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An Evaluation of Equivalent Levels of Safety Findings and Exemptions Relating to Cabin Safety Regulations for Smaller Transport Airplanes

September 2012

Final Report

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LIST OF ACRONYMS

CFR	Code of Federal Regulations
ELOS	Equivalent Level of Safety
FAA	Federal Aviation Administration
HIC	Head Injury Criterion

EXECUTIVE SUMMARY

This study has evaluated Equivalent Level of Safety (ELOS) Findings and Exemptions relating to the cabin safety requirements in Title 14 Code of Federal Regulations Part 25 that involved transport category airplanes with a maximum certificated passenger capacity of up to 60 seats. The results of this study can be used as an indication of the relevance and applicability of certain requirements to this airplane category, and could form a basis for future research studies.

A review of the FAA database up to February 2006 found a total of 98 ELOS and Exemption applications appropriate for this study. The applications were classified under 15 categories, and the categories having more than 4 original applications were given further consideration. These categories are related to:

- Occupant protection of multiple-place side-facing seat
- Installation of interior door separating passenger compartments
- The design and location of interior emergency exit marker/locator signs
- Head Injury Criteria for seats aft of bulkheads (“front row” seats)
- Type and arrangement of emergency exits
- Structural and occupant protection requirements for medical stretchers.

It was found that some of these subjects are not exclusive to smaller transport airplanes. This is mainly because the applications were related to the type of operation and configuration that require specific features, such as executive interior or air ambulance configuration that can be installed in both large and smaller transport airplanes. However, some of these issues may be more prevalent in smaller transport airplanes.

It was also found that other issues are related to the size of the airplane, in that the pertinent requirements may be considered more appropriate to larger transport airplanes.

1. INTRODUCTION.

This study is the second part of a research project into the cabin safety issues pertinent to smaller transport airplanes¹ carried out on behalf of Transport Canada. The first part of the research identified the cabin safety-related features unique to smaller transport airplanes and evaluated the cabin safety requirements of the Canadian Aviation Regulations and U.S. Code of Federal Regulations.

This study has evaluated Equivalent Level of Safety (ELOS) Findings and Exemptions relating to the cabin safety requirements in Title 14 Code of Federal Regulations (CFR) Part 25 that involved transport category airplanes with a maximum certificated passenger capacity of up to 60 seats. The results of this study can be used as an indication of the relevance and applicability of certain requirements to this airplane category, and to form a basis for future research studies.

2. OBJECTIVES.

The study is intended to analyse and document Equivalent Level of Safety Findings and Exemptions, pertinent to cabin safety, requested for smaller transport airplanes. The results of the analysis may be used as an indication of the applicability of certain regulations to these airplanes and to form a basis for future research studies.

3. SOURCE OF DATA.

3.1 EQUIVALENT LEVEL OF SAFETY.

ELOS findings are made when literal compliance with a certification regulation cannot be shown and compensating factors exist which can be shown to provide an equivalent level of safety.

The ELOS documents evaluated in this study were obtained from the U.S. Federal Aviation Administration (FAA) internet-based database (see reference 1), dating back to 1994. This database contains the FAA Memoranda of the Equivalent Level of Safety Findings, and may be selected by make, model and date.

Each ELOS document contains:

- A list of the applicable regulations for which an ELOS finding is requested;
- A description of the design features pertinent to the ELOS application;
- A description of any design changes, limitations, or equipment imposed to make the equivalency;

¹ For the purpose of this study, “smaller transport airplane” is defined as turbojet/turboprop-powered transport category airplane (14 CFR Part 25) with maximum certificated passenger seats up to 60.

- An explanation of how the actions taken provide an equivalent level of safety to that intended by the regulation.

3.2 EXEMPTIONS.

An Exemption is a petition for a request to the certificating authority by an individual or entity asking for relief from the requirements of a regulation in effect. The authority's response to the petition is one of the following: granted, partially granted or denied.

Exemption documents evaluated in this study were obtained from the FAA database (see reference 2). This database is populated with Exemptions dating back to the mid-1990's, and may be selected by number, petitioner, CFR Part, make or expiration date.

4. METHODOLOGY.

A review of the FAA database up to February 2006 found a total of 98 ELOS Findings and Exemptions relating to cabin safety requirements for smaller transport airplanes. They consist of:

- 14 ELOS
- 38 Exemptions (Granted)
- 36 Exemptions (Partially Granted)
- 10 Exemptions (Denied)

For the purpose of this study, ELOS and Exemptions have been classified into 15 categories based on their subject matter. One ELOS or Exemption can be classified into more than one category. The airplane types related to each application were identified. Exemption extension applications have been identified as a "repeat". Exemption applications for the same regulation(s) on the same airplane type, but from different applicants, are also annotated as a "repeat".

The 15 categories are explained as follows.

- **Door to Cargo Compartment** - This refers to the installation of an internal door to a main deck cargo compartment which provides in-flight access to the compartment.
- **Dynamic Seat Testing** - This refers to the required dynamic testing of crew and passenger seats and occupant protection systems under emergency landing loading conditions.
- **Emergency Exit (Access)** - This refers to the access to emergency exits, and includes deviations from the required passageway width, obstruction of the projected opening of the exits, etc.
- **Emergency Exit (type and arrangement)** - This refers to the emergency exit type (dimensions, design and construction), number and location in the cabin.

- **Emergency Exit Marking (exterior)** - This refers to the exterior emergency exit marking (e.g. emergency exit outline bands).
- **Emergency Exit Marking (Operation Instruction)** - This refers to the operation instruction marking of emergency exits (e.g. arrow marking).
- **Emergency Exit – Ditching Scenario** - This relates to the required ditching emergency exits.
- **Exit signs – visibility** - This refers to the legibility and visibility of emergency exit markings and locator signs with regard to the letter height/background requirement, and the location of the signs in the cabin. It also relates to the use of the signs as both an exit marking sign and an exit location sign.
- **Floor Distortion Test – Crew Seats** - This refers to the floor distortion test requirement, specifically for flight crew seats.
- **Head Injury Criterion (HIC) for Front Row Seats** - This refers to the protection of occupants of front row seats (seats located aft of a structure/bulkhead) in relation to the Head Injury Criterion (HIC) requirement.
- **Interior Door** - This refers to the installation of doors in the passenger cabin between passenger compartments, including the installation of a belted passenger seat in the lavatory/vanity area which is separated from the main cabin section.
- **Multiple-Place Side-Facing Seat** - This refers to the installation of a side-facing divan (multiple occupancy seat), which involves occupant protection pass/fail criteria associated with the dynamic testing of the seat.
- **Stretcher** - This refers to the structural and occupant protection requirements for stretchers under the associated dynamic test conditions.
- **Width of Aisle – Evacuation** - This refers to aisle widths that do not meet the dimensions specified by the regulation or by the distortion of seats under dynamic loading conditions.
- **Width of Aisle – Executive Seats** - This refers to the aisle width that is affected by the installation of executive seats (seats that can swivel and move forward and backward).

5. RESULTS AND DISCUSSIONS.

5.1 RESULTS.

Table 1 shows the number of ELOS/Exemption Applications and the associated requirements by Category. The number of ELOS/Original Exemption Applications, the number of Repeat Exemption Applications and the total number of Applications are shown for each Category. The affected CFR Sections are also shown for each Category. The Categories are ranked based on the number of ELOS/Original Exemption Applications.

Table 2 lists the airplane models for which the ELOS and/or Exemptions were requested for each of the Categories.

The six highest ranked Categories, based on the number of original applications, are discussed in section 5.2. Section 5.2 provides a review of the regulations affected by the ELOS or Exemption Applications, taking into account the context of the application (e.g. type of operation). The six Categories reviewed are:

1. Multiple-place side-facing seat
2. Interior door
3. Exit signs – visibility
4. Head Injury Criterion for front row seats
5. Emergency exit (type and arrangement)
6. Stretcher

It should be noted that this review was limited to documents available in the FAA database, which covers a limited period of time. Therefore, the sample of applications reviewed in this study, may not be representative of the cabin safety-related ELOS/Exemptions applications over a longer period of time.

The summary of the review of the ELOS and Exemption documents is attached as appendix A to this report. The regulations affected by the ELOS and Exemptions in the six Categories, and their amendment list, are attached as appendix B to this report.

Table 1. ELOS/Exemption Applications Pertinent to Cabin Safety Requirements on Smaller Transport Airplanes

Rank	Category	Number of ELOS/Original Exemption Applications	Number of Repeat Applications for Exemption	Total Number of Applications for ELOS/Exemption	No. of Aircraft Models	Affected CFR Regulations
1	Multiple-place side-facing seat	13	10	23	11	25.785, 25.562
2	Interior Door	8	6	14	9*	25.813
3	Exit signs - visibility	6		6	9*	25.811, 25.812
4	HIC for front row seats	5	13	18	5	25.785, 25.562
5	Emergency exit (type and arrangement)	5	1	6	6*	25.807, 25.783, 25.809
6	Stretcher	5	3	8	5	25.785, 25.562
7	Dynamic Seat Testing	4		4	4	25.562
8	Emergency exit - ditching scenario	4		4	6*	25.807, 25.1557
9	Emergency exit (Access)	2		2	1	25.813
10	Floor Distortion Test - Crew Seats	2	4	6	2	25.562
11	Width of Aisle - Evacuation	2		2	2	25.815
12	Width of Aisle - Executive Seats	2		2	2	25.815
13	Door to cargo compartment	1		1	1	25.857, 25.1447
14	Emergency Exit Marking (Exterior)	1		1	1	25.811
15	Emergency Exit Marking (Operating Instruction)	1		1	1	25.811

* There are application(s) for more than one aircraft models

Table 2. Smaller Transport Airplane Models Pertinent to the ELOS/Exemptions Applications Reviewed in This Study

Multiple-place side-facing seat (11)	Bombardier BD-100-1A10 (Challenger 300), Bombardier BD700-1A10 Global Express, Bombardier BD700-1A11 Global 5000, Cessna Model 680, Cessna Model 750 (Citation X), Dassault Falcon Model 2000, Dassault Falcon Model 2000EX, Embraer Model EMB135-BJ Legacy, Gulfstream Model 200 / IAI Galaxy, Gulfstream Model G150, Israel Aircraft Industries Galaxy (A53NM) model (same as Gulfstream Model 200)
Interior Door (9)	Bombardier BD-100-1A10 (Challenger 300), Bombardier BD700-1A10 Global Express, Bombardier BD700-1A11 Global 5000, Cessna Model 560XL, Cessna Model 680, Dassault Falcon Models Mystere Falcon 900 and Falcon 900EX, Gulfstream Model GV-SP
Exit signs - visibility (9)	Bombardier BD-100-1A10 (Challenger 300), Bombardier BD700-1A10 Global Express, Cessna Model 680, Cessna Model 750 (Citation X), Dassault Falcon Models 50, 900, and 900EX, Gulfstream Model GV-SP and GIV-X
HIC for front row seats (5)	Dornier 328, Embraer EMB-145, Jetstream Series 4100, Learjet Model 45, SAAB 2000
Emergency exit (type and arrangement) (6)	Embraer EMB-120 [EMB-120, -120RT, -120ER], Gulfstream Model GIV-X, Gulfstream Model GV-SP, Learjet Model 45
Stretcher (5)	Cessna Model 560XL, Cessna Model 750 (Citation X), Dassault Falcon Model 2000, Gulfstream Model G-V, Learjet Model 45 Serial Number 168
Dynamic Seat Testing (4)	Bombardier BD700-1A10 Global Express, Cessna Model 750 (Citation X), Dornier 328-100, Jetstream Series 4100
Emergency exit - ditching scenario (6)	Cessna Model 680, de Havilland DHC-8-311
Emergency exit (Access) (1)	Astra SPX
Floor Distortion Test - Crew Seats (2)	Dornier 328, SAAB 2000
Width of Aisle - Evacuation (2)	Bombardier BD700-1A10 Global Express, Cessna Model 560XL
Width of Aisle - Executive Seats (2)	Gulfstream Model G-IV , Gulfstream Model G-V
Door to cargo compartment (1)	Embraer EMB-135BJ
Emergency Exit Marking (Exterior) (1)	Learjet Model 31A Serial Number 084
Emergency Exit Marking (Operating Instruction) (1)	Cessna Model 680

5.2 FURTHER ANALYSIS OF THE MOST FREQUENT CATEGORIES.

5.2.1 Multiple-Place Side-Facing Seat.

The 23 applications pertinent to multiple-place side-facing seat consist of:

- 11 Granted Exemptions (2 original applications)
- 12 Partially Granted Exemptions (11 original applications)

The regulations requiring Exemption applications, as mentioned in the documents, are:

- § CFR 25.562 Amendment 25-64
- § CFR 25.562(c) Amendment 25-64
- § CFR 25.785(a) Amendment 25-64
- § CFR 25.785(b) Amendment 25-64
- § CFR 25.785(b) Amendment 25-88

Section 25.562 Amendment 25-64 contains the requirement for dynamic testing for all seats approved for occupancy during takeoff and landing as well as the related occupant injury criteria. It should be noted that § 25.562 Amendment 25-64 is currently applicable.

The text of § 25.785(a) Amendment 25-64 is the same as § 25.785(b) Amendment 25-72 and Amendment 25-88, which is currently applicable (see appendix B). This section requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in § 25.561 and § 25.562.

The dynamic responses experienced by occupants seated on side-facing seats are different from those experienced by occupants seated on forward/aft-facing seats. Although the dynamic test conditions provided by § 25.562 Amendment 25-64 are considered applicable to side-facing seats, the pass/fail (compliance) criteria for occupant injury requirement set out in this section may not be appropriate for side-facing seats, especially for multiple occupancy. Consequently, this necessitates an exemption from § 25.785(a) Amendment 25-64/§ 25.785(b) Amendment 25-88 in the certification process.

The FAA stated that side-facing seats are considered a novel design for transport category airplanes that include Amendment 25-64 in their certification bases, which were not considered when this airworthiness requirement was formulated. The FAA produced Issue Paper CI-1 dated November 12, 1997 entitled “Dynamic Test Requirements for Side-Facing Divans (Sofas)”, which addressed the injury criteria particular to multiple-place side-facing seat. Transport Canada has also issued a Policy Letter on side-facing seats for Transport Category Airplanes (PL No. 525-003, effective date 1 December 2003), which provides guidelines concerning the application of airworthiness standards required for the approval of side-facing seats. Although these authorities have acknowledged the problem, a grant of exemption is not automatic and

applicants must justify their request for exemptions. The Authorities intend to continue to refine the compliance criteria for multiple occupancy, side-facing seating.

“Multiple-place side facing seat” applications are essentially related to corporate/executive interior configurations, which can involve both large and smaller transport airplanes. Therefore, such applications are not exclusive to smaller transport airplanes (e.g. Exemption 7392 for the installation of multiple-place side-facing seats on Boeing Model 777-2AN).

5.2.2 Interior Door.

The 14 applications pertinent to the installation of interior door consist of:

- 2 ELOS
- 9 Granted Exemptions (4 original applications)
- 2 Partially Granted Exemptions (1 original application)
- 1 Denied Exemption (1 original application)

The regulations affected, as mentioned in the ELOS/Exemption documents, are:

- § 25.813(e) Amendment 25-56
- § 25.813(e) Amendment 25-82
- § 25.813(e) Amendment 25-88
- § 25.813(e) Amendment 25-116

Section 25.813(e) at amendment numbers 25-56, 25-82, 25-88 stated that no door may be installed in any partition between passenger compartments. At Amendment 25-116, which is currently applicable, this section states:

“(e) No door may be installed between any passenger seat that is occupiable for takeoff and landing and any passenger emergency exit, such that the door crosses any egress path (including aisles, crossaisles and passageways).”

All of the Exemption petitions for interior door are related to executive configurations, which are normally configured with passenger seats less than the maximum certificated number of seats. The need for an interior door that divides passenger compartments originated from customer requests to allow private business meetings during cruise. The grant or denial of exemption took into consideration the locations of emergency exits in the cabin, the design of the door, and the type of operation the aircraft is intended for. Operational and design provisions normally accompany the granting of the exemption.

