed, constructed of at least fire resistant materials, and must contain fires likely to occur in it under normal use. The ability of the receptacle to contain those fires under all probable conditions of wear, misalignment, and ventilation expected in service must be demonstrated by test.

## **NLD-MCS-OS 25.854 Lavatory fire protection**

For aeroplanes with a passenger capacity of 20 or more –

- (a) Each lavatory must be equipped with a smoke detector system or equivalent that provides a warning light in the cockpit, or provides a warning light or audible warning in the passenger cabin that would be readily detected by a cabin crew member; and
- (b) Each lavatory must be equipped with a built-in fire extinguisher for each disposal receptacle for towels, paper, or waste, located within the lavatory. The extinguisher must be designed to discharge automatically into each disposal receptacle upon occurrence of a fire in that receptacle.

## **NLD-MCS-OS 25.855 Cargo and baggage compartments**

For each cargo or baggage compartment the following apply:

- (a) The compartment must meet one of the class requirements of [NLD-MCS-OS 25.857](#). A compartment used for the combined transport of occupants and cargo must classify as a Class E or a Class M cargo compartment.
- (b) Class B through Class M cargo or baggage compartments, as defined in [NLD-MCS-OS 25.857](#), must have a liner, and the liner must be separate from (but may be attached to) the aeroplane structure.
- (c) Ceiling and sidewall liner panels of Class C compartments must meet the test requirements of Part III of Appendix F of [EASA CS-25](#) or other approved equivalent methods.
- (d) All other materials used in the construction of the cargo or baggage compartment must meet the applicable test criteria prescribed in Part I of Appendix F of [EASA CS-25](#), or other approved equivalent methods.
- (e) No compartment may contain any controls, wiring, lines, equipment, or accessories whose damage or failure would affect safe operation, unless those items are protected so that –
  - (1) [They cannot be damaged by](#) – (See [AMC-OS 25.855](#) Cargo and baggage compartments)
    - (i) [The movement of cargo in the compartment; and](#)
    - (ii) [Fire in the cargo compartment; and](#)
    - (iii) [Fire extinguishing agents likely to be used; and](#)
    - (iv) [Sources of heat within the compartment; and](#)
  - (2) Their breakage or failure will not create a fire hazard.
- (f) There must be means to prevent cargo or baggage from interfering with the functioning of the fire protective features of the compartment.
- (g) Sources of heat within the compartment must be shielded and insulated to prevent igniting the cargo or baggage.
- (h) Flight tests must be conducted to show compliance with the provisions of [NLD-MCS-OS 25.857](#) concerning –
  - (1) Compartment accessibility;

- (2) The entry of hazardous quantities of smoke or extinguishing agent into compartments occupied by the crew or passengers; and
  - (3) The dissipation of the extinguishing agent in Class C compartments.
- (i) During the above tests, it must be shown that no inadvertent operation of smoke or fire detectors in any compartment would occur as a result of fire contained in any other compartment, either during or after extinguishment, unless the extinguishing system floods each such compartment simultaneously.

**NLD-MCS-OS 25.857      Cargo compartment classification**

- (a) *Class A.* A Class A cargo or baggage compartment is one in which –
- (1) The presence of a fire would be easily discovered by a crew member while at his station; and
  - (2) Each part of the compartment is easily accessible in flight.
- (b) *Class B.* A Class B cargo or baggage compartment is one in which –
- (1) There is sufficient access in flight to enable a crew member to effectively reach any part of the compartment with the contents of a hand fire extinguisher;
  - (2) When the access provisions are being used no hazardous quantity of smoke, flames or extinguishing agent will enter any compartment occupied by the crew or passengers; and
  - (3) There is a separate approved smoke detector or fire detector system to give warning to the pilot or flight engineer station.
- (c) *Class C.* A Class C cargo or baggage compartment is one not meeting the requirements for either a Class A or B compartment but in which –
- (1) There is a separate approved smoke detector or fire detector system to give warning at the pilot or flight engineer station;
  - (2) There is an approved built-in fire extinguishing system controllable from the pilot or flight engineer stations;
  - (3) There are means to exclude hazardous quantities of smoke, flames, or extinguishing agent, from any compartment occupied by the crew or passengers; and
  - (4) There are means to control ventilation and draughts within the compartment so that the extinguishing agent used can control any fire that may start within the compartment.
- (d) *Deleted.*
- (e) *Class E.* A Class E cargo compartment is one in which –
- (1) Reserved.
  - (2) There is a separate approved smoke or fire detector system to give warning at the pilot or flight engineer station;
  - (3) There are means to shut off the ventilating airflow to, or within, the compartment, and the controls for these means are accessible to the flight crew in the crew compartment;

- (4) There are means to exclude hazardous quantities of smoke, flames, or noxious gases, from the flight-crew compartment; and
  - (5) The required crew emergency exits are accessible under any cargo loading condition.
- (f) *Class M*. A Class M cargo compartment is one in which –
- (1) There is a separate approved smoke or fire detector system to give warning at the pilot or flight engineer station;
  - (2) There are means to exclude hazardous quantities of smoke, flames, or noxious gases, from the flight-crew compartment; and
  - (3) The required crew emergency exits are accessible under any cargo loading condition.

**NLD-MCS-OS 25.859      Cargo compartment fire detection systems**

If certification with cargo compartment fire detection provisions is requested, the following must be met for each cargo compartment with those provisions:

- (a) The detection system must provide a visual indication to the flight crew within one minute after the start of a fire.
- (b) The system must be capable of detecting a fire at a temperature significantly below that at which the structural integrity of the aeroplane is substantially decreased.
- (c) There must be means to allow the crew to check in flight, the functioning of each fire detector circuit.
- (d) The effectiveness of the detection system must be shown for all approved operating configurations and conditions.

**NLD-MCS-OS 25.863      Flammable fluid fire protection**

- (a) In each area where flammable fluids or vapours might escape by leakage of a fluid system, there must be means to minimise the probability of ignition of the fluids and vapours, and the resultant hazards if ignition does occur.
- (b) Compliance with sub-paragraph (a) of this paragraph must be shown by analysis or tests, and the following factors must be considered:
  - (1) Possible sources and paths of fluid leakage, and means of detecting leakage.
  - (2) Flammability characteristics of fluids, including effects of any combustible or absorbing materials.
  - (3) Possible ignition sources, including electrical faults, overheating of equipment, and malfunctioning of protective devices.
  - (4) Means available for controlling or extinguishing a fire, such as stopping flow of fluids, shutting down equipment, fireproof containment, or use of extinguishing agents.
  - (5) Ability of aeroplane components that are critical to safety of flight to withstand fire and heat.

- (c) If action by the flight crew is required to prevent or counteract a fluid fire (e.g. equipment shutdown or actuation of a fire extinguisher), quick acting means must be provided to alert the crew.
- (d) Each area where flammable fluids or vapours might escape by leakage of a fluid system must be identified and defined.