Most applications stressed that “the difference between the commercial Transport Category aircraft used in airline operation and aircraft specifically used for corporate operations (whether private or non-scheduled commercial), was not segregated in the FAR Part 25 rules”. Applicants also argued that corporate fleets utilising 14 CFR Part 25 aircraft “has now grown to a point where it is contended that the certification agencies need to consider new revised design rules for

aircraft involved in this class of operation.” However, the FAA considers that the emphasis is not on whether the aircraft is intended for airline or corporate operation, but whether it is intended for commercial or private use. Therefore, in granting the exemptions, the FAA required that the aircraft is not operated for hire or offered for common carriage (although it does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR Part 125 and 14 CFR Part 91, subpart F, as applicable).

The FAA has acknowledged that there are differences between commercial and private use (whether by an individual or a corporation) of transport category airplanes that warrant consideration of the appropriate level of safety. The FAA has identified several regulatory requirements, including installation of interior doors, which may need to be revised to address the safety issues revealed by these differences. The FAA intends to develop alternative regulatory standards that specifically apply to privately operated airplanes, primarily relating to cabin safety issues.

As with applications related to multiple-place side facing seats, interior door-related applications were essentially related to corporate/executive interior configuration, which may also involve larger transport airplanes. Therefore, this type of application is not exclusive to smaller transport airplanes (e.g. Exemption 8616 for installation of interior door in a B747-400 equipped with executive interior).

There are two ELOS for placing a belted passenger seat in the lavatory/vanity area during taxi, takeoff and landing. This type of application is likely to be more particular to smaller transport airplanes, due to their limited space.

5.2.3 Exit Signs – Visibility.

The 6 applications pertinent to the visibility of exit signs consist of:

- 5 ELOS
- 1 Denied Exemption (1 original application)

The regulations affected, as mentioned in the ELOS/Exemption documents, are:

- § 25.811 Amendment 25-88
- § 25.811(d)(1) Amendment 25-79
- § 25.811(d)(1) Amendment 25-88
- § 25.811(d)(2) Amendment 25-88
- § 25.812 Amendment 25-88
- § 25.812(b) Amendment 25-88

Section 25.811(d)(1) Amendment 25-79 and 25-88 state that there must be a passenger emergency exit locator sign above the aisle near each passenger emergency exit, or at another overhead location if it is more practical because of low headroom, which is visible to occupants approaching along the main passenger aisle.

A petition seeking exemption from the requirements of § 25.811(d)(1) stated that the intent of the requirement for an exit locator sign to be placed overhead is “peculiar to aircraft with a much larger cabin”. Because space or ceiling height is limited, aircraft manufacturers have requested that the emergency exit marker installed on the sidewall could also function as an emergency exit locator sign. It was considered that installing an emergency exit locator sign on an “overhead” location in a cabin with limited ceiling height would create a head-strike hazard to cabin occupants.

Some ELOS findings relating to emergency exit marker/locator signs are for signs with shorter letter height and less background area than that required by § 25.812(b) Amendment 25-88.

The ELOS findings and the granting or not granting of the exemption application in this category were based on the visibility and legibility of the signs. The legibility of the exit marker and locator signs must be confirmed by person(s) with 20/20 (or worse) eyesight. It must be determined that the signs are legible by occupants ranging from 5th percentile (in height) female to a 95th percentile (in height) male. The evaluation of each marker sign is to be accomplished from a standing position in the aisle opposite the exit. The evaluation of each locator sign is to be accomplished from all standing locations in the aisle, forward or aft of the sign, as appropriate.

This category is not particularly related to any specific configuration or operation. With nine smaller transport category airplane models seeking exemption/equivalent level of safety finding for the letter height/background area and location of emergency exit marker/locator sign, it may be that these requirements are more appropriate to larger transport category airplanes. With visibility and legibility being the primary consideration in certificating the design and use/location of emergency exit locator/marker signs, Authorities may need to consider reviewing the pertinent requirements in order to simplify the certification process.

5.2.4 Head Injury Criterion for Front Row Seats.

The 18 applications pertinent to the Head Injury Criterion (HIC) for front row seats consist of:

- 4 Granted Exemptions (no original applications)
- 12 Partially Granted Exemptions (4 original applications)
- 2 Denied Exemptions (1 original application)

The regulations affected, as mentioned in the Exemption documents, are:

- § 25.562(c)(5) Amendment 25-64
- § 25.785(a) Amendment 25-64

Section 25.562(c)(5) Amendment 25-64 requires that each occupant must be protected from serious head injury under the conditions prescribed in Section 25.562(b). Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units.

Section 25.785(a) Amendment 25-64 (same as § 25.785(b) Amendment 25-72/25-88), requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in § 25.561 and § 25.562.

The applications for exemption in meeting the HIC requirement for seats aft of bulkheads were mostly due to the lack of commercially viable design solutions at that time. Removal of seats to provide more head-strike clearance and restraint systems such as shoulder harness are not considered commercially viable. Most applications in this Category were for a time extension on previously granted or partially granted exemptions, in which the applicants were in the process of developing occupant protection devices for compliance with the Head Injury Criterion that they would consider commercially acceptable. Airbags and energy absorbing bulkheads are considered as optimum solutions.

A report published by the FAA (reference 3) investigated the head injury criteria (HIC) compliance problem for front-row seating in transport category airplanes. The study investigated the performance of various padding materials, none of which were found to be satisfactory. It found, based on simulations and static tests, that energy absorbing bulkheads using a simple aluminum sheet and an aluminum honeycomb panel with fiberglass facesheets could effectively attenuate HIC values to non-injurious levels. The report concluded that the HIC value for a specific design was found to be sensitive to head impact velocity, head impact angle, seat setback distance, belt properties, and the panel stiffness and strength. The studies also showed that a minimum of 2-4 in. of bulkhead crush is required to attenuate the HIC values to levels below 1000 during 16-g dynamic sled tests.

HIC compliance for front row seats has also been a problem for some larger transport airplanes (e.g. Exemption 5597 – HIC for front row seating in Boeing 777-200). However, it may be that this issue is more significant for smaller transport airplanes, where the number of seats affected are a substantial proportion of the maximum capacity.

Compliance with the occupant injury requirement (HIC less than 1000 units) ensures that occupants of front row seats have the same level of protection as other occupants. This subject has resulted in numerous applications for ELOS/Exemptions for both large and smaller transport airplanes. The pertinent requirements, however, are not restrictive in that they allow various means of compliance.

5.2.5 Emergency Exit (Type and Arrangement).

The 6 applications pertinent to the emergency exit type and arrangement consist of:

- 2 ELOS
- 1 Granted Exemption (no original applications)
- 3 Partially Granted Exemptions (3 original applications)

The regulations affected in this Category, as mentioned in the ELOS/Exemption documents, are:

- § 25.783(h) Amendment 25-72
- § 25.807(c)(1) Amendment 25-46
- § 25.807(c)(5) Amendment 25-46
- § 25.807 Amendment 25-56
- § 25.807(g)(1) Amendment 25-94
- § 25.807 Amendment 25-98
- § 25.809(a) Amendment 25-94

One of the applications for exemption from § 25.783(h) Amendment 25-72 was related to the passenger entry door not qualifying as a Type A, Type I, or Type II emergency exit. The aircraft has a two-piece “clamshell” type door, opening upwards and downwards, and the emergency exit would be the upper half of the door. The petitioner stated that for the size and capacity of the airplane (maximum 10 passengers), this configuration was considered safer than a floor-level exit, specifically in the case of a belly landing. This exemption was eventually granted based on the safety records and accident data provided by the applicant, which supported the assertion that the “clamshell” type door increased the level of safety over the floor level exit specified in the rule.

Two ELOS (for two similar airplanes, of the same make, but different models) were requested for a pair of elliptical exits with a horizontal major axis on each side of the aircraft, instead of a Type III exit or two Type IV exits as required by § 25.807 Amendment 25-56/25-98 (§ 25.807(c)(2) Amendment 25-15). Although this type of exit is smaller and has a slower egress rate than a Type IV exit, the compensating factors were considered adequate to provide an equivalent level of safety.

One petition applied for exemption from the requirements for overwing exits per § 25.807(g)(1) and per the ditching requirements of § 25.807(i)(1) Amendment 25-94 (which is under a different Category). This petition was initiated by the unique exterior fairing and interior equipment installations for its military application. Because of the exterior fairing, the airplane also required exemption from § 25.809(a) Amendment 25-94. The petition was granted, with limitations, taking into account the aircraft was intended for military operations only.

One Exemption Application was related to the accommodation for two supernumeraries, in the existing cockpit observer’s seat and a flight attendant’s seat, in certain airplanes configured with Class E Cargo Compartments. Exemption from § 25.807(c)(1) and § 25.807(c)(5) Amendment 25-46 was sought because the exit requirements for the right side of the fuselage were not met. The only emergency exit available on that side (i.e., the cockpit window) does not meet the size, access, and possibly step-up, criteria for a non-overwing Type III passenger emergency exit. Exemption from those requirements was granted due to some compensating dimensional features, close proximity to the occupied areas, small size of the maximum occupancy, and a relatively safe low sill threshold height to the ground.

The ELOS Findings and Exemptions reviewed in this study were limited and hence it cannot be concluded whether or not there is a common root cause of certification problems for smaller transport airplanes in complying with the requirements related to emergency exit arrangement.

5.2.6 Stretcher.

The 8 applications pertinent to the stretcher installations consist of:

- 8 Granted Exemptions (5 original applications)

The regulations affected, as mentioned in the Exemption documents, are:

- § 25.562 Amendment 25-64
- § 25.785(a) Amendment 25-64
- § 25.785(b) Amendment 25-72

All of the exemptions in this category were for installation of medical stretchers, or litters, for transport of persons whose medical condition dictates such accommodation. All of the exemptions were granted, with the provision that occupancy for takeoff and landing is limited to non-ambulatory persons.

The FAA agreed that stretchers for medical use were not considered in the context of the dynamic test requirements of § 25.562 when the regulation was developed. It should be noted that 14 CFR Parts 23, 27, and 29 specifically exclude litters from the dynamic test criteria, and the FAA acknowledged that 14 CFR Part 25 differs from other aircraft regulatory standards in this regard.

The FAA agreed that demonstrating compliance of medical stretchers with the requirements of § 25.562 would be difficult, and the applicability of the existing pass/fail criteria for these installations is questionable. Applicants stated that the estimated cost of demonstrating compliance of stretcher systems with dynamic test requirements is quite high, considering the limited number of units for which the cost could be amortised.

Application for such exemption is not exclusive to smaller transport category airplanes, as similar exemptions have been granted for larger transport airplanes (e.g. Exemption No. 6515, which was granted for litter installations on Boeing 777, Airbus A330, and Airbus A340 aircraft).

6. REFERENCES.

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3. Lankarani, H. M., & Mirza, M. G. (2002). *Parametric Study of Crashworthy Bulkhead Designs DOT/FAA/AR-02/103*. United States: Federal Aviation Administration.

**APPENDIX A—SUMMARY OF EQUIVALENT LEVEL OF
SAFETY FINDINGS AND EXEMPTIONS**

Appendix A contains the list of reviewed Equivalent Level of Safety Findings and Exemptions documents (table A-1) and the summary of each document (table A-2). Table A-1 contains the primary information of the reviewed ELOS/Exemptions. Table A-2 contains the summary of the background of the application, and the alternate means of compliance, or the reason for granting/not granting the exemption.

Table A-1. List of Reviewed Equivalent Level of Safety Findings and Exemptions

NO.	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	CATEGORY
1	11 September 2002	ELOS	AT5124AT-T-A-6	Embraer EMB-135BJ	44 Max	25.857 at Amendment 25-93, and 25.1447 at Amendment 25-41	Door to cargo compartment
2	10 January 1994	Exemption (Denied)	5836	Cessna Model 750 (Citation X)	12 Max	25.562 Amendment 25-64	Dynamic Seat Testing
3	16 February 1995	Exemption (Denied)	6028	Dornier 328-100	33 Max	25.562(b), 25.562(c)	Dynamic Seat Testing
4	15 June 1995	Exemption (Partially Granted)	6100	Jetstream Series 4100	30 Max, 14 Executive	25.562(a), 25.562(b), 25.562(c)	Dynamic Seat Testing
5	09 September 1996	Exemption (Denied)	6506	Bombardier BD700-1A10 Global Express	19 Max	25.562	Dynamic Seat Testing
6	28 August 1997	Exemption (Partially Granted)	6699	Astra SPX Serial Number 88 and 90	9 Max	25.813(a)	Emergency exit (Access)
7	08 March 2002	Exemption (Denied)	7737	Astra SPX	9 Max	25.813(c)(1), 25.813(c)(2)	Emergency exit (Access)
8	26 June 1996	Exemption (Partially Granted)	6468	Learjet Model 45	10 Max	25.783(h) Amendment 25-72	Emergency exit (type and arrangement)
9	29 December 1997	Exemption (Granted)	6468A	Learjet Model 45	10 Max	25.783(h)	Emergency exit (type and arrangement)
10	17 May 2000	Exemption (Partially Granted)	7212	Embraer EMB-120 () [EMB-120, -120RT, -120ER]	2 (Cargo)	25.807(c)(1) Amendment 25-46, 25.807(c)(5) Amendment 25-46, 25.807(d)(1) Amendment 25-46, 25.857(e) Amendment 25-32	Emergency exit (type and arrangement), Emergency exit – ditching scenario
11	28 August 2003	ELOS	AT5080AT-T-A-2	Gulfstream Model GIV-X	19 Max	25.807 at Amendment 25-56, including 25.807(c)(2) at Amendment 25-15	Emergency exit (type and arrangement)
12	07 September 2004	ELOS	AT5177AT-T-A-2	Gulfstream Model GV-SP	19 Max	25.807 at Amendment 25-98	Emergency exit (type and arrangement)

NO.	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	CATEGORY
13	03 December 2004	Exemption (Partially Granted)	<u>8453</u>	Gulfstream Model GV-SP	6 (Military)	25.807(g)(1) Amendment 25-94, 25.807(i)(1) Amendment 25-94, 25.809(a) Amendment 25-94	Emergency exit (type and arrangement) , Emergency exit – ditching scenario
14	20 January 1994	Exemption (Granted)	<u>5832</u>	Learjet Model 31A Serial Number 084	8 Max	25.811(f)(1), 25.811(f)(2)	Emergency Exit Marking (Exterior)
15	14 April 2004	ELOS	<u>TC2548WI-T-AG-5</u>	Cessna Model 680	13 Max	25.811(e)(4)	Emergency Exit Marking (Operating Instruction)
16	24 December 1990	Exemption (Granted)	<u>5260</u>	de Havilland DHC-8-311	56 Max	25.807(d), 25.1557(d), 121.310(f)(6)	Emergency Exit - ditching scenario
17	21 January 2004	ELOS	<u>TC2548WI-T-AG-1</u>	Cessna Model 680	13 Max	25.807(i)	Emergency Exit - ditching scenario
18	27 December 1995	Exemption (Denied)	<u>6251</u>	Cessna Model 750 (Citation X)	12 Max	25.811(d)(1)	Exit signs - visibility
19	23 July 2002	ELOS	<u>SP5109SE-T-C-1</u>	Bombardier BD700-1A10 Global Express	19 Max	25.811, 25.812 Amendment 25-88	Exit signs - visibility
20	30 September 2002	ELOS	<u>ST3302WI-T-A-1</u>	Dassault Falcon Models 50, 900, and 900EX	Max 19	25.811(d)(1), 25.811(d)(2), 25.812(b)(1)(i)	Exit signs - visibility
21	28 August 2003	ELOS	<u>AT5177AT-T-C-1</u>	Gulfstream Model GV-SP and GIV-X	19 Max	25.812(b) at Amendment 25-88	Exit signs - visibility
22	07 October 2003	ELOS	<u>ANM-113-04-01</u>	Bombardier BD-100-1A10 (Challenger 300)	15 Max	25.811(d)(1), 25.812(b)(1)(i)	Exit signs - visibility
23	09 April 2004	ELOS	<u>TC2548WI-T-AG-4</u>	Cessna Model 680	13 Max	25.811(d)(1), 25.812(b)(1)	Exit signs - visibility
24	28 September 2005	ELOS	<u>TC-0067-AT-C-1</u>	Gulfstream Model G150	Flight crew only (Green configuration)	25.812(a)(1), 25.812(c), 25.812(d), 25.812(e)	N/A (not considered in analysis)
25	30 June 1993	Exemption (Partially Granted)	<u>5704</u>	Dornier 328	33 Max	25.562(b)(2) Amendment 25-64	Floor Distortion Test - Crew Seats
26	30 June 1994	Exemption (Partially Granted)	<u>5704A</u>	Dornier 328	33 Max	25.562(b)(2) Amendment 25-64	Floor Distortion Test - Crew Seats
27	(December 1994)	Exemption (Granted)	<u>5704B</u>	Dornier 328	33 Max	25.562(b)(2) Amendment 25-64	Floor Distortion Test - Crew Seats
28	(June 1995)	Exemption (Granted)	<u>5704C</u>	Dornier 328	33 Max	25.562(b)(2) Amendment 25-64	Floor Distortion Test - Crew Seats
29	02 June 1995	Exemption (Denied)	<u>6097</u>	Dornier 328	33 Max	25.562(b)(2)	Floor Distortion Test - Crew Seats
30	31 December 1991	Exemption (Partially Granted)	<u>5623B</u>	SAAB 2000	53 Max	25.562(c)(5) Amendment 25-64	HIC for front row seats
31	19 October 1993	Exemption (Partially Granted)	<u>5765</u>	Dornier 328	33 Max	25.562(c)(5) Amendment 25-64	HIC for front row seats

NO.	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	CATEGORY
32	29 December 1993	Exemption (Partially Granted)	<u>5587A</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	HIC for front row seats
33	13 June 1994	Exemption (Partially Granted)	<u>5765A</u>	Dornier 328	33 Max	25.562(c)(5) Amendment 25-64	HIC for front row seats
34	05 August 1994	Exemption (Denied)	<u>5983</u>	SAAB 2000	53 Max	25.562(c)(5) Amendment 25-64	HIC for front row seats
35	30 December 1994	Exemption (Partially Granted)	<u>5765B</u>	Dornier 328	33 Max	25.562(c)(5) Amendment 25-64	HIC for front row seats
36	31 December 1995	Exemption (Partially Granted)	<u>5623C</u>	SAAB 2000	53 Max	25.562(c)(5)	HIC for front row seats
37	09 April 1996	Exemption (Partially Granted)	<u>6420</u>	Learjet Model 45	10 Max	25.562(c)(5), 25.785(a)	HIC for front row seats
38	23 December 1996	Exemption (Partially Granted)	<u>5587D</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	HIC for front row seats
39	23 December 1996	Exemption (Partially Granted)	<u>5623D</u>	SAAB 2000	53 Max	25.562(c)(5)	HIC for front row seats
40	15 September 1997	Exemption (Partially Granted)	<u>5587E</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	HIC for front row seats
41	23 February 1998	Exemption (Denied)	<u>6732</u>	Embraer EMB- 145	50 Max	25.562(c)(5), 25.785(a)	HIC for front row seats
42	31 March 1998	Exemption (Granted)	<u>5587F</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	HIC for front row seats
43	02 June 1998	Exemption (Granted)	<u>6776</u>	Jetstream Series 4100 Registration N333UE	30 Max	25.785(a), 25.562(c)(5)	HIC for front row seats
44	21 November 2000	Exemption (Granted)	<u>5587G</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	HIC for front row seats
45	22 December 2000	Exemption (Granted)	<u>6776A</u>	Jetstream Series 4100 Registration N333UE	30 Max	25.785(a), 25.562(c)(5)	HIC for front row seats
46	(November / December 1994)	Exemption (Partially Granted)	<u>5587B</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	HIC for front row seats
47	03 March 1993	Exemption (Partially Granted)	<u>5623</u>	SAAB 2000	53 Max	25.562(b)(2) Amendment 25-64, 25.562(c)(5)	HIC for front row seats; Floor Distortion Test - Crew Seats
48	15 March 1989	Exemption (Denied)	<u>5029</u>	Dassault Falcon Model Mystere- Falcon 900	19 Max, 5-12 Executive	25.813(e) Amendment 25-56	Interior Door
49	29 June 2000	Exemption (Granted)	<u>7259</u>	Bombardier BD700-1A10 Global Express	19 Max, 15 Executive	25.813(e)	Interior Door
50	07 March 2001	Exemption (Granted)	<u>7455</u>	Bombardier BD700-1A10 Global Express	19 Max, 15 Executive	25.813(e)	Interior Door

NO.	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	CATEGORY
51	20 July 2001	Exemption (Granted)	<u>7573</u>	Bombardier BD700-1A10 Global Express	19 Max, 15 Executive	25.813(e)	Interior Door
52	10 August 2001	Exemption (Granted)	<u>7590</u>	Dassault Falcon Models Mystere Falcon 900 and Falcon 900EX	19 Max	25.813(e)	Interior Door
53	27 November 2001	Exemption (Granted)	<u>7668</u>	Dassault Falcon Models Mystere Falcon 900 and Falcon 900EX	19 Max	25.813(e)	Interior Door
54	18 September 2002	Exemption (Partially Granted)	<u>7891</u>	Bombardier BD700-1A10 Global Express	19 Max	25.813(e)	Interior Door
55	09 January 2003	Exemption (Partially Granted)	<u>7946</u>	Gulfstream Model GV-SP	19 Max	25.813(e)	Interior Door
56	03 September 2003	Exemption (Granted)	<u>8123</u>	Dassault Falcon Models Mystere Falcon 900 and Falcon 900EX	19 Max	25.813(e)	Interior Door
57	19 December 2003	Exemption (Granted)	<u>8199x</u>	Dassault Falcon Models Mystere Falcon 900 and Falcon 900EX	19 Max	25.813(e)	Interior Door
58	09 April 2004	ELOS	<u>TC2548WI-T-AG-2</u>	Cessna Model 680	13 Max	25.813(e)	Interior Door
59	19 January 2005	ELOS	<u>ST4805NY-SE-1</u>	Bombardier BD-100-1A10 (Challenger 300)	15 Max	25.813(e) at Amendment 25-88	Interior Door
60	13 June 2005	Exemption (Granted)	<u>7259A</u>	Bombardier BD700-1A11 Global 5000	19 Max	25.813(e)	Interior Door
61	03 October 2005	Exemption (Granted)	<u>8621</u>	Cessna Model 560XL	12 Max	25.813(e), Amendment 25-82	Interior Door
62	29 November 1994	Exemption (Partially Granted)	<u>5991</u>	Dassault Falcon Model 2000	19 Max	25.562(c) Amendment 25-64	Multiple-place side-facing seat
63	25 April 1996	Exemption (Partially Granted)	<u>6432</u>	Cessna Model 750 (Citation X)	12 Max	25.562 Amendment 25-64	Multiple-place side-facing seat
64	18 January 2000	Exemption (Partially Granted)	<u>7104</u>	Dassault Falcon Model 2000	19 Max	25.785(a) Amendment 25-64	Multiple-place side-facing seat
65	15 February 2000	Exemption (Partially Granted)	<u>7120</u>	Bombardier BD700-1A10 Global Express	19 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat

NO.	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	CATEGORY
66	02 August 2000	Exemption (Partially Granted)	<u>7296</u>	Israel Aircraft Industries Galaxy (A53NM) model	19 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat
67	17 November 2000	Exemption (Partially Granted)	<u>7120A</u>	Bombardier BD700-1A10 Global Express	19 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat
68	07 September 2001	Exemption (Partially Granted)	<u>7625</u>	Cessna Model 680	13 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat
69	14 June 2002	Exemption (Partially Granted)	<u>7811</u>	Embraer Model EMB135-BJ Legacy	44 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat
70	09 September 2002	Exemption (Partially Granted)	<u>7878</u>	Embraer Model EMB135-BJ Legacy	44 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat
71	16 September 2002	Exemption (Partially Granted)	<u>7884</u>	Bombardier BD-100-1A10 (Challenger 300)	15 Max, 8 Executive	25.785(b) Amendment 25-88	Multiple-place side-facing seat
72	20 November 2002	Exemption (Partially Granted)	<u>7922</u>	Cessna Model 750 (Citation X)	12 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat
73	23 December 2002	Exemption (Granted)	<u>7120B</u>	Bombardier BD700-1A10 Global Express	19 Max	25.785(b)	Multiple-place side-facing seat
74	31 March 2003	Exemption (Partially Granted)	<u>8007</u>	Dassault Falcon Model 2000EX	19 Max	25.785(b)	Multiple-place side-facing seat
75	02 September 2003	Exemption (Granted)	<u>7120C</u>	Bombardier BD700-1A10 Global Express	19 Max	25.785(b)	Multiple-place side-facing seat
76	02 September 2003	Exemption (Granted)	<u>7884A</u>	Bombardier BD-100-1A10 (Challenger 300)	15 Max, 8 Executive	25.785(b)	Multiple-place side-facing seat
77	24 November 2003	Exemption (Granted)	<u>7296A</u>	Gulfstream Model 200 / IAI Galaxy	19 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat
78	24 November 2003	Exemption (Granted)	<u>7625A</u>	Cessna Model 680	13 Max	25.785(b)	Multiple-place side-facing seat
79	01 December 2003	Exemption (Granted)	<u>7104A</u>	Dassault Falcon Model 2000	19 Max	25.785(a) Amendment 25-64	Multiple-place side-facing seat
80	01 December 2003	Exemption (Granted)	<u>8007A</u>	Dassault Falcon Model 2000EX	19 Max	25.785(b)	Multiple-place side-facing seat
81	24 December 2003	Exemption (Granted)	<u>7878A</u>	Embraer Model EMB135-BJ Legacy	44 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat
82	24 December 2003	Exemption (Granted)	<u>7922A</u>	Cessna Model 750 (Citation X)	12 Max	25.785(b) Amendment 25-64	Multiple-place side-facing seat
83	22 February 2005	Exemption (Granted)	<u>8498</u>	Gulfstream Model G150	9 Max	25.785(b)	Multiple-place side-facing seat

NO.	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	CATEGORY
84	13 June 2005	Exemption (Granted)	<u>7120D</u>	Bombardier BD700-1A11 Global 5000	19 Max	25.785(b)	Multiple-place side-facing seat
85	01 February 1994	Exemption (Granted)	<u>5832A</u>	Learjet Model 31A Serial Number 084	8 Max	25.811(f)(1), 25.811(f)(2)	N/A (Correction)
86	26 April 1996	Exemption (Partially Granted)	<u>6420A</u>	Learjet Model 45	10 Max	25.562(c)(5), 25.785(a)	N/A (Correction)
87	01 July 1999	Exemption (Granted)	<u>6911</u>	Gulfstream Model G-V Serial numbers 560, 569, 573.	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25-64]	Stretcher
88	13 July 1999	Exemption (Granted)	<u>6920</u>	Dassault Falcon Model 2000	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25-64]	Stretcher
89	23 August 1999	Exemption (Granted)	<u>6952</u>	Cessna Model 560XL	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25-64]	Stretcher
90	02 May 2000	Exemption (Granted)	<u>7189</u>	Gulfstream Model G-V	Air Ambulance	25.562, 25.785(b) Amendment 25-72	Stretcher
91	16 August 2000	Exemption (Granted)	<u>7318</u>	Cessna Model 560XL	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25-64]	Stretcher
92	14 May 2002	Exemption (Granted)	<u>7769</u>	Learjet Model 45 Serial Number 168	Air Ambulance	25.562, 25.785(b)	Stretcher
93	03 October 2003	Exemption (Granted)	<u>8140</u>	Gulfstream Model G-V	Air Ambulance	25.562 Amendment 25-64, 25.785(b) Amendment 25-72	Stretcher
94	(March/April 1997)	Exemption (Granted)	<u>6625</u>	Cessna Model 750 (Citation X)	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25-64]	Stretcher
95	23 August 2002	ELOS	<u>SP2095WI-T-AG-8</u>	Cessna Model 560XL	12 Max	25.815	Width of Aisle - Evacuation
96	27 September 2002	Exemption (Denied)	<u>7893</u>	Bombardier BD700-1A10 Global Express	19 Max	25.815 Amendment 25-38	Width of Aisle - Evacuation
97	26 October 1999	Exemption (Partially Granted)	<u>7054</u>	Gulfstream Model G-IV Serial Numbers 1348 to 1390	19 Max	25.815	Width of Aisle - Executive Seats
98	26 October 1999	Exemption (Partially Granted)	<u>7055</u>	Gulfstream Model G-V Serial Numbers 554 to 583	19 Max	25.815	Width of Aisle - Executive Seats

Table A-2. Summary of Equivalent Level of Safety Findings and Exemptions Reviewed

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
1	11 September 2002	ELOS	<u>AT5124AT-T-A-6</u>	Embraer EMB- 135BJ	44 Max	25.857 at Amendment 25- 93, and 25.1447 at Amendment 25-41	The EMB-135BJ model interior configuration presents a door in the partition panel between the Class C cargo compartment, located at the aft end of the cabin, and the passenger compartment. This door is intentionally designed to provide in-flight access to the cargo compartment. Such in-flight access could impact the isolation of the passenger cabin from the cargo compartment in the event that any fire or smoke starts within the cargo compartment. In addition, the in-flight access to the Class C compartment creates unique hazards resulting from passengers having access to cargo and baggage in the compartment. Embraer has demonstrated compliance to additional requirements that provide an equivalent level of safety to ensure sufficient cabin isolation from fire and smoke, and for passenger safety while occupying the Class C compartment.	Means shall be provided to indicate to the pilot in real time, during all aircraft operation, if the cargo compartment door is closed or open; Means must be provided to keep the door open while the cargo compartment is occupied; Oxygen dispensing units shall be automatically presented and immediately available to an occupant of the baggage compartment with at least one extra unit available, but no oxygen shall be plumbed to the compartment. In the case of the EMB-135BJ, the FAA concurs that the lavatory oxygen masks would meet this requirement; For cargo and baggage placed in the baggage compartment whose primary retention means is by net, the net shall be constructed so that the means of opening and closing or securing the net is easily identified and operated.	Door to cargo compartment

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
2	10 January 1994	Exemption (Denied)	<u>5836</u>	Cessna Model 750 (Citation X)	12 Max	25.562 Amendment 25-64	Petition for exemption from the dynamic seat testing requirements of 14 CFR 25.562, which was promulgated by Amendment 25-64, of the Code of Federal Regulations (CFR), for the cockpit forward observer seat on the Cessna Model 750 Citation X (ten) airplane; Section 25.562, which was promulgated by Amendment 25-64, requires that each seat and restraint system in the airplane that is approved for crew or passenger occupancy during takeoff or landing must be designed as prescribed in this section to protect each occupant during an emergency landing condition when: (1) proper use is made of seats, safety belts, and shoulder harnesses provided for in the design; and (2) the occupant is exposed to loads resulting from the conditions prescribed in this section. The regulatory standards include a specification to successfully demonstrate, by dynamic tests, the capability of the seat and restraint system to protect the occupant during the dynamic tests conducted in accordance with this section. The standards include performance measures that must not be exceeded.	This observer seat will be used exclusively by FAA personnel for en route inspections only. It should be understood that en route means all flight segments including takeoff and landing. The principal argument offered in support of the exemption is based on the belief that it would be economically impractical, if technically achievable, to design a portable seat to meet the new dynamic criteria. Implicit in the petitioner's supporting arguments is the presumption that, due to the exclusive and limited use of the observer's seat, the crashworthiness standards should be relaxed. The preamble to Amendment 25-64, in responding to a commenter, clearly states that crewmembers are entitled to the same level of safety as the passengers. Although an FAA inspector is not considered a crewmember while performing en route inspections, he is entitled to the same level of protection as a crewmember. The cost associated with dynamic testing of the observer's seat should be no greater than that associated with dynamic testing of any other seat in the airplane.	Dynamic Seat Testing
3	16 February 1995	Exemption (Denied)	<u>6028</u>	Dornier 328- 100	33 Max	25.562(b), 25.562(c)	Petition for exemption from performing the emergency landing dynamic tests required by §§ 25.562(b) and (c), for seating on Corning's Dornier 328-100 aircraft. Section 25.562(b) defines the emergency landing conditions that crew and passenger seats intended for occupancy during takeoff and landing must be qualified for either by test or rational analysis. These conditions include 14g downward vertical loads, and 16g longitudinal loads with yaw and floor misalignment. Section 25.562(c) defines the structural integrity and occupant protection success criteria associated with the conditions defined in § 25.562(b).	Notwithstanding any variations that may exist in safety records among different airplanes and types of operations, it is clear that the requirements of Amendment 25-64 were intended to be applied to all part 25 airplanes, regardless of airplane size or type of operations, and that the goal was to foster an overall enhancement in transport category airplane safety; The FAA anticipates that upon a thorough examination of the actual costs incurred in accomplishing required testing, the cost burden could be considerably less than estimated, and consistent with that already absorbed by other entities similar to Corning; the FAA notes that although Corning asserts that granting the petition would be in the public interest, no reasons for this view, as required by § 11.25, were offered.	Dynamic Seat Testing