**NLD-MCS-OS 25.869      Fire protection: systems**

(a) Electrical system components:

- (1) Components of the electrical system must meet the applicable fire and smoke protection requirements of [NLD-MCS-OS 25.831\(c\)](#) and [NLD-MCS-OS 25.863](#).
- (2) Electrical cables, terminals, and equipment in designated fire zones, that are used during emergency procedures, must be at least fire resistant.
- (3) Main power cables (including generator cables) in the fuselage must be designed to allow a reasonable degree of deformation and stretching without failure and must be –
  - (i) Isolated from flammable fluid lines; or
  - (ii) Shrouded by means of electrically insulated, flexible conduit, or equivalent, which is in addition to the normal cable insulation.
- (4) Insulation on electrical wire and electrical cable installed in any area of the aeroplane must be self-extinguishing when tested in accordance with the applicable portions of Part I, Appendix F of [EASA CS-25](#).

(b) [Each vacuum air system line and fitting on the discharge side of the pump that might contain flammable vapours or fluids must be fireproof if the line or fitting is in a designated fire zone, and, when exposed to or damaged by fire, could –](#)

- (1) [Result in spreading the fire to other regions of the aeroplane, or](#)
- (2) [Cause unintentional operation of, or inability to operate, essential services or equipment.](#)

[Other vacuum air systems components, including other lines and fittings, in designated fire zones must be at least fire resistant.](#)

(c) Oxygen equipment and lines must –

- (1) Not be located in any designated fire zone.
- (2) Be protected from heat that may be generated in, or escape from, any designated fire zone, and
- (3) Be installed so that escaping oxygen cannot cause ignition of grease, fluid, or vapour accumulations that are present in normal operation or as a result of failure or malfunction of any system.

## - SUBPART F – EQUIPMENT

### -- ELECTRICAL SYSTEMS AND EQUIPMENT

#### **NLD-MCS-OS 25.1360    Precautions against injury**

- (a) *Shock.* The electrical system must be designed so as to minimise the risk of electric shock to crew, passengers and servicing personnel and also to maintenance personnel using normal precautions.
- (b) *Burns.* The temperature rise of any part, which has to be handled during normal operation by the flight crew, must not be such as to cause dangerous inadvertent movement, or injury to the crew member.

#### **NLD-MCS-OS 25.1362    Electrical supplies for emergency conditions**

A suitable supply must be maintained to those services which are required, either by this [NLD-MCS-OS 25](#) or in order that emergency drills may be carried out, after an emergency landing or ditching. The circuits to these services must be so designed and protected that the risk of their causing a fire, under these conditions, is minimised.

### -- SAFETY EQUIPMENT

#### **NLD-MCS-OS 25.1411    General**

- (a) *Accessibility.* Required safety equipment to be used by the crew in an emergency must be readily accessible.
- (b) *Stowage provisions.* Stowage provisions for required emergency equipment must be furnished and must –
  - (1) Be arranged so that the equipment is directly accessible and its location is obvious; and
  - (2) Protect the safety equipment from inadvertent damage.
- (c) *Emergency exit descent device.* The stowage provisions for the emergency exit descent device required by [NLD-MCS-OS 25.810\(f\)](#) must be at the exits for which they are intended.
- (d) *Liferafts*
  - (1) The stowage provisions for the liferafts described in [NLD-MCS-OS 25.1415](#) must accommodate enough rafts for the maximum number of occupants for which certification for ditching is requested.
  - (2) Liferafts must be stowed near exits through which the rafts can be launched during an unplanned ditching.
  - (3) Rafts automatically or remotely released outside the aeroplane must be attached to the aeroplane by means of the static line prescribed in [NLD-MCS-OS 25.1415](#).
  - (4) The stowage provisions for each portable liferaft must allow rapid detachment and removal of the raft for use at other than the intended exits.

- (e) *Long-range signalling device.* The stowage provisions for the long-range signalling device required by [NLD-MCS-OS 25.1415](#) must be near an exit available during an unplanned ditching.
- (f) *Life-preserver stowage provisions.* The stowage provisions for life preservers described in [NLD-MCS-OS 25.1415](#) must accommodate one life preserver for each occupant for which certification for ditching is requested. Each life preserver must be within easy reach of each seated occupant
- (g) *Life line stowage provisions.* If certification for ditching under [NLD-MCS-OS 25.801](#) is requested, there must be provisions to store the life lines. These provisions must –
  - (1) Allow one life line to be attached to each side of the fuselage; and
  - (2) Be arranged to allow the life lines to be used to enable the occupants to stay on the wing after ditching. This requirement is not applicable to aeroplanes having no overwing ditching exits.

#### **NLD-MCS-OS 25.1415 Ditching equipment**

- (a) Ditching equipment used in aeroplanes to be certified for ditching under [NLD-MCS-OS 25.801](#), and required by [any applicable operating rule](#), must meet the requirements of this paragraph.
- (b) Each liferaft and each life preserver must be approved. In addition –
  - (1) Unless excess rafts of enough capacity are provided, the buoyancy and seating capacity beyond the rated capacity of the rafts must accommodate all occupants of the aeroplane in the event of a loss of one raft of the largest rated capacity; and
  - (2) Each raft must have a trailing line, and must have a static line designed to hold the raft near the aeroplane but to release it if the aeroplane becomes totally submerged.
- (c) Approved survival equipment must be attached to, or stored adjacent to, each liferaft.
- (d) [Survival type emergency locator transmitters for use in liferafts must meet the applicable requirements of the relevant EASA ETSO, FAA TSO or an acceptable equivalent.](#)
- (e) For aeroplanes, not having approved life preservers, there must be an approved flotation means for each occupant. This means must be within easy reach of each seated occupant and must be readily removable from the aeroplane.

#### **NLD-MCS-OS 25.1421 Megaphones**

If a megaphone is installed, a restraining means must be provided that is capable of restraining the megaphone when it is subjected to the ultimate inertia forces specified in [NLD-MCS-OS 25.561\(b\)\(3\)](#)

#### **NLD-MCS-OS 25.1423 Public address system**

A public address system required by this [NLD-MCS-OS 25](#) must –

- (a) Be powerable when the aeroplane is in flight or stopped on the ground, after the shutdown or failure of all engines and auxiliary power units, or the disconnection or failure of all power sources dependent on their continued operation, for –

- (1) A time duration of at least 10 minutes, including an aggregate time duration of at least 5 minutes of announcements made by flight and cabin crew members, considering all other loads which may remain powered by the same source when all other power sources are inoperative; and
  - (2) An additional time duration in its standby state appropriate or required for any other loads that are powered by the same source and that are essential to safety of flight or required during emergency conditions.
- (b) The system must be capable of operation within 3 seconds from the time a microphone is removed from its stowage by a cabin crew member at those stations in the passenger compartment from which its use is accessible.
  - (c) Be intelligible at all passenger seats, lavatories, and cabin crew member seats and work stations [when all doors, windows, hatches etc. to the outside are closed.](#) (See AMC-OS 25.1423 Public address system)
  - (d) Be designed so that no unused, unstowed microphone will render the system inoperative.
  - (e) Be capable of functioning independently of any required crew member interphone system.
  - (f) Be accessible for immediate use from each of two flight-crew member stations in the pilot compartment.
  - (g) For each required floor-level passenger emergency exit which has an adjacent cabin crew member seat, have a microphone which is readily accessible to the seated cabin crew member, except that one microphone may serve more than one exit, provided the proximity of the exits allows unassisted verbal communications between seated cabin crew members.