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4	15 June 1995	Exemption (Partially Granted)	<u>6100</u>	Jetstream Series 4100	30 Max, 14 Executive	25.562(a), 25.562(b), 25.562(c)	Petition for an exemption from § 25.562(a), (b) and (c) of the Code of Federal Regulations (CFR), to allow installation of "executive seating" in Jetstream Model 4100 airplanes, until such time as design solutions are available. Section 25.562(a) requires that each occupant must be protected from serious injury under emergency landing conditions. Section 25.562(b) specifies the dynamic test conditions under which injury protection must be demonstrated. Section 25.562(c) provides the pass/fail criteria for both seat and restraint system performance and human injury parameters.	Lack of a TSO authorization by itself is not a barrier to issuance of an STC; FAA is aware of only one issue that affects compliance with part 25. This issue relates to the particular structural capabilities of the seat leg, and requires further discussion; due to the short time available until the airplane's experimental certificate of airworthiness expires, the FAA will grant a temporary exemption for this one issue to allow time for discussion and resolution; three months is considered an acceptable interval for resolution of this issue; FAA concurs that relief is warranted to the extent needed to resolve the seat leg structural issues, there is neither need nor justification for relief from compliance with § 25.562 in any other respect; It must also be noted that no relief from the provisions of § 25.561 is granted; This exemption expires on September 15, 1995.	Dynamic Seat Testing
5	09 September 1996	Exemption (Denied)	<u>6506</u>	Bombardier BD700-1A10 Global Express	19 Max	25.562	Petition for an exemption from the emergency landing dynamic conditions of § 25.562 of the Code of Federal Regulations (CFR), for the Model BD-700-1A10 airplane. The manufacturer refers to the Model BD-700-1A10 for sales purposes as the Global Express. Section 25.562 requires that each seat type design approved for crew or passenger occupancy during takeoff and landing must successfully complete dynamic tests. The tests must be conducted with an occupant simulated by a 170-pound anthropomorphic test dummy. The seat and supporting structure must not fail during the test. Also, injury criteria are provided that must not be exceeded during the test.	All newly certificated airplanes, for which application for type certification was made on or after May 17, 1988, have been required to comply with the provisions of this amendment; Although the dynamic seat test regulation was unpopular with the industry during its promulgation, it has since gained acceptance by many seat and airframe designers; All new certification projects initiated since 1988 have been required to show compliance with most of the provisions of § 25.562. Partial exemptions have been granted for the head injury criteria (HIC) in front row seats and for the floor warpage requirement for crew seats on airplanes having a minimum of 40 inches of frangible structure between the flightcrew floor and the lower contour of the fuselage. The FAA has also granted exemption from the HIC on executive type airplanes where shoulder straps were installed on all seats; The argument that compliance with the rule would put the petitioner at an economic disadvantage is not supported by any factual evidence.	Dynamic Seat Testing

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6	28 August 1997	Exemption (Partially Granted)	<u>6699</u>	Astra SPX Serial Number 88 and 90	9 Max	25.813(a)	Petition for an exemption from the requirements of 14 CFR § 25.813(a), to permit an interior arrangement that does not provide the required passageway to the main entry door of the Astra SPX airplane. Section 25.813(a) requires that an unobstructed passageway, 20" in width, be provided to each Type I emergency exit.	The FAA notes that the minimum passageway width occurs at a relatively low height above the floor, where it would be expected to have the least impact on egress of passengers. Since Type II and larger exits are required to have specified passageways, the observer seat installation on the C-38 effectively "de-rates" the entry door (the entry door becomes an oversized Type III exit), and therefore does not comply with § 25.783. The airplane could be said to have three fully qualified exits (where only two are required). Passengers on these airplanes (military personnel) will not be the typical flying public, and can be instructed to a higher level of proficiency regarding the emergency evacuation procedures for the airplane. The petitioner has conducted evacuation testing showing that the observer seat does not constitute a significant impediment to trained crew. The FAA finds that the entry door is still a viable means of egress for the number of occupants on board. This exemption is limited to airplanes S/N 88 & 90/operations by/on behalf of US military service.	Emergency exit (Access)
7	08 March 2002	Exemption (Denied)	<u>7737</u>	Astra SPX	9 Max	25.813(c)(1), 25.813(c)(2)	Petition for an exemption from the requirements of §§ 25.813(c)(1) and (c)(2) of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would permit installation of adjustable seats that could encroach into the projected opening of the Type III exit on the Astra SPX airplane. Section 25.813(c)(1) requires that there be access from the nearest aisle to each emergency exit. Section 25.813(c)(2) requires that, for each Type III exit, the projected opening of the exit provided may not be obstructed by seats or other protrusions for a distance inboard equal to the width of a passenger seat. On airplanes with 19 or fewer passengers, an exception is made to permit minor obstructions provided the effectiveness of the exit is not reduced.	§ 25.813 actually refers to "seatbacks in any position," when describing the requirement for an unobstructed exit opening. In addition, FAA policy on this specific issue is provided in memorandums dated May 29, 1991 and October 15, 1991. These memorandums state that crew procedures and placard are not adequate for ensuring that seats will be relocated to the appropriate locations and remain in those locations during taxi, take-off and landing, to ensure that the exits can be opened in case of an emergency; that the necessary modifications were not made originally does not compel the FAA to continue to accept non-compliant configurations.	Emergency exit (Access)

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8	26 June 1996	Exemption (Partially Granted)	<u>6468</u>	Learjet Model 45	10 Max	25.783(h) Amendment 25-72	Petition for exemption from the passenger entry door emergency exit requirements of § 25.783(h) for the Lear 45 airplane. Section 25.783(h) requires that each passenger entry door in the side of the fuselage must qualify as a Type A, Type I, or Type II passenger emergency exit and must meet the requirements of §§ 25.807 through 25.813 that apply to that type of passenger emergency exit.	The Lear 45 is already in a considerable degree of compliance with the requirements of § 25.783(h) from which exemption is sought. The FAA estimates that only relatively minimal reconfigurations should be necessary to satisfy most of the several remaining aspects of § 25.783(h) compliance. The petitioner has not convincingly shown (as required by § 11.25(b)(5)) either that the proposals would not adversely affect safety or that they would provide a level of safety equal to that provided by the rule from which exemption is sought. An interval of time in which to fully comply with certification requirements is granted. Exemption expires June 15, 1998.	Emergency exit (type and arrangement)
9	29 December 1997	Exemption (Granted)	<u>6468A</u>	Learjet Model 45	10 Max	25.783(h)	Section 25.783(h) requires that each passenger entry door in the side of the fuselage must qualify as a Type A, Type I, or Type II passenger emergency exit and must meet the requirements of §§ 25.807 through 25.813 that apply to that type of passenger emergency exit. "The relief would allow part of the cabin entry door to be used as a qualified emergency exit. The exit would be the upper portion of the two-piece clamshell cabin entry door. The exit exceeds the requirements to qualify as a Type III exit, exceeds the width requirement of a Type II exit and, in fact, the area provided is 50% greater than the Type II exit area. The exit will comply with § 25.807(a)(3) and the applicable sections of §§ 25.807(b) through 25.813 as required by the remainder of § 25.783(h)."	Clamshell door has not adversely affected safety from historical data; retrofit would be very expensive and against public interest.	Emergency exit (type and arrangement)
10	17 May 2000	Exemption (Partially Granted)	<u>7212</u>	Embraer EMB- 120 () [EMB- 120, -120RT, - 120ER]	2 (Cargo)	25.807(c)(1) Amendment 25- 46, 25.807(c)(5) Amendment 25- 46, 25.807(d)(1) Amendment 25- 46, 25.857(e) Amendment 25-32	Petition for exemption from the requirements of §§ 25.807(g)(1), 25.807(i)(1), and 25.857(e) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit the accommodation of a total of up to two supernumeraries in the existing cockpit observer's seat and the existing single forward flight attendant's seat on Embraer EMB-120() airplanes modified with a Class E cargo compartment. Section 25.807(c)(1) & (c)(5), as amended by Amendment 25-46, together require that for a passenger seating configuration (crewmember seats not included) of from 1 to 9,	Sections 25.807(c)(1) & (c)(5): Compliance with these requirements for the left side of the fuselage are met with the Type I entry door emergency exit. Exemption [for use of cockpit window in lieu of non-overwing Type III] from those requirements is granted due to some compensating dimensional features noted, close proximity to the occupied areas, small size of the maximum occupancy, and a relatively safe low sill threshold height to the ground. The exemption in this regard is conditioned on this exit having been modified from its	Emergency exit (type and arrangement), Emergency exit – ditching scenario

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							<p>there must be at least an overwing Type IV emergency exit on each side of the fuselage, except that, if overwing exits can not be provided due to vertical wing locations, those exits must be sized to have at least the dimensions of a Type III exit. Section 25.807(d)(1), as amended by Amendment 25-46, requires that for an airplane passenger seating configuration, excluding pilots seats, of 9 seats or less, a ditching emergency exit above the waterline and meeting the dimensions of a Type IV exit must be provided on each side of the fuselage. Section 25.857(e), as amended by Amendment 25-32, defines the attributes of a Class E cargo compartment, and requires that a Class E cargo compartment may not be on any airplane other than one used only for the carriage of cargo (i.e., occupants other than flightcrew not permitted). NOTE: The petitioner erroneously cited the current § 25.807(g)(1) and § 25.807(i)(1) as the section from which exemption is sought. Although the citations differ, the requirements in this instance are the same.</p>	<p>original type design configuration into one that is openable from both the outside and inside, in order to comply with the requirements of § 25.783(b). Section 25.807(d)(1): If the Type I exit is above the waterline, it should be considered as the primary ditching exit on that side, due to the ease of egress through that exit. If the two cockpit windows are the only two emergency exits above the waterline, then exemption is granted from the Type IV dimensional requirements, due to the compensating dimensional features noted. Section 25.857(e): One major concern in permitting occupancy by noncrewmembers outside the flight deck on such airplanes is in ensuring that there is a suitable means for preventing smoke penetration into this occupied area. Another concern is that the persons allowed on board the airplane are limited to those who are briefed on emergency equipment and procedures, and are found by the operator to be both physically fit and willing to use the emergency equipment and means of emergency egress provided. The petitioner appears to satisfy these concerns by providing a smoke curtain, and by acknowledging that certain limitations on the occupants is appropriate. As a condition of this exemption, existing pertinent emergency procedures defined in the FAA-approved Airplane Flight Manual (AFM) specifically for the EMB-120() airplane with a Class E cargo compartment shall be observed. Alternatively, if that has not been already addressed, such as it typically is during initial type certification, those procedures shall be developed and FAA-approved to the satisfaction of the cognizant FAA ACO. As a condition of this exemption, substantiation shall be provided to the satisfaction of the cognizant FAA ACO that sufficient supplemental oxygen is available for all occupants at the cabin altitudes prescribed for the maximum anticipated flight durations under emergency conditions. As a condition of this exemption, it shall be confirmed by the cognizant FAA ACO that the proposed</p>	

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								audio and visual means for notifying the supernumerary of a decompression event are adequate under all ambient noise and lighting conditions likely to be encountered.	
11	28 August 2003	ELOS	<u>AT5080AT-T-A-2</u>	Gulfstream Model GIV-X	19 Max	25.807 at Amendment 25- 56, including 25.807(c)(2) at Amendment 25-15	Gulfstream Aerospace Corporation (GAC) is updating the design of their GIV business jet aircraft to a derivative model known as the GIV-X. The GIV-X certification basis has been set as 14 CFR Part 25 at Amendment 25-101 for the modified areas of the GIV. GAC has requested to maintain the original certification basis of the GIV for the oval emergency exit windows with a horizontal major axis. The original certification basis is § 25.807 at Amendment 25-56 including § 25.807(c)(2) at Amendment 25-15. Gulfstream plans to demonstrate an equivalent level of safety to that rule.	Larger than required main entry door, increased number of exits, configuration specific emergency briefing cards, required pre-flight safety briefing on the configuration specific egress procedures and exits.	Emergency exit (type and arrangement)
12	07 September 2004	ELOS	<u>AT5177AT-T-A-2</u>	Gulfstream Model GV-SP	19 Max	25.807 at Amendment 25-98	Gulfstream aircraft have traditionally incorporated two pairs of overwing emergency exits, each being a 19" x 26" ellipse with its long axis parallel to the floor. Gulfstream proposed continuing the use of these exits on the GV-SP airplane. The FAA determined that the GV-SP emergency exits would be subject to the requirements of § 25.807 at Amendment 25-98, which requires a Type III exit for an aircraft of this passenger capacity. The Type III exit is a rectangular opening, not less than 20" x 36", with its long axis oriented vertically.	An additional crewmember for directing evacuation in flights with 10-19 pax; Preflight briefing on method of evacuating; Flight crew evacuation training as part of type rating; A type I entry door (larger than the required Type II); An excess pair of elliptical exit on the left side; Improved ditching characteristics; Lighter/smaller hatch; Passenger emergency briefing cards.	Emergency exit (type and arrangement)

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13	03 December 2004	Exemption (Partially Granted)	<u>8453</u>	Gulfstream Model GV-SP	6 (Military)	25.807(g)(1) Amendment 25- 94, 25.807(i)(1) Amendment 25- 94, 25.809(a) Amendment 25-94	Petition for an exemption from Title 14, Code of Federal Regulations (14 CFR) 25.807(g)(1) and 25.807(i)(1). The requested exemption, if granted, would permit relief from the requirements of these regulations to allow carriage of six non-crewmembers (commonly referred to as supernumeraries) on Gulfstream Model GV-SP (G550) airplanes which have been converted from a passenger to a Compact Airborne Early Warning (CAEW) configuration. Section 25.807(g)(1), Amendment 25-94, requires that in airplanes having a passenger seating configuration of 1 to 9 seats, there must be at least one Type IV or larger overwing exit in each side of the fuselage. Section 25.807(i)(1), Amendment 25-94, requires that airplanes having a passenger seating configuration of 1 to 9 seats must have at least one exit above the waterline in each side of the airplane, meeting at least the dimensions of a Type IV exit. [The addition of the external fairing hatches is not in compliance with § 25.809(a), which requires an unobstructed opening to the outside. Although not identified by the petitioner, the FAA views an exemption from § 25.809(a) as necessary.]	The airplane is operated for government use only. The government use operation is intended to include the specific 'military like' mission activity, and any associated training, maintenance and ferry flights. The specific modifications of this airplane interior and exterior are appropriate only for flights related to the specific mission. The airplane may not be used in common carriage or for hire operations; All crewmembers and supernumeraries are trained regarding the operation of the emergency exit and the external fairing hatch. This petitioner's proposed training must be acceptable to the FAA Aircraft Certification Office as part of the Supplemental Type Certificate process; Occupancy in the airplane is restricted to a minimum of two crew, and maximum of six supernumeraries (maximum of eight occupants total). It must be demonstrated with the interior arrangement installed, or an acceptable mock-up that occupants representing the 5th percentile female and the 95th percentile male can open and egress through the overwing elliptical and external fairing hatch exits; The pilot in command must make the determination that all occupants can operate and egress through the overwing elliptical and external fairing hatch exits prior to each flight; The design of the external fairing hatch exits must meet the requirements of the Type IV exit and include an adequate viewing window so the airplane occupants can assess the external conditions, such as a fire, and make a determination of the most appropriate exit to use in the event of evacuation; The interior arrangement must not interfere with the access to and use of the emergency exits.	Emergency exit (type and arrangement), Emergency exit – ditching scenario