## -- MISCELLANEOUS EQUIPMENT

### **NLD-MCS-OS 25.1439 Protective breathing equipment**

- (a) Protective breathing equipment must be installed for use by appropriate crew members. Such equipment must be located so as to be available for use in compartments accessible in flight.
- (b) For protective breathing equipment required by [NLD-MCS-OS 25.1439\(a\)](#) or by [any applicable operating rule](#), the following apply:
  - (1) The equipment must be designed to protect the appropriate crew member from smoke, carbon dioxide, and other harmful gases while on flight deck duty or while combating fires.
  - (2) The equipment must include –
    - (i) Masks covering the eyes, nose and mouth, or
    - (ii) Masks covering the nose and mouth, plus accessory equipment to cover the eyes.
  - (3) Equipment, including portable equipment, while in use must allow communication with other crew members. Equipment available at flight crew assigned duty stations must enable the flight crew to use radio equipment.
  - (4) The part of the equipment protecting the eyes may not cause any appreciable adverse effect on vision and must allow corrective glasses to be worn.
  - (5) Each dispensing equipment must supply protective oxygen of 15 minutes duration at a pressure altitude of 8,000 ft with a respiratory minute volume of 30 litres per minute BTPD. The equipment and system must be designed to prevent any leakage to the inside of the mask and any significant increase in the oxygen content of the local ambient atmosphere.
  - (6) The equipment must meet the requirements of [NLD-MCS-OS 25.1441](#).
  - (7) [For aeroplanes carrying passengers and cargo in the same compartment a total duration of protective oxygen supply of 30 minutes under the conditions of NLD-MCS-OS 25.1439\(b\)\(5\) must be available for at least two cabin crew members while combating fires.](#)

### **NLD-MCS-OS 25.1441 Oxygen equipment and supply**

- (a) When oxygen equipment is installed the equipment must meet the requirements of this paragraph and of applicable sub-paragraphs of [NLD-MCS-OS 25.1443 to NLD-MCS-OS 25.1453](#). The number of occupants to be provided with oxygen and the duration of the supplies is defined by [the applicable operating rules](#).
- (b) The oxygen system must be free from hazards in itself, in its method of operation, and in its effect upon other components.
- (c) [Except for oxygen chemical generators and for small sealed, one-time use, gaseous oxygen bottles, there must be a means to allow the crew to readily determine, during flight, the quantity of oxygen available in each source of supply.](#)
- (d) The oxygen flow rate and the oxygen equipment for aeroplanes for which certification for operation above 40,000 ft is requested must be approved.

**NLD-MCS-OS 25.1443 Minimum mass flow of supplemental oxygen**

- (a) If continuous flow equipment is installed for use by flight-crew members, the minimum mass flow of supplemental oxygen required for each crew member may not be less than the flow required to maintain, during inspiration, a mean tracheal oxygen partial pressure of 149 mmHg when breathing 15 litres per minute, BTPS, and with a maximum tidal volume of 700 cc with a constant time interval between respirations.
- (b) If demand equipment is installed for use by flight-crew members, the minimum mass flow of supplemental oxygen required for each crew member may not be less than the flow required to maintain, during inspiration, a mean tracheal oxygen partial pressure of 122 mmHg, up to and including a cabin pressure altitude of 35,000 ft, and 95% oxygen between cabin pressure altitudes of 35,000 and 40,000 ft, when breathing 20 litres per minute BTPS. In addition, there must be means to allow the crew to use undiluted oxygen at their discretion.
- (c) For passengers and cabin crew members, the minimum mass flow of supplemental oxygen required for each person at various cabin pressure altitudes may not be less than the flow required to maintain, during inspiration and while using the oxygen equipment (including masks) provided, the following mean tracheal oxygen partial pressures:
  - (1) At cabin pressure altitudes above 10,000 ft up to and including 18,500 ft, a mean tracheal oxygen partial pressure of 100 mmHg when breathing 15 litres per minute, BTPS, and with a tidal volume of 700 cc with a constant time interval between respirations.
  - (2) At cabin pressure altitudes above 18,500 ft up to and including 40,000 ft, a mean tracheal oxygen partial pressure of 83.8 mmHg when breathing 30 litres per minute, BTPS, and with a tidal volume of 1,100 cc with a constant time interval between respirations.
- (d) If first-aid oxygen equipment is installed, the minimum mass flow of oxygen to each user may not be less than 4 litres per minute, STPD. However, there may be a means to decrease this flow to not less than 2 litres per minute, STPD, at any cabin altitude. The quantity of oxygen required is based upon an average flow rate of 3 litres per minute per person for whom first-aid oxygen is required.
- (e) If portable oxygen equipment is installed for use by crew members, the minimum mass flow of supplemental oxygen is the same as specified in sub-paragraph (a) or (b) of this paragraph, whichever is applicable.

**NLD-MCS-OS 25.1445 Equipment standards for the oxygen distributing system**

- (a) When oxygen is supplied to both crew and passengers, the distribution system must be designed for either –
  - (1) A source of supply for the flight crew on duty and a separate source for the passengers and other crew members; or
  - (2) A common source of supply with means to separately reserve the minimum supply required by the flight crew on duty.
  - (3) Deleted.
- (b) Portable walk-around oxygen units of the continuous flow, diluter-demand, and straight demand kinds may be used to meet the crew or passenger breathing requirements.

## **NLD-MCS-OS 25.1447    Equipment standards for oxygen dispensing units**

If oxygen dispensing units are installed, the following apply:

- (a) There must be an individual dispensing unit for each occupant for whom supplemental oxygen is to be supplied. Units must be designed to cover the nose and mouth and must be equipped with a suitable means to retain the unit in position on the face. Flight crew masks for supplemental oxygen must have provisions for the use of communication equipment.
- (b) If certification for operation up to and including 25,000 ft is requested, an oxygen supply terminal, either a supply terminal with the unit of oxygen dispensing equipment already connected or a connection which ensures that the oxygen is immediately available, must be within easy reach of each crew member. For any other occupants the supply terminals and dispensing equipment must be located to allow use of oxygen as required by the applicable [operating rules](#).
- (c) Except as specified in [the applicable operating rules](#), if certification for operation above 25,000 ft is requested, there must be oxygen dispensing equipment meeting the following requirements:
  - (1) There must be an oxygen dispensing unit connected to oxygen supply terminals immediately available to each occupant, wherever seated. If certification for operation above 30,000 ft is requested, the dispensing units providing the required oxygen flow must be automatically presented to the occupants before the cabin pressure altitude exceeds 15,000 ft and the crew must be provided with a manual means to make the dispensing units immediately available in the event of failure of the automatic system. The total number of dispensing units and outlets must exceed the number of seats by at least 10%. The extra units must be as uniformly distributed throughout the cabin as practicable.
  - (2) Each flight-crew member on flight deck duty must be provided with demand equipment. In addition, each flight-crew member must be provided with a quick donning type of oxygen dispensing unit, connected to an oxygen supply terminal, that is immediately available to him when seated at his station, and this is designed and installed so that it—
    - (i) Can be placed on the face from its ready position, properly secured, sealed, and supplying oxygen upon demand, with one hand within 5 seconds and without disturbing eyeglasses or causing delay in proceeding with emergency duties; and
    - (ii) Allows, while in place, the performance of normal communication functions.
  - (3) There must be at least two outlets and units of dispensing equipment of a type similar to that required by sub-paragraph (c)(1) of this paragraph in all other compartments or work areas that may be occupied by passengers or crew members during flight, i.e. toilets, washrooms, galley work areas, etc.
  - (4) Portable oxygen equipment must be immediately available for each cabin crew member.