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14	20 January 1994	Exemption (Granted)	<u>5832</u>	Learjet Model 31A Serial Number 084	8 Max	25.811(f)(1), 25.811(f)(2)	Mr. Richard A. Henson, Salisbury/Wicomico Airport, Salisbury, Maryland 21801, petitioned for an exemption from the provisions of Part 25 of the Code of Federal Regulations (CFR) to permit type certification of his Learjet Model 31A without the required emergency exit outline bands. Although not specifically mentioned in the petition, that requirement is contained in § 25.811(f)(1) and (2) of the CFR. Section 25.811(f) specifies that 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 airplane. Subparagraphs (f)(1) and (2) of that section, which were adopted in March 1965, further specify that the outside marking for each passenger emergency exit in the side of the fuselage must include a 2-inch colored band outlining the exit and that the band must have color contrast to be readily distinguishable from the surrounding fuselage surface.	Aircraft will not be used for commercial activities, cabin length (20ft) small compared to typical transport category airplane, Model 31A and 35A have identical exit arrangements but Model 35A does not require marking due to earlier TC date, small fuselage allows exit to be easily identified, 25.811(f) still need to be met, not relief from 121.310(g) or 135.178(g) should the airplane enters commercial services at later date.	Emergency Exit Marking (Exterior)
15	14 April 2004	ELOS	<u>TC2548WI-T-AG-5</u>	Cessna Model 680	13 Max	25.811(e)(4)	The Main Cabin Door for the Model 680 Sovereign is a Type I exit and this door complies with § 25.783(h), which references §§ 25.807 through 25.813, except it does not comply with § 25.811(e)(4). The main cabin door handle for the Model 680 has a rotational motion that is perpendicular to the plane of the door and is mounted on a shaft on the forward edge of the door's integral steps. The door handle is closed when the handle is in its up position. Installation of the curved arrow markings defined in § 25.811(e)(4) is not possible because the handle rotates perpendicular to the door rather than parallel and there is not a visible surface adequate to affix the curved markings because of the doors integral stair design.	Door and handle operating instruction markings are located directly under the handle's closed location on top of the first integral door step, the red arrow mounted on the doorsteps meet the 25.811(e)(4)(i) requirements, the word printed at the head of the arrow meets 25.811(e)(4)(iii) requirements.	Emergency Exit Marking (Operating Instruction)

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16	24 December 1990	Exemption (Granted)	<u>5260</u>	de Havilland DHC-8-311	56 Max	25.807(d), 25.1557(d), 121.310(f)(6)	de Havilland has contracted with a U.S. operator (Markair) to provide two DHC-8-311 aircraft (S/N 230 and S/N 242). These aircraft are to be equipped with a passenger compartment to cargo compartment bulkhead capable of being positioned at various locations along the fuselage. This moveable bulkhead permits operation of the aircraft with variable passenger/cargo capacities. With the bulkhead at Station 354, the exit door arrangement does not satisfy the requirements of 14 CFR 25.807(d)(2). This is because in a ditching scenario, the lower sill of one of the forward floor level exits will be below the water line. The DHC-8 is not unique in this regard, and similar aircraft (commuter size, high wing) suffer the same fate.	Overhead emergency escape hatch situated in the flight compartment in close proximity to the passengers and flight attendant. Unimpeded access to the hatch is provided when the flight compartment door is opened and latched in compliance with FAR 25.1557(d), the extended and severe winter operations until changes to the aircraft can be incorporated, the bodies of water likely to be encountered will be iced over for most of the time, the requested exemption from the provisions of § 25.813(c)(1) is unnecessary because that section is not relevant to the overhead hatch, exemption expired June 30, 1991.	Emergency exit – ditching scenario
17	21 January 2004	ELOS	<u>TC2548WI-T-AG-1</u>	Cessna Model 680	13 Max	25.807(i)	The Model 680 will have emergency exits, one on each side of the aircraft. The emergency exit on the right hand side of the Model 680 airplane is an over wing exit which is in full compliance with § 25.807(i). However, the left hand emergency exit, the cabin entry door, is a Type I side exit where expected flotation in fresh water would have the lower sill below the waterline. As in Type Certificate Nos. A9NM, T00007WI and A23CE, a water barrier is provided for insertion prior to a ditching such that a freeboard is achieved from the projected flotation waterline, which will leave an opening above the waterline that complies with the minimum dimensions of a Type III exit.	Cessna agrees to a demonstration that the barrier can, in the airplane's analyzed flotation time after a water landing, be removed from its stowed position in the aft vanity closet, be installed at the main entry door and be traversed by naive occupants with ease and rapidity. Cessna also agrees to include FAA-approved placarding located on or immediately adjacent to the main cabin door indicating: 1) A water barrier is required to be installed prior to opening the door and subsequent to a ditching; 2) The stowed location of the water barrier. Cessna agrees to placard the installation instructions on the water barrier itself.	Emergency exit – ditching scenario

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18	27 December 1995	Exemption (Denied)	<u>6251</u>	Cessna Model 750 (Citation X)	12 Max	25.811(d)(1)	Petition for exemption from the emergency exit locator sign requirements of § 25.811(d)(1) for the Cessna Model 750 airplane. Section 25.811(d)(1) requires that the location of each emergency exit must be indicated by a sign visible to occupants approaching along the main passenger aisle. There must be a locator sign above the aisle near each exit, or at another overhead location if it is more practical because of low headroom.	The FAA evaluates the acceptability of proposed locator signs by standing in the main aisle at the most adverse points in the aisle, which are generally at the extreme ends of the aisle and at other exit locations, and determining whether the nearest exit locator signs in both directions, as appropriate, are adequately legible. Cessna's proposed interior arrangement, with the marker signs installed and the locator signs omitted, have been evaluated by the FAA using this standard criteria, and it has been found to be not acceptable. The marker signs are installed flat against the sidewall where most marker signs are traditionally installed, and they do fulfill the marker sign function adequately. But, due to their orientation, they are only marginally visible from the required locations for locator signs, and are not at all legible to the extent required. Therefore, the required safety function intended to be afforded by locator signs would not be provided to the passengers of Cessna 750 airplanes.	Exit signs - visibility
19	23 July 2002	ELOS	<u>SP5109SE-T-C-1</u>	Bombardier BD700-1A10 Global Express	19 Max	25.811, 25.812 Amendment 25-88	The emergency exit arrangement for a Bombardier BD-700-1A10 consists of a Type I exit on the left side of the aircraft at fuselage station 330.00 and one Type III overwing exit on the right side of the aircraft at fuselage station 632.10. GATS proposed to install electrically-illuminated signs that measured 1.54 X 4.84 inches with 1 inch high red letters. The proposed signs ranged from 6.01 to 6.78 square inches in area, excluding letters. These signs did not comply with the letter and background requirements of § 25.812(b)(1).	Place exit locator sign on the aft-face, upper-inboard edge of a nearby bulkhead due to low headroom, letters on sign to be legible by person with 20/20 or worst eyesight and stature between 5th percentile female and 95th percentile male, legibility of word must be evaluated either with two worst case scenarios or re-evaluated everytime the background changes, illumination levels of the signs must meet requirements of 25.812(b)(1)(i).	Exit signs - visibility
20	30 September 2002	ELOS	<u>ST3302WI-T-A-1</u>	Dassault Falcon Models 50, 900, and 900EX	19 Max	25.811(d)(1), 25.811(d)(2), 25.812(b)(1)(i)	Aviation Consulting & Engineering Solutions, Inc. (ACES) letter dated February 22, 2002 requested an Equivalent Level of Safety Finding for Installation of Exit Signs for Falcon Models 50, 900, and 900EX. Similar equivalent safety findings have been granted for other similar aircraft.	The small size of the fuselage in the aircraft for which the ELOS is proposed permits a single smaller sign to serve as both the locator sign required by 25.811(d)(1) and the marker sign required by 25.811(d)(2) while maintaining the illumination level required by 25.812(b)(1)(i) when viewed from an angle other than 90 degrees.	Exit signs - visibility

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21	28 August 2003	ELOS	<u>AT5177AT-T-C-1</u>	Gulfstream Model GV-SP and GIV-X	19 Max	25.812(b) at Amendment 25-88	Gulfstream Aerospace Corporation (GAC) has installed exit marker, locator and bulkhead/divider signs, which are 1.5 X 4.75 inches with 1 inch high red letters, on GIV-X and GV-SP airplanes. These signs are electrically illuminated. The signs installed by GAC do not meet the background area and letter height requirements of § 25.812(b)(1) and do not meet the background height requirement of § 25.812(b)(2). GAC has also combined the exit locator sign and exit marker sign into one sign by utilizing two 1.5 X 4.75 inch electrically illuminated exit signs on a wedge mounting base. The wedge shape of this sign allows it to be viewed from forward and aft of the sign, thus enabling it to function as the locator sign, and also from inboard of the sign, thus allowing it to function as the marking sign. Two of these signs will be installed at the elliptical overwing exits (one each on the left and right side of the fuselage) and have been demonstrated to meet §§ 25.811(d)(1) and 25.811(d)(2).	The certification bases for the GV-SP and GIV-X model airplanes require compliance with 14 CFR §§ 25.811(d) and 25.812(b) at Amendment 25-88. These paragraphs have not changed since Amendment 25-32, which is earlier than the GIV certification basis for these sections. A similar ELOS finding has been granted previously for the GIV and GV model airplanes. As with the current proposal, the lighting intensity and color requirements of the regulations were maintained for the ELOS for the GIV and GV. Previous ELOS findings, which allow the installation of smaller exit signs, have been found acceptable for specific airplanes based on their passenger cabin aisle lengths and fuselage diameters.	Exit signs - visibility
22	07 October 2003	ELOS	<u>ANM-113-04-01</u>	Bombardier BD-100-1A10 (Challenger 300)	15 Max	25.811(d)(1), 25.812(b)(1)(i)	Due to the low ceiling height of the BD-100-1A10 airplane, Bombardier Aerospace has proposed to install an emergency exit locator sign on the aft-facing, upper-inboard edge of a left-hand entryway wardrobe cabinet just forward of the Type I entry door/emergency exit. This sign does not meet the size requirements of § 25.812(b)(1)(i). Bombardier Aerospace also proposed to install a single, wedge shaped exit sign to serve the function of both the exit marking sign and the exit locator sign at the Type III overwing exit. This sign does not meet the size requirements of § 25.812(b)(1)(i) and is installed somewhat low for its location to be considered overhead, as is required by § 25.811(d)(1) for an exit locator sign.	Combined exit locator sign and exit marker sign, sign to be visible to occupants approaching the main aisle with the seats occupied by person the size of a 95th percentile male, letters on sign to be legible by person with 20/20 or worst eyesight and stature between 5th percentile female and 95th percentile male, legibility of word must be evaluated either with two worst case scenarios or re-evaluated everytime the background changes, illumination levels of the signs must meet requirements of 25.812(b)(1)(i).	Exit signs - visibility

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23	09 April 2004	ELOS	<u>TC2548WI-T-AG-4</u>	Cessna Model 680	13 Max	25.811(d)(1), 25.812(b)(1)	Cessna Aircraft Company is requesting that Cessna Model 680 be certificated for 13 passengers in addition to 2 crewmembers. Cessna requested an Equivalent Level of Safety finding to: 1) § 25.812(b)(1) for the reduction of the background area requirement of the main cabin door exit locator/marketing sign, the escape hatch emergency exit locator/marketing sign, and the divider escape hatch emergency exit locator sign, and 2) § 25.811(d)(1) for allowing the exit signs to serve as both an exit marking sign and an exit locator sign. Although, all of the aforementioned exit locator/marketing signs comply with all of the regulations for aircraft having 9 or less passengers (§ 25.812(b)(2)), the Model 680, having a maximum seating passenger capacity of 13 passengers, will comply with the regulations of § 25.812(b)(1), with the exception of the background areas.	Meet or exceed the requirements of 25.812(b)(1) in areas of total illumination intensity as well as contrast, cabin size creates condition in which all exit locator and marking signs become easily legible, ELOS granted to similar aircraft previously, cabin length identical to configuration with 9 or less passengers which provides same viewing distance regardless of passenger capacity, exit locator sign and exit marking signs are installed in the most appropriate locations.	Exit signs - visibility
24	28 September 2005	ELOS	<u>TC-0067-AT-C-1</u>	Gulfstream Model G150	Flight crew only (Green confi- guration)	25.812(a)(1), 25.812(c), 25.812(d), 25.812(e)	In the green configuration, the aircraft does not comply with §§ 25.812(a)(1), (c), (d) and (e), regarding emergency lighting. Each green aircraft is intended to make a single flight from the factory to the completion center for installation of complete interior via the STC process. No seats are installed and carriage of passengers is not allowed. The only occupants are the 2 flight crewmembers. The observer seat will not be occupied. There is a Type II entry door emergency exit on the left side of the airplane plus a pair of Type IV exits over the wing. Emergency equipment, including rafts, is installed on a pallet located between these exits. The applicant will install simplified, self-illuminated emergency exit signs and emergency lighting that are not in full compliance with § 25.812.	Flashlight to aid crew in locating the entry door and overwing emergency exits (flashlight documented in flight menu), general illumination lighting near exits, placard to indicate configuration approved for two flight crew only, placard to indicate limitations if carrying some cargo.	N/A (not considered in analysis)

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
25	30 June 1993	Exemption (Partially Granted)	<u>5704</u>	Dornier 328	33 Max	25.562(b)(2) Amendment 25-64	Petition for exemption from the floor distortion test requirement of § 25.562(b)(2) of the CFR, for the pilot and co-pilot seats in Dornier 328 airplanes. Section 25.562(b)(2) Amendment 25-64, in prescribing the conditions under which seats must be tested, requires in pertinent part that where floor rails or floor fittings are used to attach the seating devices to the test fixture, the rails or fittings must be misaligned with respect to the adjacent set of rails or fittings by at least ten degrees vertically (i.e., out of parallel) with one rolled ten degrees.	Intent behind the misaligned seat fitting test requirement is to assure a certain degree of seat flexibility, and the requirement is applied irrespective of any floor requirements or anticipated floor behavior; FAA acknowledges that the noted March 5, 1990, FAA letter has the potential, if not carefully considered, to mislead the recipient into incorrectly assuming that implementation of the stated intentions was a foregone conclusion; in view of the noted letter's unintended impact, the FAA considers it appropriate to grant some relief to allow a limited period of time beyond the scheduled September 30, 1993, type certification date of the Dornier 328 for the petitioner to complete development of the required seats, providing that a retrofit of any noncompliant seats is accomplished; The petitioner shall provide this office, within one month from the issue date of this grant, with a commitment to complete the required testing in a timely manner; Within three months of completing the required testing, the petitioner shall provide this office with a schedule for the retroactive implementation of any design changes required, and assure its completion by June 30, 1994; This exemption expires June 30, 1994.	Floor Distortion Test - Crew Seats
26	30 June 1994	Exemption (Partially Granted)	<u>5704A</u>	Dornier 328	33 Max	25.562(b)(2) Amendment 25-64	Petition for a time extension to Exemption No. 5704 from the floor distortion test requirements of § 25.562(b)(2) of the Code of Federal Regulations (CFR), for captain's and first officer's seats in Dornier Model 328 airplanes, which expires on June 30, 1994. Section 25.562(b)(2), as amended by Amendment 25-64, in prescribing the conditions under which seats must be tested, requires in pertinent part that where floor rails or floor fittings are used to attach the seating devices to the test fixture, the rails or fittings must be misaligned with respect to the adjacent set of rails or fittings by at least ten degrees vertically (i.e., out of parallel) with one rolled ten degrees.	Dornier believes the remaining tasks to be very difficult to achieve/accomplish in the available time (three months); the petitioner is progressing toward a satisfactory compliance with the noted requirement; Other provisions, conditions and limitations of Exemption 5704 remains.	Floor Distortion Test - Crew Seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
27	(September 1994)	Exemption (Granted)	<u>5704B</u>	Dornier 328	33 Max	25.562(b)(2) Amendment 25-64	Time extension to Exemption No. 5704A, from the floor distortion test requirements of § 25.562(b)(2) of the Code of Federal Regulations (CFR), for captain's and first officer's seats in Dornier Model 328 airplanes, which expires on December 31, 1994.	Previous exemption No. 5704 granted (and extended) due to confusion of requirements, safety standard of seats equivalent to nearly all existing airplanes in service, redesigned seat passed test requirements.	Floor Distortion Test - Crew Seats
28	(June 1995)	Exemption (Granted)	<u>5704C</u>	Dornier 328	33 Max	25.562(b)(2) Amendment 25-64	Dornier Luftfahrt are petitioning for a 12 month allowance to conduct a modification programme to an early design of Dornier 328 crew seat due to the extent of modification required to enable that seat to meet the floor warping requirements of 14 CFR 25.562(b)(2).	Additional time necessary for retrofit due to larger number of delivered aircraft, current seats have safety standard equivalent to nearly all existing airplanes in service, seat vendor's schedule is conservative, hence, no further extension would be required.	Floor Distortion Test - Crew Seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
29	02 June 1995	Exemption (Denied)	<u>6097</u>	Dornier 328	33 Max	25.562(b)(2)	<p>Petition that temporary Exemption No. 5704B from the floor warpage test requirement of § 25.562(b)(2) of the Code of Federal Regulations (CFR), for Ipeco pilot and co-pilot seats in Dornier model 328 airplanes, be made permanent, only for those DO328 airplanes registered prior to June 30, 1995. Section 25.562(b)(2), in prescribing the conditions under which seats must be tested, requires in pertinent part that where floor rails or floor fittings are used to attach the seating devices to the test fixture, the rails or fittings must be misaligned with respect to the adjacent set of rails or fittings by at least ten degrees vertically (i.e., out of parallel) with one rolled ten degrees.</p>	<p>Although the FAA's letter of March 5, 1990, may have contributed to the applicants' incorrect belief that full compliance with § 25.562 would not be required, the FAA has long since clarified its position that full compliance would be required for all applicants subject to the rule. The FAA's previous grants of temporary exemptions, including those to Dornier, have provided adequate opportunity for applicants to bring affected airplanes into compliance without unnecessary expense or disruption. The FAA does not consider that it is in the public interest to grant a permanent exemption that would permanently expose passengers and crew members to a level of safety that is less than that required by the applicable rules; Cockpit floor characteristics may not be used as a basis for exemption from the floor distortion test requirements of § 25.562(b)(2). The intent behind the rule imposing a misaligned seat fitting test is to assure a certain degree of seat flexibility and retention of seat attachments, and is applied irrespective of any floor requirements or anticipated floor behavior; Ipeco does not substantiate the degree of safety inherent in the provided seats relative to the required seats; The FAA notes that Ipeco has not offered any reasons why granting their petition would be in the public interest, nor have they included any reasons why the requested exemption would not adversely affect safety or what actions would provide a level of safety equal to that provided by the rule from which exemption is sought.</p>	Floor Distortion Test - Crew Seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
30	31 December 1991	Exemption (Partially Granted)	<u>5623B</u>	SAAB 2000	53 Max	25.562(c)(5) Amendment 25-64	Petition for an extension to Exemption 5623A regarding Head Injury Criterion (HIC) of § 25.562(c)(5) and the floor distortion requirement of § 25.562(b)(2) of the Code of Federal Regulations (CFR). The existing exemption expires on June 30, 1994, or upon delivery of a US certificate of airworthiness, whichever comes first. Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units. The petitioner stated that the redesigned flight-deck seats have passed the floor warpage test and that no extension is needed for compliance with § 25.562(b)(2).	Certification date has now been delayed until spring of 1994 and deliveries to US customers will not occur until late 1994, an extension of the exemption will not adversely affect safety, provided the same philosophy is employed; Saab has been making a good faith effort to comply with the regulation, as noted in their progress reports submitted in accordance with Exemption 5623; FAA agrees that the compliance problems will not be solved in time for type certification; Other provisions, conditions and limitations of Exemption 5623 remains.	HIC for front row seats
31	19 October 1993	Exemption (Partially Granted)	<u>5765</u>	Dornier 328	33 Max	25.562(c)(5) Amendment 25-64	Petition for an exemption from the Head Injury Criterion (HIC) of § 25.562(c)(5) of the Code of Federal Regulations (CFR), for front row passenger seats located behind bulkheads in Dornier Model 328 airplanes, until June 30, 1994. Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the dynamic test conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units.	Only a temporary situation in which front row seats on Dornier 328 aircraft would be no more unsafe than existing front row seats on other, previously certificated aircraft models; FAA recognizes primarily the commercial unavailability of solutions to the HIC problem, and the adverse effect of this condition on the impending October 29, 1993, scheduled type certification date of the Dornier Model 328; FAA acknowledges that technically feasible solutions have not been developed to the point where they are viable for installation; The petitioner shall provide the FAA, at three-month intervals from the issue date of the grant, a detailed progress report of applicable HIC research accomplished in the previous three months, and a schedule of activity intended for the following three months; Within three months of identifying a design solution(s), the petitioner shall provide the FAA with a schedule for retrofitting the Dornier Model 328 fleet, and assure its complete execution by June 30, 1994.	HIC for front row seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
32	29 December 1993	Exemption (Partially Granted)	<u>5587A</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	An extension to Exemption 5587 regarding the Head Injury Criterion (HIC) of §§ 25.562(c)(5) and 25.785(a) of the Code of Federal Regulations (CFR), for front row passenger seating in Jetstream Series 4100 airplanes, until December 31, 1994. The existing exemption expires on December 31, 1993. Section 25.785(a) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562(c)(5) requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a Head Impact Criterion (HIC) of 1,000 units.	Lack of "commercially desirable" solutions to the HIC certification requirement; extension to allow sufficient development time without unduly delaying implementation of this new safety requirement benefiting passengers seated behind bulkhead structures; Jetstream Aircraft has made a good-faith effort to observe the terms of exemption, having engaged in developmental efforts and by documenting this activity in quarterly status reports; FAA concurs that it is not likely that desired solutions will be achieved prior to December 31, 1993; Other provisions, conditions and limitations of Exemption 5587 remains.	HIC for front row seats
33	13 June 1994	Exemption (Partially Granted)	<u>5765A</u>	Dornier 328	33 Max	25.562(c)(5) Amendment 25-64	Petition for a time extension to Exemption No. 5765 from the Head Injury Criterion (HIC) of § 25.562(c)(5) of the Code of Federal Regulations (CFR), for front row passenger seats located behind bulkheads in Dornier Model 328 airplanes, which expires on June 30, 1994. Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the dynamic test conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units.	It is apparent from the supporting material provided with the current petition, that the petitioner has been, and continues to be, engaged in the required research activity, albeit unsuccessfully, and has more readily achievable means of compliance under review; Other provisions, conditions and limitations of Exemption 5765 remains.	HIC for front row seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
34	05 August 1994	Exemption (Denied)	<u>5983</u>	SAAB 2000	53 Max	25.562(c)(5) Amendment 25-64	Petition for an extension to Exemption 5623B regarding Head Injury Criterion (HIC) of § 25.562(c)(5) of the Code of Federal Regulations (CFR). The existing exemption expires on December 31, 1994, or upon delivery of a US certificate of airworthiness, whichever comes first. Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units.	In issuing the (original) exemption, the FAA established a date that would have allowed type certification of the airplane, but would have expired before the first such airplane was delivered to a US operator. Since deliveries to US customers will not occur until late 1995, there is no need for an extension of the exemption. That is, there will be no US configurations that do not comply with the rule, and therefore a further grant of exemption would not be in the public interest; the FAA cannot accept the failure of a single design approach as a basis for exemption from the regulation.	HIC for front row seats
35	30 December 1994	Exemption (Partially Granted)	<u>5765B</u>	Dornier 328	33 Max	25.562(c)(5) Amendment 25-64	Petition for a time extension to Exemption No. 5765A, which expires on December 31, 1994, and a permanent exemption, respectively, from the Head Injury Criterion (HIC) of § 25.562(c)(5) of the Code of Federal Regulations (CFR), for front row passenger seats located behind bulkheads in Dornier Model 328 airplanes. Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the dynamic test conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units.	the FAA does not agree with the supporting arguments; In consideration of the time that may likely be required to initiate and complete certification and retrofit activity involving one of the indicated feasible means of compliance, a one year extension to the existing exemption extension is deemed appropriate.; the petition of Dornier Luftfahrt for exemption from the HIC requirements of § 25.562(c)(5) of the CFR, for front row passenger seats located behind bulkheads on Dornier Model 328 airplanes, is granted through December 31, 1995, only. The petition for permanent exemption is denied.	HIC for front row seats
36	31 December 1995	Exemption (Partially Granted)	<u>5623C</u>	SAAB 2000	53 Max	25.562(c)(5)	Petition for an extension to Exemption 5623B regarding Head Injury Criterion (HIC) of § 25.562(c)(5) for passengers seated behind interior furnishings. The existing exemption expired on December 31, 1994, and a previous request for extension was denied (Exemption No. 5983) on the basis that no airplanes would have been affected by the exemption. Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units.	The technical merit of the petition did not enter into the decision to the deny a previous exemption; FAA notes that no manufacturer has yet arrived at a design solution for front row HIC that will address every installation, that is, combination of seat arrangement and interior furnishing; FAA wants to encourage the development of systems that are both commercially acceptable and at the same provide maximum safety benefit; relatively few airplanes will enter the US fleet while the exemption is in effect, which will reduce the number of airplanes requiring retrofit; Other provisions, conditions and limitations of Exemption 5623 remains.	HIC for front row seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
37	09 April 1996	Exemption (Partially Granted)	<u>6420</u>	Learjet Model 45	10 Max	25.562(c)(5), 25.785(a)	Petition for exemption from the Head Injury Criterion (HIC) of §§ 25.562(c)(5) and 25.785(a) of the Code of Federal Regulations (CFR), for passenger seating in Learjet Model 45 airplanes. Section 25.785(a) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562(c)(5) requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a Head Impact Criterion (HIC) of 1,000 units.	Other manufacturers of similar airplanes have, in fact, demonstrated compliance with the requirement. The FAA notes that HIC compliance for seats placed in repetitive rows should not be different for commercial or business aircraft. The FAA has granted other exemptions for front row HIC until the end of 1996, and will do the same in this case. For the remaining seats, the exemption is not justified. The petitioner shall submit a schedule for retrofit of the design solution (to any airplanes delivered that are not in compliance) by December 31, 1996.	HIC for front row seats
38	23 December 1996	Exemption (Partially Granted)	<u>5587D</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	An extension to Exemption 5587C regarding the Head Injury Criterion (HIC) of §§ 25.562(c)(5) and 25.785(a) of the Code of Federal Regulations (CFR), for front row passenger seating in Jetstream Series 4100 airplanes, until December 31, 1997. The existing exemption expires on December 31, 1996. Section 25.785(a) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562(c)(5) requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a Head Impact Criterion (HIC) of 1,000 units.	Lack of commercially available solutions to the HIC certification requirement. The FAA concurred that extension as appropriate to allow sufficient development time without unduly delaying implementation of this new safety requirement benefiting passengers seated behind bulkhead structures; installation of airbag will likely provide a higher level of safety than might other means of compliance and considers and extension of the existing compliance time is reasonable for completion of the development program; the petitioner shall submit a schedule for retrofit of the design solution prior to the expiration this exemption; Extension granted until September 20, 1997; Other provisions, conditions and limitations of Exemption 5587 remains.	HIC for front row seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
39	23 December 1996	Exemption (Partially Granted)	<u>5623D</u>	SAAB 2000	53 Max	25.562(c)(5)	Petition for an extension to Exemption 5623C regarding Head Injury Criterion (HIC) of § 25.562(c)(5) for passengers seated behind interior furnishings. The existing exemption expires on December 31, 1996. Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units.	Saab has been making a good faith effort to comply with the regulation; Nonetheless, their efforts have focused on energy absorbing pads, which have not shown the promise that had been hoped; FAA cannot base a further extension on the hope that a new solution will become viable; one manufacturer has installed upper torso restraints as a means of compliance with front row HIC; FAA is not aware of any adverse reaction to this installation from the flying public; However, even given their technical and commercial viability, upper torso restraints are not a simple add-on to a seat, and will require specific certification programs for a given installation. Therefore, additional time would be necessary to adopt even this solution; FAA recognizes that it may be counterproductive to establish relatively short compliance dates which can actually inhibit development of optimal solutions in favor of those that appear to be easier to achieve; Other provisions, conditions and limitations of Exemption 5623 remains.	HIC for front row seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
40	15 September 1997	Exemption (Partially Granted)	<u>5587E</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	An extension to Exemption 5587C regarding the Head Injury Criterion (HIC) of §§ 25.562(c)(5) and 25.785(a) of the Code of Federal Regulations (CFR), for front row passenger seating in Jetstream Series 4100 airplanes, until March 31, 1997. The existing exemption expires on September 30, 1997. Section 25.785(a) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562(c)(5) requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a Head Impact Criterion (HIC) of 1,000 units.	Consideration of the continuing efforts that BAe was making to achieve compliance, and recognition of an unforeseen parts availability problem that delayed the overall schedule for implementation; additional technical problems have developed that throw the completion date of the program into question; FAA continues to believe that the airbag has the potential to provide a level of safety even greater than that required by the rule, and thus is interested in seeing its development come to fruition; any further deliveries (after September 30, 1997) of Jetstream 4101 airplanes should be in compliance with HIC for front row passengers; the FAA expect that a schedule for accomplishing the retrofit will be approved prior to the expiration of this exemption, and that the retrofit will be accomplished in a timely manner; installation of airbag will likely provide a higher level of safety than might other means of compliance and considers and extension of the existing compliance time is reasonable for completion of the development program; the petitioner shall submit a schedule for retrofit of the design solution prior to the expiration this exemption; this extension applies only to airplanes delivered prior to September 30, 1997; Other provisions, conditions and limitations of Exemption 5587 remains.	HIC for front row seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
41	23 February 1998	Exemption (Denied)	<u>6732</u>	Embraer EMB-145	50 Max	25.562(c)(5), 25.785(a)	Petition for an exemption regarding the Head Injury Criterion (HIC) of §§ 25.562(c)(5) and 25.785(a) of the Code of Federal Regulations (CFR), for front row and exit row passenger seating in Embraer EMB-145 airplanes, until July 31, 1998. Section 25.785(a) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562(c)(5) requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a Head Impact Criterion (HIC) of 1,000 units.	The petitioner is requesting a temporary exemption, due to the unavailability of alternate seats, for an airplane that has already shown compliance with the requirement. The petitioner wants to install a seat model for which the airframe manufacturer has not shown compliance; The FAA has previously granted exemptions from the requirements of § 25.562(c)(5) for front row seats, in those cases where there either was no viable technical solution, or a solution was forthcoming, but not quite available. In addition, the FAA has only granted exemptions in those cases where the alternative to not granting the exemption was removal of seats. In this case, neither of these conditions apply. There is a technical solution, as evidenced by the original approval of the EMB-145. Removal of seats is not required since there are seats that comply. Therefore, the FAA has concluded that there is insufficient basis for an exemption, and that such a grant would not be in the public interest.	HIC for front row seats
42	31 March 1998	Exemption (Granted)	<u>5587F</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	An amendment to Exemption 5587E regarding the Head Injury Criterion (HIC) of 14 CFR §§ 25.562(c)(5) and 25.785(a), for front row passenger seating in Jetstream Series 4100 airplanes, to allow retrofit of airplanes already delivered. The existing exemption expires on March 31, 1998. Section 25.785(a) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562(c)(5) requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a Head Impact Criterion (HIC) of 1,000 units.	In accordance with the terms of Exemption 5587E, BAe has submitted a retrofit schedule for airplanes delivered under the terms of previous amendments of this exemption. BAe proposes a retrofit schedule. Under this schedule, all airplanes would be brought into compliance no later than the end of 2000. The extension applies only to airplanes delivered prior to September 30, 1997. The airworthiness certificates of airplanes not in compliance after December 31, 2000, are no longer effective.	HIC for front row seats