## **NLD-MCS-OS 25.1449    Means for determining use of oxygen**

There must be a means to allow the crew to determine whether oxygen is being delivered to the dispensing equipment.

## **NLD-MCS-OS 25.1451    Chemical oxygen generators**

- (a) For the purpose of this paragraph, a chemical oxygen generator is defined as a device which produces oxygen by chemical reaction.

- (b) Each chemical oxygen generator must be designed and installed in accordance with the following requirements:
  - (1) Surface temperature developed by the generator during operation may not create a hazard to the aeroplane or to its occupants.
  - (2) Means must be provided to relieve any internal pressure that may be hazardous.
- (c) In addition to meeting the requirements in sub-paragraph (b) of this paragraph, each portable chemical oxygen generator that is capable of sustained operation by successive replacement of a generator element must be placarded to show –
  - (1) The rate of oxygen flow, in litres per minute;
  - (2) The duration of oxygen flow, in minutes, for the replaceable generator element; and
  - (3) A warning that the replaceable generator element may be hot, unless the element construction is such that the surface temperature cannot exceed 37.8°C (100°F).

**NLD-MCS-OS 25.1453 Protection of oxygen equipment from rupture**

- (a) Each element of the system must have sufficient strength to withstand the maximum pressures and temperatures in combination with any externally applied load, arising from consideration of limit structural loads that may be acting on that part of the system in service.
- (b) Oxygen pressure sources and pipe lines between the sources and shut-off means must be –
  - (1) Protected from unsafe temperatures; and
  - (2) Located where the probability and hazard of rupture in a crash landing are minimised.

**NLD-MCS-OS 25.1499 Domestic services and appliances**

- (a) Domestic appliances must be so designed and installed that in the event of failures of the electrical supply or control system -
  - (1) The occurrence of any failure condition which would prevent the continued safe flight and landing of the aeroplane is extremely improbable; and
  - (2) The occurrence of any other failure condition which would reduce the capability of the aeroplane or the ability of the crew to cope with adverse operating conditions is improbable.
- (b) The installation of galleys and cooking appliances must be such as to minimise the risk of fire.
- (c) Domestic appliances, particularly those in galley areas, be so installed or protected as to prevent damage or contamination of other equipment or systems from fluids or vapours which may be present during normal operation or as a result of spillage, where such damage or contamination may hazard the aeroplane.
- (d) All electrical domestic appliances must be suitably bonded.
- (e) Warning information must be provided for domestic services and appliances to alert the crew to unsafe system operating conditions, and to enable them to take appropriate corrective action. Systems, controls, and associated monitoring and warning means must be designed to minimise crew errors which could create additional hazards.

- (f) Compliance with the requirements of subparagraph (a) of this paragraph must be shown by analysis, and where necessary, by appropriate ground, flight, or simulator tests. The analysis must consider –
- (1) Possible modes of failure, including malfunctions and damage from external sources;
  - (2) The probability of multiple failures and undetected failures;
  - (3) The resulting effects on the aeroplane and occupants, considering the stage of flight and operating conditions; and
  - (4) The crew warning cues, corrective action required, and the capability of detecting faults.

**- SUBPART G – OPERATING LIMITATIONS AND INFORMATION**

**-- MARKINGS AND PLACARDS**

**NLD-MCS-OS 25.1541 General**

- (a) The aeroplane must contain –
  - (1) The specified markings and placards; and
  - (2) Any additional information, instrument markings, and placards required for the safe operation if there are unusual design, operating, or handling characteristics.
- (b) Each marking and placard prescribed in sub-paragraph (a) of this paragraph –
  - (1) Must be displayed in a conspicuous place; and
  - (2) May not be easily erased, disfigured, or obscured.

**NLD-MCS-OS 25.1557 Miscellaneous markings and placards**

- (a) *Baggage and cargo compartments and ballast location.* Each baggage and cargo compartment, and each ballast location must have a placard stating any limitations on contents, including weight, that are necessary under the loading requirements. However, underseat compartments designed for the storage of carry-on articles weighing not more than 20 pounds need not have a loading limitation placard. (See AMC-OS 25.1557 Miscellaneous markings and Placards(a).)
- (b) Deleted
- (c) *Emergency exit placards.* Each emergency exit placard must meet the requirements of [NLD-MCS-OS 25.811](#).
- (d) *Doors.* Each door that must be used in order to reach any required emergency exit must have a suitable placard stating that the door is to be latched in the open position during take-off and landing.

**NLD-MCS-OS 25.1561 Safety equipment**

- (a) Each safety equipment control to be operated by the crew in emergency, such as controls for automatic liferaft releases, must be plainly marked as to its method of operation.
- (b) Each location, such as a locker or compartment, that carries any fire extinguishing, signalling, or other lifesaving equipment must be marked accordingly.
- (c) Stowage provisions for required emergency equipment must be conspicuously marked to identify the contents and facilitate the easy removal of the equipment.
- (d) Each liferaft must have obviously marked operating instructions.
- (e) Approved survival equipment must be marked for identification and method of operation.

## Section 3 – Appendices to NLD-MCS-OS 25

### Appendix A - Emergency Demonstration

The following test criteria and procedures must be used for showing compliance with NLD-MCS-OS 25.803:

- (a) The emergency evacuation must be conducted either during the dark of the night or during daylight with the dark of night simulated. If the demonstration is conducted indoors during daylight hours, it must be conducted with each window covered and each door closed to minimise the daylight effect. Illumination on the floor or ground may be used, but it must be kept low and shielded against shining into the aeroplane's windows or doors.
- (b) The aeroplane must be in a normal attitude with landing gear extended.
- (c) Unless the aeroplane is equipped with an off-wing descent means, stands or ramps may be used for descent from the wing to the ground. Safety equipment such as mats or inverted life rafts may be placed on the floor or ground to protect participants. No other equipment that is not part of the aeroplane's emergency evacuation equipment may be used to aid the participants in reaching the ground.
- (d) Except as provided in paragraph (a) of this Appendix, only the aeroplane's emergency lighting system may provide illumination.
- (e) All emergency equipment required for the planned operation of the aeroplane must be installed.
- (f) Each external door and exit and each internal door or curtain must be in the take-off configuration.
- (g) Each crewmember must be seated in the normally assigned seat for take-off and must remain in that seat until receiving the signal for commencement of the demonstration. Each crew member must be a person having knowledge of the operation of exits and emergency equipment and, if compliance with the applicable [operating rules](#) is also being demonstrated, each cabin crew member must be a member of a regularly scheduled line crew.
- (h) [A representative passenger load of persons in normal health must be used. Crewmembers, mechanics, and training personnel who maintain or operate the aircraft in the normal course of their duties may not be used as passengers.](#)
- (i) No passenger may be assigned a specific seat except as the MAA-NLD may require. Except as required by sub-paragraph (g) of this Appendix, no employee of the applicant may be seated next to an emergency exit.
- (j) Seat belts and shoulder harnesses (as required) must be fastened.
- (k) Before the start of the demonstration, approximately one-half of the total average amount of carry-on baggage, blankets, pillows and other similar articles must be distributed at several locations in the aisles and emergency exit access ways to create minor obstructions.
- (l) No prior indication may be given to any crewmember or passenger of the particular exits to be used in the demonstration.
- (m) The applicant may not practice, rehearse, or describe the demonstration for the participants nor may any participant have taken part in this type of demonstration within the preceding 6 months.