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43	02 June 1998	Exemption (Granted)	<u>6776</u>	Jetstream Series 4100 Registration N333UE	30 Max	25.785(a), 25.562(c)(5)	A temporary exemption regarding the Head Injury Criterion (HIC) of §§ 25.785(a) and 25.562(c)(5) of Title 14, Code of Federal Regulations (14 CFR), for front row passenger seating in one Jetstream Series 4100 airplane, to allow retrofit of that airplane in accordance with a previously issued exemption. Section 25.785(a) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562(c)(5) requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a Head Impact Criterion (HIC) of 1,000 units.	Serial Number N333UE is identical to 31 other aircraft delivered prior to September 30, 1997, the exemption (5587E) cutoff date; the FAA's intent was to minimize non-complying fleet, although there are aircraft already manufactured but delivered between the time the exemption was issued and the deadline imposed by the exemption; the aircraft under petition was expected to be covered by Exemption 5587; compliance is required no later than December 31, 2000 as in 5587F.	HIC for front row seats
44	21 November 2000	Exemption (Granted)	<u>5587G</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	An amendment to Exemption #5587F. Exemption #5587F was regarding the Head Injury Criterion (HIC) of §§ 25.562(c)(5) and 25.785(a) of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would allow the retrofit of front row passenger seating in Jetstream Series 4100 airplanes already delivered. The existing exemption expires on December 31, 2000.	Operator resistance to install previously approved Shoulder Harness Restraint System, BAe's new AmSafe Aircraft Inflatable Restraint system, compliance must be met by March 31, 2001.	HIC for front row seats
45	22 December 2000	Exemption (Granted)	<u>6776A</u>	Jetstream Series 4100 Registration N333UE	30 Max	25.785(a), 25.562(c)(5)	Extension of Exemption 6776 to March 31, 2001 to confirm with newly issued Exemption 5587G.	Aircraft was delivered between the time exemption 5587E was issued and the cutoff date; Exemption 6776 granted the airplane to be treated equally with those covered by Exemption No. 5587.	HIC for front row seats

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46	(November 1994)	Exemption (Partially Granted)	<u>5587B</u>	Jetstream Series 4100	30 Max	25.562(c)(5), 25.785(a)	An extension to Exemption 5587A regarding the Head Injury Criterion (HIC) of §§ 25.562(c)(5) and 25.785(a) of the Code of Federal Regulations (CFR), for front row passenger seating in Jetstream Series 4100 airplanes, until December 31, 1995. The existing exemption expires on December 31, 1994. Section 25.785(a) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562(c)(5) requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a Head Impact Criterion (HIC) of 1,000 units.	Lack of commercially available solutions to the HIC certification requirement. The FAA concurred with the petitioner's December 31, 1994, requested expiration date for that extension, as appropriate to allow sufficient development time without unduly delaying implementation of this new safety requirement benefiting passengers seated behind bulkhead structures; Jetstream Aircraft has been making a good-faith effort to observe the terms of that exemption, having engaged in developmental efforts and by documenting this activity in quarterly status reports. The principal reason for requesting this further extension is that Jetstream has changed its proposed method of compliance from an energy absorbing pad, to an airbag. Jetstream notes several problems with the energy absorbing pad concept that have led to this decision; Jetstream have been exploring this means of compliance (airbags) for some time, and have functioning prototype systems to work with; resultant product (airbag) will likely provide a higher level of safety than might other means of compliance; the petitioner shall submit a schedule for retrofit of the design solution prior to the expiration this exemption; Other provisions, conditions and limitations of Exemption 5587 remains.	HIC for front row seats

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47	03 March 1993	Exemption (Partially Granted)	<u>5623</u>	SAAB 2000	53 Max	25.562(b)(2) Amendment 25- 64, 25.562(c)(5)	Petitioned for an exemption from: the Head Injury Criterion (HIC) of § 25.562(c)(5) of the Code of Federal Regulations (CFR), for front row passenger seats in SAAB 2000 airplanes until seat retrofits are mandated for all aircraft type certificated after January 1, 1958; and from the floor distortion requirement of § 25.562(b)(2) of the CFR, for the pilot/co-pilot seats in SAAB 2000 airplanes. Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units. Section 25.562(b)(2), in prescribing the conditions under which seats must be tested, requires in pertinent part that where floor rails or floor fittings are used to attach the seating devices to the test fixture, the rails or fittings must be misaligned with respect to the adjacent set of rails or fittings by at least ten degrees vertically (i.e., out of parallel) with one rolled ten degrees.	[on 25.562(c)(5)] The scheduled type certification date of the SAAB 2000 is imminent, in July 1993 (scheduled type certification date of B777 is April 1995); the FAA does not wish a favorable consideration of this petition to be construed as encouragement to other potential petitioners whose justifications may be based solely on unsupported rationales. [on 25.562(b)(2)] the airplane's negotiated certification basis still determines the requirements that must be met; Cockpit floor characteristics may not be used as a basis for exemption from seat test requirements. The intent behind the rule imposing a misaligned seat fitting test is to assure a certain degree of seat flexibility and is applied irrespective of any floor requirements or anticipated floor behavior. Granted until Dec 31, 1993; [on 25.562(c)(5)] the petitioner shall provide the FAA, at 3-month intervals from the issue date of the grant, a detailed progress report of applicable HIC research accomplished in the previous three months, and a schedule of activity intended for the following three months; within three months of identifying a design solution(s), the petitioner shall provide the FAA with a schedule for the retroactive implementation of the solution, and assure its execution by Dec 31, 1993; [on 25.562(b)(2)] the petitioner shall provide the FAA, within three months from the issue date of the grant, with a commitment to complete the required testing in a timely manner; within three months of completing the required testing, the petitioner shall provide the FAA with a schedule for the retroactive implementation of any design changes required, and assure its execution by Dec 31, 1993.	HIC for front row seats; Floor Distortion Test - Crew Seats

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48	15 March 1989	Exemption (Denied)	<u>5029</u>	Dassault Falcon Model Mystere- Falcon 900	19 Max, 5-12 Executive	25.813(e) Amendment 25-56	Petition for exemption from § 25.813(e) of the Code of Federal Regulations (CFR) to permit type certification of the Avions Marcel Dassault-Breguet Aviation (AMD-BA) Mystere-Falcon 900 with a door installed in the passenger cabin between passenger compartments. Section 25.813(e), Amendment 25-56, requires that "no door may be installed in any partition between passenger compartments."	The petitioner assumes that the proposed placard would be strictly adhered to, and the door would always be latched open for takeoff and landing; yet in the proposed Part 91 service, there would be no flight attendant or crewmember with the responsibility or the authority to see to it that the placard instructions are observed; The petitioner states that the Gulfstream G-IV (G-1159C) aircraft has an FAA approved cabin interior door of the kind proposed herein, however, the later requirement of § 25.813(e) was not made a part of the certification basis for the Gulfstream G-IV, and doors of the kind described in this petition are permitted as claimed. However, the petitioner has presented no credible evidence to show that this single design feature places the Falcon Jet Corporation at a significant competitive disadvantage; The petitioner has not shown that a partition with curtain doorway would not provide adequate privacy, nor that it would be detrimental to the occupants or the Falcon Jet Corporation; the FAA would like to point out that it is possible to install the partition with sliding door at the location proposed, in full compliance with § 25.813(e), so long as the area aft of the partition cannot be occupied during taxi, takeoff, or landing.	Interior Door

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49	29 June 2000	Exemption (Granted)	<u>7259</u>	Bombardier BD700-1A10 Global Express	19 Max, 15 Executive	25.813(e)	Petitioned for an exemption from the requirements of § 25.813 (e) of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would permit installation of interior doors between passenger compartments on the Bombardier Global Express airplane, Model BD-700-1A10. Section 25.813(e) prohibits the installation of doors between passenger compartments.	The airplane is not operated for hire, or offered for common carriage; Each door between passenger compartments must be frangible; Each door between passenger compartments must have a means to signal to the flight crew when the door is closed. Appropriate procedures/limitations to ensure that takeoff and landing is prohibited, when such compartments are occupied and the door is closed, must be established; Each door between passenger compartments must have dual means to retain it in the open position, each of which is capable of reacting the inertia loads specified in § 25.561 of 14 CFR; When doors are installed in transverse partitions, they must translate laterally to open and close; When doors are installed in specified egress paths, each passenger must be informed that the airplane does not comply with the occupant safety requirements. This notification is only required the first time a person is a passenger on the airplane; When doors are installed aft of station 642.1, it shall be possible for persons aft of the door to unlock or unlatch the door, without the use of tools. When doors are installed forward of station 622.1, it shall be possible for persons forward or aft of the door to unlock or unlatch the door, without the use of tools.	Interior Door

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50	07 March 2001	Exemption (Granted)	<u>7455</u>	Bombardier BD700-1A10 Global Express	19 Max, 15 Executive	25.813(e)	The petitioner has requested the exemption in order to permit the installation of interior doors between passenger compartments on the Bombardier Global Express airplane, Model BD-700-1A10. Section 25.813(e) prohibits the installation of doors between passenger compartments.	The airplane is not operated for hire, or offered for common carriage; Each door between passenger compartments must be frangible; Each door between passenger compartments must have a means to signal to the flight crew when the door is closed. Appropriate procedures/limitations to ensure that takeoff and landing is prohibited, when such compartments are occupied and the door is closed, must be established; Each door between passenger compartments must have dual means to retain it in the open position, each of which is capable of reacting the inertia loads specified in § 25.561 of 14 CFR; When doors are installed in transverse partitions, they must translate laterally to open and close; When doors are installed in specified egress paths, each passenger must be informed that the airplane does not comply with the occupant safety requirements. This notification is only required the first time a person is a passenger on the airplane; When doors are installed aft of station 642.1, it shall be possible for persons aft of the door to unlock or unlatch the door, without the use of tools. When doors are installed forward of station 622.1, it shall be possible for persons forward or aft of the door to unlock or unlatch the door, without the use of tools.	Interior Door

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51	20 July 2001	Exemption (Granted)	<u>7573</u>	Bombardier BD700-1A10 Global Express	19 Max, 15 Executive	25.813(e)	The petitioner has requested the exemption in order to permit the installation of interior doors between passenger compartments on the Bombardier Global Express airplane, Model BD-700-1A10. Section 25.813(e) prohibits the installation of doors between passenger compartments.	The airplane is not operated for hire, or offered for common carriage; Each door between passenger compartments must be frangible; Each door between passenger compartments must have a means to signal to the flight crew when the door is closed. Appropriate procedures/limitations to ensure that takeoff and landing is prohibited, when such compartments are occupied and the door is closed, must be established; Each door between passenger compartments must have dual means to retain it in the open position, each of which is capable of reacting the inertia loads specified in § 25.561 of 14 CFR; When doors are installed in transverse partitions, they must translate laterally to open and close; When doors are installed in specified egress paths, each passenger must be informed that the airplane does not comply with the occupant safety requirements. This notification is only required the first time a person is a passenger on the airplane; When doors are installed aft of station 642.1, it shall be possible for persons aft of the door to unlock or unlatch the door, without the use of tools. When doors are installed forward of station 622.1, it shall be possible for persons forward or aft of the door to unlock or unlatch the door, without the use of tools.	Interior Door

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52	10 August 2001	Exemption (Granted)	<u>7590</u>	Dassault Falcon Models Mystere Falcon 900 and Falcon 900EX	19 Max	25.813(e)	The petitioner has requested the exemption in order to permit the installation of interior doors between passenger compartments on the Dassault Falcon Jet airplane models Mystere Falcon 900 and Falcon 900EX. Section 25.813(e) prohibits the installation of doors between passenger compartments.	The airplane is not operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR part 125 and 14 CFR part 91, subpart F, as applicable; Each door between passenger compartments must be frangible; Each door between passenger compartments must have a means to signal to the flight crew when the door is closed. Appropriate procedures/limitations must be established to ensure that takeoff and landing is prohibited when such compartments are occupied and the door is closed; Each door between passenger compartments must have dual means to retain it in the open position, each of which must be capable of reacting the inertia loads specified in 14 CFR § 25.561; When doors are installed in transverse partitions, they must translate laterally to open and close; When doors are installed in specified egress paths, each passenger must be informed that the airplane does not comply with the occupant safety requirements mandated for the airplane type in general. This notification is only required the first time that a person is a passenger on the airplane; When doors are installed between passenger compartments, it must be possible for persons forward or aft of the door to unlock or unlatch the door without the use of tools.	Interior Door

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53	27 November 2001	Exemption (Granted)	<u>7668</u>	Dassault Falcon Models Mystere Falcon 900 and Falcon 900EX	19 Max	25.813(e)	The petitioner has requested the exemption in order to permit the installation of interior doors between passenger compartments on the Dassault Falcon Jet airplane models Mystere Falcon 900 and Falcon 900EX. Section 25.813(e) prohibits the installation of doors between passenger compartments.	The airplane is not operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR part 125 and 14 CFR part 91, subpart F, as applicable; Each door between passenger compartments must be frangible; Each door between passenger compartments must have a means to signal to the flight crew when the door is closed. Appropriate procedures/limitations must be established to ensure that takeoff and landing is prohibited when such compartments are occupied and the door is closed; Each door between passenger compartments must have dual means to retain it in the open position, each of which must be capable of reacting the inertia loads specified in 14 CFR § 25.561; When doors are installed in transverse partitions, they must translate laterally to open and close; When doors are installed in specified egress paths, each passenger must be informed that the airplane does not comply with the occupant safety requirements mandated for the airplane type in general. This notification is only required the first time that a person is a passenger on the airplane; When doors are installed between passenger compartments, it must be possible for persons forward or aft of the door to unlock or unlatch the door without the use of tools.	Interior Door

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54	18 September 2002	Exemption (Partially Granted)	<u>7891</u>	Bombardier BD700-1A10 Global Express	19 Max	25.813(e)	Petition for an exemption from § 25.813(e) of Title 14, Code of Federal Regulations (14 CFR). The petitioner has requested the exemption in order to permit the installation of interior doors between passenger compartments on Bombardier BD-700-1A10 airplanes. Section 25.813(e) - prohibits the installation of doors in any partition that separates passenger compartments.	The FAA finds that an acceptable level of safety can be provided based on specific limitations associated with a grant of exemption. In order to maintain an acceptable level of safety, the FAA has concluded that the installation of an interior door that spans the main cabin aisle can only be allowed if it opens and closes in a transverse direction. That is, the direction of motion of the door must be at a right angle to the longitudinal axis of the airplane. Although the crew compartment door opens and closes in the direction of the longitudinal axis of the airplane, the FAA finds it acceptable provided it meets the limitations of this exemption. The crew compartment door would not have as significant an impact on an evacuation if it became jammed closed as the proposed hinged door would have if it became jammed closed. The crew compartment door could affect evacuation of one passenger, whereas the hinged door could affect evacuation of many passengers on the airplane. The FAA finds that the proposed limitations would provide an acceptable level of safety for the crew compartment door. The airplane is not used to transport the general public (common carriage) even if fares are not collected. Provisions as stated in exemption.	Interior Door

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55	09 January 2003	Exemption (Partially Granted)	<u>7946</u>	Gulfstream Model GV-SP	19 Max	25.813(e)	Petition for an exemption on behalf of Gulfstream Aerospace Corporation from the requirements of § 25.813(e) of Title 14, Code of Federal Regulations (14 CFR). The petitioner has requested the exemption in order to permit the installation of interior doors between passenger compartments on Gulfstream Aerospace Corporation Model GV-SP series airplanes. Section 25.813(e) prohibits the installation of doors in any partition between passenger compartments.	The petitioner has indicated that the Model GV-SP series airplane will be operated in private and non-scheduled commercial use. All previous exemptions from § 25.813(e) have been granted based on public interest having been found for private use operations only. We find that it is not in the public interest to exempt the Model GV-SP series airplane from § 25.813(e) for non-private use operations. Such operators generally have a duty to provide service with the highest possible degree of safety in the public interest. As a result, § 25.813(e) must be met for non-private use operations. The airplane must not be operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR part 125 and 14 CFR part 91, subpart F, as applicable; Each door between passenger compartments must be frangible; Each door between passenger compartments must have a means to signal to the flightcrew when the door is closed during takeoff and landing. Appropriate procedures/limitations must be established to ensure that takeoff and landing is prohibited when any such door is not in the proper takeoff and landing configuration; Each door between passenger compartments must have dual means to retain it in the open position, each of which must be capable of withstanding the inertia loads specified in 14 CFR 25.561; Doors installed across a longitudinal aisle must translate laterally to open and close; When doors are installed between passenger compartments, it must be possible for persons on either side of the door to unlock or unlatch the door without the use of tools; Provisions 1 and 3 must be documented as operating limitations in the limitations section of the Airplane Flight Manual.	Interior Door