- (n) The pre-take-off passenger briefing required by the applicable [operating rules](#) may be given. The passengers may also be advised to follow directions of crewmembers but not be instructed on the procedures to be followed in the demonstration.
- (o) If safety equipment as allowed by subparagraph (c) of this Appendix is provided, either all passenger and cockpit windows must be blacked out or all emergency exits must have safety equipment in order to prevent disclosure of the available emergency exits.
- (p) Not more than 50% of the emergency exits in the sides of the fuselage of an aeroplane that meets all of the requirements applicable to the required emergency exits for that aeroplane may be used for the demonstration. Exits that are not to be used for the demonstration must have the exit handle deactivated or must be indicated by red lights, red tape, or other acceptable means placed outside the exits to indicate fire or other reason why they are unusable. The exits to be used must be representative of all the emergency exits on the aeroplane and must be designated by the applicant, subject to approval by the MAA-NLD.
- (q) Except as provided in sub-paragraph (c) of this paragraph, all evacuees must leave the aircraft by a means provided as part of the aeroplane's equipment.
- (r) The applicant's approved procedures must be fully utilised, except the flight-crew must take no active role in assisting others inside the cabin during the demonstration.
- (s) The evacuation time period is completed when the last occupant has evacuated the aeroplane and is on the ground. Provided that the acceptance rate of the stand or ramp is no greater than the acceptance rate of the means available on the aeroplane for descent from the wing during an actual crash situation, evacuees using stands or ramps allowed by sub-paragraph (c) of this Appendix are considered to be on the ground when they are on the stand or ramp.

## Section 4 – Acceptable Means of Compliance (AMC)

### AMC-OS 25.561 Emergency landing conditions - General

*AMC-OS 25.561(c):*

The items of mass referred in this sub-paragraph are only items of mass which are part of the certified aeroplane configuration.

*AMC-OS 25.561(e):*

If a pallet loading system is used to carry pallets together with occupants in the same compartment, applicable pallet weight limitations compatible with the specified load factors should be included in the loading instructions for the pallet loading system.

### AMC-OS 25.562 Emergency landing dynamic conditions

*AMC-OS 25.562:*

The performance measures of NLD-MCS-OS 25.562(c) only address forward- and aft-facing seats. Side-facing seats were not considered when those airworthiness standards were issued. The existing regulations do not provide adequate or appropriate safety standards for occupants of side-facing seats because they do not consider the differences in the dynamic forces that apply to a side-facing occupant. To achieve an equivalent level of safety, special conditions should be added to the type-certification basis of aeroplanes with side-facing seat installations. The MAA-NLD accepts the technical criteria of FAA Policy Statement PS-ANM-25-03 as appropriate special conditions in addition to the requirements of NLD-MCS-OS 25.562 and 25.785.

### AMC-OS 25.625 Fitting factors and visual inspection of attachments

*AMC-OS 25.625(d):*

In the context of NLD-MCS-OS 25.625(d), cargo tie-down points in the cabin are to be considered as 'attachments to the structure concerning an item in the cabin that can be optionally installed'.

*AMC-OS 25.625(d)(2):*

Attachments of items that may be optionally installed are usually considered subject to wear and tear.

### AMC-OS 25.783 Doors

*AMC-OS 25.783(b):*

This requirement does not preclude the possibility to open a door during flight by deliberate action from the crew if required for mission purposes.

### AMC-OS 25.785 Seats, berths, safety belts and harnesses

*AMC-OS 25.785:*

See AMC-OS 25.562 Emergency landing dynamic conditions

*AMC-OS 25.785(a):*

(Military) litters are often exchanged with other parties in a medical evacuation chain and are therefore normally not part of the aircraft type design. They are normally not certified according to aircraft certification standards. However, for certain missions like training or regular civil medical support missions an operator may want to specify the use of a certified litter that complies (as much as possible) to the certification standard of the type design. In such case the requirements for berths in NLD-MCS-OS 25.785 shall apply.

*AMC-OS 25.785(b) and (d):*

Seats and adjacent parts should be evaluated for head and limb strike hazards. Potentially injurious objects should be removed or padded when feasible. Suitable warnings and instructions should be provided when potentially injurious objects cannot be removed or padded. In case there are no head and limb strike envelopes available for representative dynamic landing conditions the strike envelopes provided in the Army Crash Survival Design Guide (ref. USAAVSCOM TR 89-D-22D) may be used as guidance. See Figure 1 and Figure 2 for reference.

*AMC-OS 25.785(f):*

Occupant weights should be agreed that match typical occupant weights expected in service, including military gear. Par example, the following typical occupant weights were used in the structural design of the CH-47 helicopters:

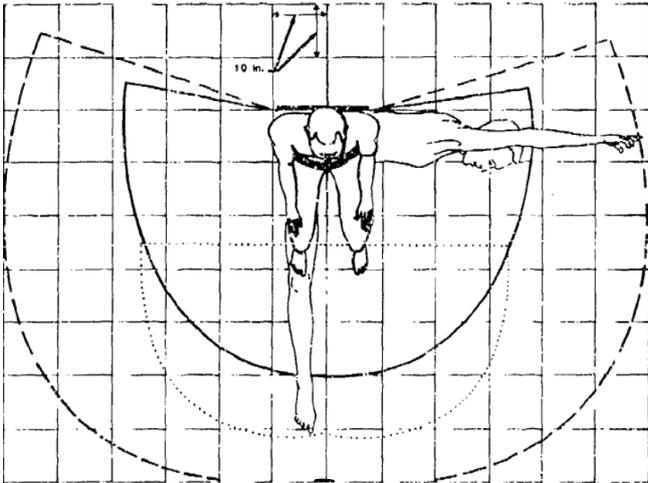
- (1) Pilot, co-pilot: combined weight of man and equipment: 250 lbs
- (2) Troops, occupants: combined weight of man and equipment: 250 lbs
- (3) Litter occupant: combined weight of man, litter and equipment: 250 lbs

*AMC-OS 25.785(p):*

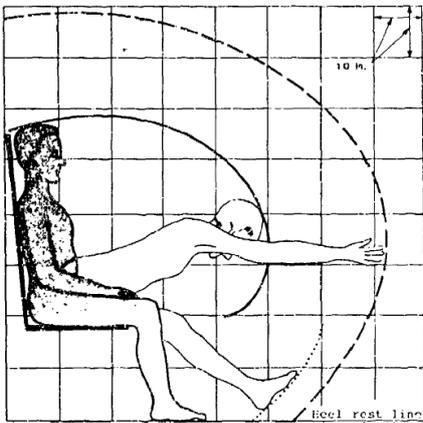
The Flight Manual should include head strike envelope geometry data. This allows the flight crew to comply with the operational requirements in NLD-SMAR-3 to not position cargo or equipment within the head strike envelope of seated occupants such that the occupant may (or is likely to) suffer serious injury in an emergency landing, taking into account the installed type of seat and restraint system.

NB: The head strike envelopes that are to be considered by the operator when seating passengers next to cargo or equipment should not be presented in the AFM as hard certification limits that strictly determine whether the seats may be used or not based on airworthiness regulations only. If under operational circumstances the cargo cannot be positioned outside the head strike envelopes, the operator must follow the risk assessment and acceptance procedures required under NLD-SMAR-300. The MTCHO is responsible for providing the operator with the correct aircraft related data to perform this assessment. The head strike envelopes are part of that data.

If strike envelope geometry of the actual seat is not available, the figures from the Army Crash Survival Design Guide (ref. USAAVSCOM TR 89-D-22D) may be used, as shown in Figure 1 and Figure 2.

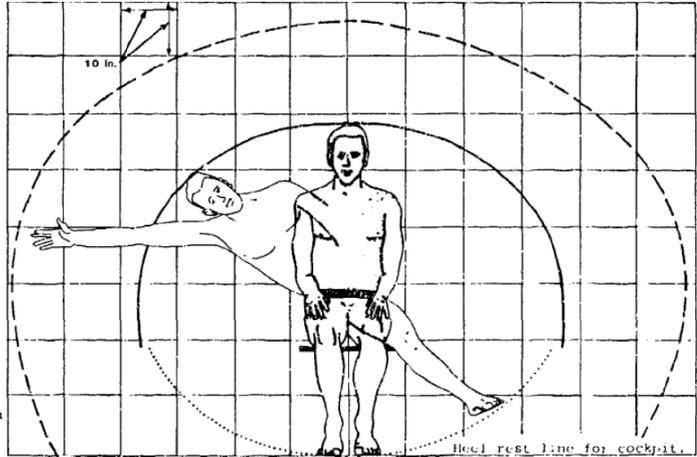


Top View



Side view

Heel rest line for cockpit.  
Aircraft floor line for  
troop compartment.

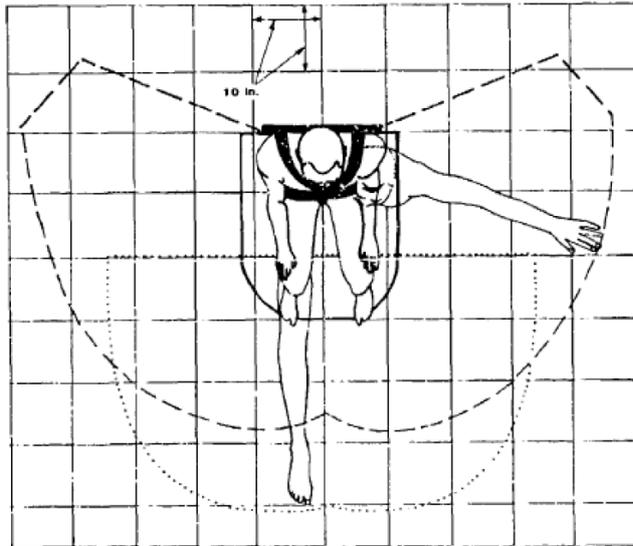


Front view

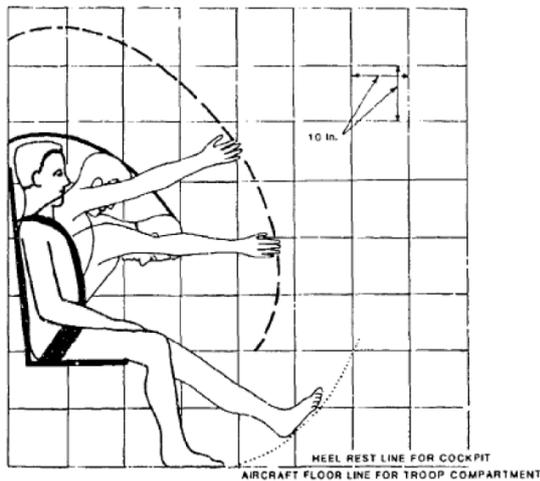
Heel rest line for cockpit.  
Aircraft floor line for  
troop compartment.

(Source: USAAVSCOM TR 89-D-22D: Aircraft crash survival design guide Volume IV, Chapter 11.2)

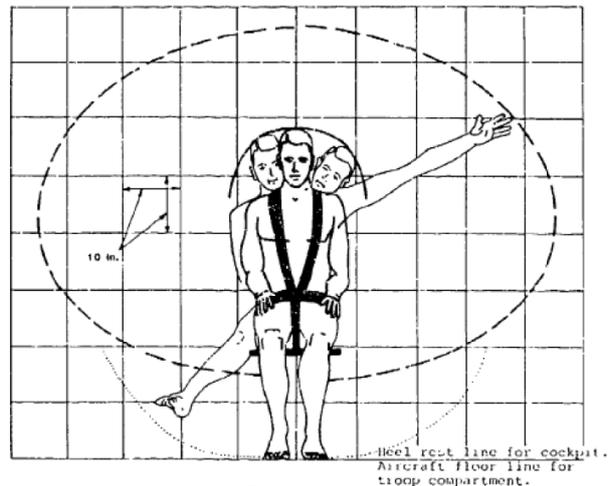
Figure 1: Lap-belt-only extremity strike envelope (continuous line indicates head strike envelope)



Top View



Side view



Front view

(Source: USAAVSCOM TR 89-D-22D: Aircraft crash survival design guide Volume IV, Chapter 11.2)

Figure 2: Full-restraint extremity strike envelope (continuous line indicates head strike envelope)

### AMC-OS 25.803 Emergency evacuation

#### AMC-OS 25.803(c):

The evacuation capacity of an exit is defined as the number of evacuees that can safely escape the aeroplane through that exit within 90 seconds. The escape sequence starts at the signal for commencement of the evacuation with the exit initially closed and the evacuees sitting on their seats and ends at the moment when the last evacuee reaches the ground.

If different cabin configurations, with different maximum allowed numbers of passengers each, are to be certified, the allowed number of occupants for each configuration according to NLD-MCS-OS 25.803 can be presented in the form of a table in the Flight Manual. An example of such a table is shown below. In such table both the evacuation capacity as well as any other limitations on the allowable number of occupants (e.g. limitations listed in the MTCDS) should be taken into account. The table should be added to the Flight Manual, along with any relevant procedures in relation to the emergency exits.

<b>Allowable number of occupants per cabin compartment and configuration for aircraft type X</b>				
<b>Cabin configuration / section****</b>	<b>Most limiting exit(s)</b>	<b>Configuration</b>	<b>Summed evacuation capacities of exits</b>	<b>Allowable no. of occupants</b>
Open Cabin	LH FWD exit + Ramp exit	No weapon	12+50	<b>48**</b>
		Weapon 1 in LH FWD exit Weapon 2 in Ramp exit	5*+40	<b>45*</b>
Divided cabin / FWD section	LH FWD exit	No weapon	12	<b>12</b>
		Weapon 1 in LH FWD exit	5*	<b>5*</b>
Divided cabin / Aft section	Ramp exit	No weapon	50	<b>20***</b>
		Weapon 2 in Ramp exit	40	<b>20***</b>

\* A crew member must de-install Weapon 1 in the FWD exits prior to evacuation.

\*\* This amount is limited by the maximum seating capacity according to the MTCDS of the aircraft type.

\*\*\* When the cabin is divided, the aft part of the cabin offers only one exit. Therefore the maximum capacity is limited to 20 (cfm NLD-MCS-OS 25/29.807).

\*\*\*\* A cabin is defined as 'divided' when the access between the forward section and the rear section does not comply with the minimum requirements for an evacuation route in accordance with NLD-SMAR-3.40.b. Otherwise it is defined as 'open'.

**AMC-OS 25.803(c)(1):**

The evacuation capacity should be shown for occupants wearing typical clothing as determined by the intended use. For tactical aeroplanes this should include as a minimum normal weather clothing and a fragmentation protective vest. On tactical aeroplanes it should be possible to remove obstructing items of equipment (if any, see AMC-OS 25.803(c)(2)) and to open the emergency exits while wearing gloves.

**AMC-OS 25.803(c)(2):**

In exceptional cases, and only when deemed necessary due to the nature of the operation, an obstruction due to the installation of operationally required equipment may be accepted that is not 'simple and obvious' to remove. In such cases it may be necessary to instruct occupants before flight on how to remove an obstruction that blocks the passage through an exit. In such case relevant data and warnings should be included in the Flight Manual.

When such procedure is not practical, or does not provide in a reliable means to remove the obstruction, as an alternative measure crew members who are trained in the removal of the obstruction may be allocated at the affected emergency exit pair. For redundancy, a minimum of two crew members should be allocated to each exit pair that is obstructed by the installation of operationally required equipment, also when only one of the exits of that exit pair is obstructed.

**AMC-OS 25.803(c)(6) and (7):**

For the purpose of NLD-MCS-OS 25.803(c)(6) and (7), the passenger cabin area should be considered to be divided into separate compartments if the passageway between the compartments does not comply with the minimum requirements for passageways between individual occupied areas in accordance with NLD-MCS-OS 25.813(a). The maximum number of occupants should be established for each individual separate compartment.

For aeroplanes that may be used for the combined transport of passengers and cargo, the positioning of the cargo may result in the cabin being divided into separate compartments according to operational regulations in NLD-SMAR-3. If such positioning is to be allowed, the effect on the allowed number of passengers per compartment should be stated in the Flight Manual. See the example in AMC-OS 25.803(c) above.

### **AMC-OS 25.809 Emergency exit arrangement**

*AMC-OS 25.809(c):*

In case the opening of emergency exits cannot be achieved in a simple and obvious manner by itself, suitable placards should be placed with instructions on how to open the emergency exits in accordance with NLD-MCS-OS 25.803(c)(3).

The design of the emergency exit opening mechanism should be such that the operation of the emergency exit opening mechanism is not hampered when wearing any commonly used type of gloves.

*AMC-OS 25.809(g):*

Acceptable means may be a jettison capability of the emergency exit. The provisioning of alternative exits in addition to the required exits may be acceptable too.

### **AMC-OS 25.811 Emergency exit marking**

*AMC-OS 25.811(e)(4):*

The background of an arrow may be interpreted as a border around the arrow with a minimum width of 12.7 mm (0.5 inch) in all directions.

*AMC-OS 25.811(f):*

For doors with a lack of space for application of the peripheral markings on the surroundings of the door, the peripheral markings may be applied on these doors themselves.

For doors that can be used as an emergency exit by themselves, and that are equipped with an additional escape hatch in the door as a redundant escape provision, no peripheral marking nor the wording 'Emergency Exit' need to be applied to mark that escape hatch separately. For the hatch itself only the opening instructions need to be applied and should comply with the requirements for textual markings.

*AMC-OS 25.811(f)(1):*

The following test is acceptable to verify if the emergency exits can be easily distinguished from a distance of 10m in dusk lighting conditions:

#### **1. PREPARATION**

- Apply the paint scheme to be certified to the aeroplane. At least the basic aeroplane colour and the peripheral marking (the coloured band) around the emergency exits to be evaluated shall be applied.
- Position the aeroplane (outside or inside a building) in such a way that every exit to be assessed can be viewed from a distance of 10m from and approximately perpendicular to the applicable exit, without any items that can block the view to the aeroplane from that distance.
- Turn off all lights that are not required for the evaluation and might influence the evaluation. Reflections from (artificial or natural) light sources shall be minimized as much as possible for the best result of the evaluation.
- The evaluation shall be performed with an ambient light intensity of a maximum of 85 Lux.

## 2. EXECUTION

- The evaluation shall be performed by at least 12 persons, who shall individually rate how easy or difficult it is to distinguish the peripheral marking around each emergency exit to be evaluated.

*NOTE: Each evaluator must rate every emergency exit individually i.e. the evaluators are not allowed to discuss what ratings they will give.*

- From a distance of 10m, approximately perpendicular to the emergency exit under test, the applicable peripheral marking around the emergency exit shall be rated in accordance with the rating scale provided in the table below.

Rating	Evaluation
1	I cannot or just barely see the coloured band outlining the emergency exit.
2	
3	
4	
5	I can see the coloured band outlining the emergency exit, however, it takes effort to follow the band with my eyes.
6	
7	
8	
9	
10	I can very clearly see the entire coloured band outlining the emergency exit.

Minimum data to be recorded:

- Place and date the evaluation took place.
- Location of the aeroplane (If outside, record approximate position e.g. spot 2 of the 298SQ platform. If inside, record building number and if applicable hangar bay number).
- Aircraft registration number.
- The type and serial number of the Lux meter used, including last calibration date (if applicable).
- Names of the evaluators.
- Ratings per evaluator per emergency exit.

*NOTE: The evaluation/rating sheet shall be signed by the applicable evaluator.*

- The Lux level at the time of the assessment. If this differs per assessment (evaluator and/or exit), then for each assessment the Lux level must be recorded.
- Any condition that might have influenced the assessment and therefore the rating given.

## 3. RESULTS

- The average rating per exit shall be determined by adding the rating of each evaluator for that specific emergency exit and then divide the outcome by the number of evaluators. This average rating is the final rating for that emergency exit.

- The final rating for each emergency exit under test must be at least 6.3.

Using a combination of analysis and testing:

A combination of analysis and testing may be used to show compliance with the requirement if a previous test on a similar design is available that shows compliance with the requirement, at the acceptance of the MAA-NLD, and analysis shows that the contrast between the colours used in the actual design under study is higher than the contrast between the colours in the similar design.

*AMC-OS 25.811(f)(2):*

The following test (steps 1 to 3) is acceptable to verify if the emergency exit opening instructions can be easily read from a distance of 1m in dusk lighting conditions:

#### 1. PREPARATION

- Apply the paint scheme to be certified to the aeroplane. At least the basic aeroplane colour and the emergency exits opening instructions to be evaluated shall be applied.
- Position the aeroplane (outside or inside a building) in such a way that every exit to be assessed can be viewed from a distance of 1m from and approximately perpendicular to the applicable exit, without any items that can block the view to the aeroplane from that distance.
- Turn off all lights that are not required for the evaluation and might influence the evaluation. Reflections from (artificial or natural) light sources shall be minimized as much as possible for the best result of the evaluation.
- The evaluation shall be performed with an ambient light intensity of a maximum of 85 Lux.

#### 2. EXECUTION

- The evaluation shall be performed by at least 12 persons, who shall individually rate how easy or difficult it is to read the opening instruction of each emergency exit to be evaluated.

*NOTE: Each evaluator must rate every emergency exit individually i.e. the evaluators are not allowed to discuss what ratings they will give.*

- From a distance of 1m, approximately perpendicular to the emergency exit under test, the applicable emergency opening instructions shall be rated in accordance with the rating scale provided in the table below.

Rating	Evaluation
1	I cannot or just barely see the emergency opening instructions.
2	
3	
4	
5	I can see the emergency opening instructions, however, it takes effort.
6	
7	
8	
9	
10	

Minimum data to be recorded:

- Place and date the evaluation took place.

- Location of the aeroplane (If outside, record approximate position e.g. spot 2 of the 298SQ platform. If inside, record building number and if applicable hangar bay number).
- Aircraft registration number.
- The type and serial number of the Lux meter used, including last calibration date (if applicable).
- Names of the evaluators.
- Ratings per evaluator per emergency exit.

*NOTE: The evaluation/rating sheet shall be signed by the applicable evaluator.*

- The Lux level at the time of the assessment. If this differs per assessment (evaluator and/or exit), then for each assessment the Lux level must be recorded.
- Any condition that might have influenced the assessment and therefore the rating given.

### 3. RESULTS

- The average rating per exit shall be determined by adding the rating of each evaluator for that specific emergency exit and then divide the outcome by the number of evaluators. This average rating is the final rating for that emergency exit.
- The final rating for each emergency exit under test must be at least 6.3.

Using a combination of analysis and testing:

A combination of analysis and testing may be used to show compliance with the requirement if a previous test on a similar design is available that shows compliance with the requirement, at the acceptance of the MAA-NLD, and analysis shows that the contrast between the colours used in the actual design under study is higher than the contrast between the colours in the similar design.

*AMC-OS 25.811(h):*

The following should be substantiated for excess emergency exits, marked as emergency exits:

- The presence and configuration of the excess exits will not lead to confusion during an emergency.
- The use of the excess exits will not result in significantly increased evacuation times, due to reduced use of more efficient exits in an emergency.
- Occupants will not get directed to excess exits which are not simple and obvious to open without training.

Excess exits which can only be used for safe evacuation under supervision of trained crew members should not be marked as exit. However, those exits may be described in the Flight Manual as emergency exits with proper warnings.

It may happen that an exit that may be marked as an (excess) emergency exit in one configuration, may not be marked as such in another configuration due to too strict application of NLD-MCS-OS 25.811(h)(2). To prevent the unnecessary burden to cover the exit markings between flights, as well as the associated risk that the markings are not uncovered when they are required, the likeliness of any use of such exit should be considered and weighed against the hazards. In many cases it may suffice to warn the passengers not to use such an exit and direct their attention to the other exits during the passenger briefing before the start of the flight.

## **AMC-OS 25.812 Emergency lighting**

### *AMC-OS 25.812(f):*

To support covered military operations, the 'off' position of the cockpit control device may be designed so that it overrides the cabin control device and disables any automatic activation of the emergency lighting.

### *AMC-OS 25.812(g) and (h):*

To comply with the requirements, internal light sources may be used. External light sources are not required. It is acceptable that the illumination on the ground is reduced to less than the stated requirement at the moment that a person actually exits through the window.

## **AMC-OS 25.851 Fire extinguishers**

### *AMC-OS 25.851(a)(1):*

Specific fire hazards of any equipment or systems installed in the cabin or in accessible cargo compartments should be considered. Examples of (role) equipment in the cabin or accessible cargo compartments that may introduce specific fire hazards are:

- Internal auxiliary fuel tank systems.
- (Multiple) Electrical medical equipment, with or without batteries, as used in Medevac configurations.

Anytime when equipment with specific fire hazards is installed in the cabin or in accessible cargo compartments, the immediate access to an appropriate hand fire extinguisher by the cabin crew should be assured. Access should not rely upon the help of any other occupants. If additional hand fire extinguishers are required or present hand fire extinguishers need to be relocated when hazardous equipment is installed, this should be stated in the installation instructions of the hazardous equipment and/or the flight manual. When an existing hand fire extinguisher is relocated, the new location should be at a conspicuous place while the original location should clearly be marked as unserviceable.

### *AMC-OS 25.851(a)(5):*

Hand fire extinguishers must be approved according to MLE 21.305 or NLD-MAR 21.A.305. and should comply with industry standards. The following industry standards are accepted:

- (1) U.S. - UL Standard 711, Rating and Fire Testing of Fire Extinguishers, and U.S. - UL construction and performance requirements for specific agent extinguishers.  
Hand fire extinguishers must be marked with the name of the listing agency and rating according to U.S. - UL 711, and must have the UL listing mark (with UL copyright logo) with the four required elements: UL in circle mark; word "listed;" product or company name; and issue/serial number or control number.
- (2) European Standard EN 3, Portable fire extinguishers.  
Hand fire extinguishers must be marked according to EN 3-7 clause 16.2 and have the CE-mark and the number(s) and reference(s) relating to the approval of the extinguisher.

Equivalent standards may be proposed by the applicant for acceptance.

### *AMC-OS 25.851(a)(7):*

Hand fire extinguishers approved conform UL711 should have a C-rating. Hand fire extinguishers approved conform EN 3 should include markings that they are suitable for use on live electrical equipment.

### **AMC-OS 25.853 Compartment interiors**

#### *AMC-OS 25.853(a):*

Isolated parts/materials which are considered small may be exempt due to their small size because they would not contribute significantly to the propagation of a fire. Parts eligible to be considered small should at least comply to each of the following:

- a maximum exposed length less than 15 cm, and;
- an exposed area less than 100 cm<sup>2</sup>, and;
- a volume less than 100 cm<sup>3</sup>, and;
- a mass less than 100 grams.

Consideration should be given when more than one small part is located in the same proximity with the same or other small parts (one part may ignite the other part) as the combined fuel load may contribute to propagation of a flame, in this case the above small parts exemption would not apply. Small parts exemption does not apply to wire and cable.

### **AMC-OS 25.855 Cargo and baggage compartments**

#### *AMC-OS 25.855(e)(1):*

Consideration should be given to the movement of cargo as part of normal loading and unloading procedures, but also to movement of cargo due to flight and ground loads, including emergency landing conditions.

Consideration should be given to hazards resulting from water based fire extinguishing agents in relation to exposed electrical parts.

Sources of heat in the cargo compartment should preferably also be shielded and insulated themselves to prevent damage to critical systems.

### **AMC-OS 25.1423 Public address system**

#### *AMC-OS 25.1423(c)*

NLD-MCS-OS 25.1423(c) requires that the public address system is intelligible at all passenger seats (incl. lavatories), cabin crew member seats and work stations. However, the nature of the operation can, under certain conditions, lead to high ambient noise levels in the cabin areas (e.g. due to engine noise, opened doors). This could lead to seat positions at which the public address system is not intelligible.

In those cases an acceptable level of safety may be achieved by the cabin crew relaying the messages from the flight crew directly to each passenger through operational procedures. To achieve acceptable level of safety the intercommunications system (ICS) should enable continuous contact between the cabin crew and flight crew during such conditions.

### **AMC-OS 25.1557 Miscellaneous markings and Placards**

#### *AMC-OS 25.1557(a):*

If baggage, cargo compartment and ballast location limitations are complex and involve, for example, additional limitations on loading intensity and distribution, it is acceptable to provide a placard making reference to the appropriate document.

## Final clauses

This regulation is known as NLD-MCS-OS 25 and will be published on the intranet and internet site of the Ministry of Defence.

The Hague, 1 August 2025

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The Director Military Aviation Authority - The Netherlands,

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