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56	03 September 2003	Exemption (Granted)	<u>8123</u>	Dassault Falcon Models Mystere Falcon 900 and Falcon 900EX	19 Max	25.813(e)	Petition for an exemption from the requirements of § 25.813(e) of Title 14, Code of Federal Regulations (14 CFR). The petitioner has requested the exemption in order to permit the installation of interior doors between passenger compartments on the Dassault Aviation airplane models Mystere Falcon 900 and Falcon 900EX. Section 25.813(e) prohibits the installation of doors between passenger compartments.	The airplane is not operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR part 125 and 14 CFR part 91, subpart F, as applicable; Each door between passenger compartments must be frangible; Each door between passenger compartments must have a means to signal to the flightcrew when the door is closed. Appropriate procedures/limitations must be established to ensure that takeoff and landing is prohibited when such compartments are occupied and the door is closed; Each door between passenger compartments must have dual means to retain it in the open position, each of which must be capable of reacting the inertia loads specified in 14 CFR § 25.561; When doors are installed in transverse partitions, they must translate laterally to open and close; Each door between passenger compartments (regardless of where it is located in relation to the emergency exits) must allow persons on either side of the door to unlock or unlatch the door without the use of tools; NOTE: limitation 'when doors are installed in specified egress path, each passenger must be informed that the airplane does not comply with the occupant safety requirements mandated for the airplane type in general' no longer necessary.	Interior Door

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
57	19 December 2003	Exemption (Granted)	<u>8199x</u>	Dassault Falcon Models Mystere Falcon 900 and Falcon 900EX	19 Max	25.813(e)	Petition for an exemption from the requirements of § 25.813(e) of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would permit the installation of interior doors between passenger compartments on the Dassault Aviation airplane models Mystere Falcon 900 and Falcon 900EX. Section 25.813(e) prohibits the installation of doors between passenger compartments.	The airplane is not operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR part 125 and 14 CFR part 91, subpart F, as applicable; Each door between passenger compartments must be frangible; Each door between passenger compartments must have a means to signal to the flightcrew when the door is closed. Appropriate procedures/limitations must be established to ensure that takeoff and landing is prohibited when such compartments are occupied and the door is closed; Each door between passenger compartments must have dual means to retain it in the open position, each of which must be capable of reacting the inertia loads specified in 14 CFR § 25.561; When doors are installed in transverse partitions, they must translate laterally to open and close; Each door between passenger compartments (regardless of where it is located in relation to the emergency exits) must allow persons on either side of the door to unlock or unlatch the door without the use of tools.	Interior Door
58	09 April 2004	ELOS	<u>TC2548WI-T-AG-2</u>	Cessna Model 680	13 Max	25.813(e)	The Cessna Model 680 has an aft lavatory/vanity area in the passenger cabin. This area is separated from the main section of the passenger cabin by pocket doors, which slide out of the privacy partitions and are held together in the middle by a magnetic strip. The seating configuration requested by Cessna includes placing a belted passenger side-facing seat in the lavatory/vanity area during taxi, takeoff and landing. This design creates two passenger compartments separated by a door within the passenger cabin. This is in conflict with § 25.813(e), which states: "No door may be installed in any partition between passenger compartments."	The lavatory doors have provision to be secured open during taxi, takeoff and landing and will be required to be opened; The door is designed to be a split sliding pocket door; The lavatory is limited to one occupant.	Interior Door

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59	19 January 2005	ELOS	<u>ST4805NY-SE-1</u>	Bombardier BD-100-1A10 (Challenger 300)	15 Max	25.813(e) at Amendment 25-88	The certification basis of the BD-100-1A10 airplane requires compliance with § 25.813(e) at Amendment 25-88. The BD-100-1A10 standard interiors include 15 passenger seats. To offer the flexibility of carrying 16 passengers, Bombardier wishes to install a belted toilet seat in the aft lavatory to allow it to be occupied during taxi, takeoff and landing. Approval of the lavatory to be occupied for taxi, takeoff, and landing effectively created another passenger compartment. Installation of the door divides passenger compartments and does not meet Title 14 Code of Federal Regulations (CFR) part 25.813(e). Section 25.813(e) does not allow a door to be installed in any partition between passenger compartments. Bombardier has applied to get approval of these design elements and validated by the FAA through Transport Canada on project ST4805NY-T. As the previous finding was not documented in an ELOS memorandum nor referenced on the TCDS, an additional ELOS is needed.	ELOS limited to 25.813(e), lavatory door must be able to be secured open for taxi, takeoff and landing, limitations must be established in Airplane Flight Manual Supplement, demonstration that a 5th percentile female can break the door and that a 95th percentile male can egress through the opening.	Interior Door
60	13 June 2005	Exemption (Granted)	<u>7259A</u>	Bombardier BD700-1A11 Global 5000	19 Max	25.813(e)	Petitioned for an amendment to Exemption No. 7259, previously issued on June 29, 2000. That exemption permitted Bombardier certain relief from the requirements of § 25.813(e), Title 14, Code of Federal Regulations (14 CFR), to permit installation of interior doors between passenger compartments on the Bombardier Global Express airplane, Model BD-700-1A10. The petitioner now requests an amendment to Exemption No. 7259 to include Bombardier Model BD-700-1A11 airplanes. Section 25.813(e) prohibits the installation of doors between passenger compartments.	The Bombardier Model BD-700-1A11 airplane is a variant of the Bombardier Model BD-700-1A10 airplane, and both airplanes have the same certification basis; no request for changes to limitations and conditions for the amended exemption (as in 7259);	Interior Door

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61	03 October 2005	Exemption (Granted)	<u>8621</u>	Cessna Model 560XL	12 Max	25.813(e), Amendment 25-82	Petition for an exemption from the requirements of § 25.813(e) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit relief from the requirement that prohibits the installation of interior doors between passenger compartments. The proposed exemption is specifically for the installation of an executive interior on the Cessna Model 560XL airplane that will be designated as "private, not-for-hire." Section 25.813(e), Amendment 25-82 - Prohibits installation of interior doors between passenger compartments.	The airplane is not operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR parts 125 and 91, subpart F, as applicable; Each door between passenger compartments must be frangible; Doors that fall into Categories 1 and 3 must be in the open position during taxi, takeoff and landing only when the room is occupied or when passengers must pass through the room to reach an emergency exit; Doors that fall into Categories 2 or 4 must be in the open position during taxi, takeoff and landing, regardless of occupancy; Appropriate procedures must be established to signal the flightcrew that a door between passenger compartments is closed and to prohibit takeoff or landing when a door between passenger compartments is not in the proper position. Doors between passenger compartments must have dual means to retain them in the open position, each of which means must be capable of withstanding the inertia loads specified in § 25.561; Doors in Categories 2, 3, or 4, which are installed across a longitudinal aisle, must translate laterally to open and close. (Refer to exemption for the different Categories of doors)	Interior Door

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62	29 November 1994	Exemption (Partially Granted)	<u>5991</u>	Dassault Falcon Model 2000	19 Max	25.562(c) Amendment 25-64	Petition for a temporary exemption from the requirements of § 25.562(c) for side-facing sofas in the Falcon Model 2000 airplane. Section 25.562(c), as amended by Amendment 25-64, contains in paragraphs (c)(1) through (c)(6) occupant protection pass/fail criteria associated with the dynamic testing of seats required by § 25.562(b). Paragraphs (c)(7) and (c)(8) contain the seat strength pass/fail criteria associated with those same tests.	The Falcon 2000 is the first airplane with both multiple-place, side-facing seats (sofas) in its interior configurations and Amendment 25-64 in its certification basis; The petitioner is, without providing a justification for doing so, requesting a timelimited exemption from the entirety of § 25.562(c);The only exception is § 25.562(c)(5), the head impact criterion (HIC), which is considered inappropriate for occupants of side-facing seats. A grant of exemption that is not time-limited is issued in this regard only, for side-facing seats only; the FAA has taken the position of very strongly encouraging the incorporation of dynamically qualified seats into the scope of any significant modification to existing pre-Amendment 25-64 airplanes; in order to preclude a protracted period of time during which fruitless research is being deliberately accomplished while occupants of side-facing sofas are not afforded equivalent safety, the FAA does not anticipate being predisposed to extend this grant unless success is imminent; conditions as stated in Exemption 5991.	Multiple-place side-facing seat

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63	25 April 1996	Exemption (Partially Granted)	<u>6432</u>	Cessna Model 750 (Citation X)	12 Max	25.562 Amendment 25-64	Petition for an exemption from the emergency landing dynamic conditions of § 25.562 for multiple-occupancy, side-facing divans in the Cessna Model 750 airplane. Section 25.562(a), as amended by Amendment 25-64, requires, in pertinent part, that seats and restraints must be designed to protect occupants from the dynamic conditions described in this section. Section 25.562(b), as amended by Amendment 25-64, describes the dynamic tests that are required to be successfully accomplished for all seats intended to be occupied for takeoff and landing. Section 25.562(c), as amended by Amendment 25-64, contains, in paragraphs (c)(1) through (c)(6), occupant protection pass/fail criteria associated with the dynamic testing of seats required by § 25.562(b). Paragraphs (c)(7) and (c)(8) contain the seat strength pass/fail criteria associated with those same tests.	The FAA acknowledges that most of the existing certification criteria are directed at forward- and aft-facing seats. Regarding the potential cost of certification, the FAA is on record as agreeing to assist in such development at the Civil Aeromedical Institute, which can further reduce costs. The FAA observes that the introduction of any new factor into the marketplace can always be expected to be temporarily disturbing to the status quo. The FAA cannot accept a lack of accident experience as justification for non-compliance. Within six months from the issue date of this partial grant, the petitioner shall submit to the Wichita Aircraft Certification Office, for FAA approval, a side-facing divan developmental test proposal for addressing, as a minimum, the specific concerns identified in the noted Issue Paper and repeated herein. Upon successful completion of certification testing, the petitioner shall provide this office with a schedule for assuring that the affected Cessna 750 fleet will be retrofitted by November 30, 1996.	Multiple-place side-facing seat

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64	18 January 2000	Exemption (Partially Granted)	<u>7104</u>	Dassault Falcon Model 2000	19 Max	25.785(a) Amendment 25-64	Petition for exemption from § 25.785(a) Title 14 Code of Federal Regulations (14 CFR), as amended by Amendment 25-64. The proposed exemption, if granted, would permit relief from the general occupant protection requirements for multiple place side-facing seats on the Falcon Model 2000 airplanes. Section 25.785(a), Amendment 25-64, requirements for general occupant protection for occupants of multiple place side-facing seats that are occupied during takeoff and landing.	Since the granting of Exemption No. 5991, the petitioner has developed new designs of seats and restraint systems that can comply with the requirements of § 25.562(c)(5). The petitioner proposes demonstrating compliance with the requirements of § 25.562(c)(5) as part of the exemption from § 25.785(a). The FAA may refine the compliance criteria for multiple occupancy side-facing seating to establish an equivalent level of safety. This may include additional injury criteria related to neck loads or other injury mechanisms. The guidance will be updated accordingly, and the certification of multiple occupancy seating may be processed with special conditions in lieu of exemptions. Therefore, the FAA does not agree with the petitioner's request for exemption for all Falcon 2000 airplanes. The FAA will grant an exemption that will cover airplanes that are manufactured for a specific amount of time. Exemption only granted for Falcon 2000 airplanes manufactured prior to January 1, 2004. Other limitations as stated in Exemption must be met.	Multiple-place side-facing seat

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65	15 February 2000	Exemption (Partially Granted)	<u>7120</u>	Bombardier BD700-1A10 Global Express	19 Max	25.785(b) Amendment 25-64	The proposed exemption, if granted, would permit relief from the general occupant protection requirements for multiple place side-facing seats on BD700-1A10 Global Express airplanes. Section 25.785(b), Amendment 25-64, requirements for general occupant protection for occupants of multiple place side-facing seats that are occupied during takeoff and landing.	Use of the criteria from the FAA Memorandum, side-facing seats. The FAA may refine the compliance criteria for multiple occupancy side-facing seating to establish an equivalent level of safety. This may include additional injury criteria related to neck loads or other injury mechanisms. The guidance will be updated accordingly, and the certification of multiple occupancy seating may be processed with special conditions in lieu of exemptions. Therefore, the FAA does not agree with the petitioner's request for exemption for all Bombardier Global Model BD-7001A10 airplanes. The FAA will grant an exemption that will cover airplanes that are manufactured for a specific amount of time. During this time, the FAA may refine the compliance criteria for multiple occupancy side-facing seating. Exemption only granted for Bombardier Global Model BD-7001A10 airplanes manufactured prior to January 1, 2004. Other limitations as stated in Exemption must be met.	Multiple-place side-facing seat

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66	02 August 2000	Exemption (Partially Granted)	<u>7296</u>	Israel Aircraft Industries Galaxy (A53NM) model	19 Max	25.785(b) Amendment 25-64	Petition for an exemption from § 25.785(b) Title 14 Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit relief from the general occupant protection requirements for multiple place side-facing seats on Israel Aircraft Industries Galaxy (A53NM) model airplanes. Section 25.785(b), Amendment 25-64, requirements for general occupant protection for occupants of multiple place side-facing seats that are occupied during takeoff and landing.	Galaxy Aerospace Company and NORDAM Group has proposed to certify the seat and the body-to-body contact by demonstrating that there is no interaction between individual seat modules. The applicant would need to demonstrate that there is no interaction between individual seats by test. Without this testing the FAA can not accept the proposal to test the sofa as individual seat modules. This also applies to the Occupant Movement Envelope. The FAA may refine the compliance criteria for multiple occupancy side-facing seating to establish an equivalent level of safety. This may include additional injury criteria related to neck loads or other injury mechanisms. The guidance will be updated accordingly, and the certification of multiple occupancy seating may be processed with special conditions in lieu of exemptions. Therefore, the FAA does not agree with the petitioner's request for exemption for all IAI Galaxy (A53NM) airplanes. Exemption only granted for IAI Galaxy (A53NM) model airplanes manufactured prior to January 1, 2004. Other limitations as stated in Exemption must be met.	Multiple-place side-facing seat

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67	17 November 2000	Exemption (Partially Granted)	<u>7120A</u>	Bombardier BD700-1A10 Global Express	19 Max	25.785(b) Amendment 25-64	Petition for an amendment of Exemption 7120, previously issued on January 31, 2000. That exemption had granted Bombardier certain relief from the general occupant protection requirements of Title 14 Code of Federal Regulations (14 CFR) § 25.785(b) for occupants of multiple place side-facing seats on BD700-1A10 Global Express airplanes during takeoff and landing. The petitioner now requests that the FAA revise the original Exemption 7120 to take into account the divan certification criteria recognized by Transport Canada for the side-facing divans installed on aircraft operated under Canadian register. Without these criteria, the divan certification requirements included in FAA Exemption 7120 do not match those currently accepted by Transport Canada. Therefore, the petitioner requests a revision to Exemption 7120 in an effort to "harmonize" the divan certification requirements between the two countries. Section 25.785(b), Amendment 25-64, requirements for general occupant protection for occupants of multiple place side-facing seats that are occupied during takeoff and landing.	Regarding end closures, the FAA considers that use of the restraint system for this purpose is another means to achieve the same objective. Therefore, the current exemption provides the relief sought by this amendment. The FAA originally required 2 in of padding on the surface of structure that the an occupant could contact, in order to provide an unquantified, but nonetheless tangible, measure of energy absorption/injury protection. However, as noted by the petitioner, the requirements as they currently exist require measurement of several injury parameters, which, if satisfied without padding, should provide an acceptable level of safety. Therefore, the FAA considers that padding is not a specific requirement, if all the relevant injury criteria can be met. SID may not be required, but a test dummy suitable for measuring Thoracic Trauma Index and lateral pelvic acceleration is required when those measurements are required. The FAA has changed the name of the petitioner to Bombardier Aerospace, as requested. Other limitations as in Exemption 7120.	Multiple-place side-facing seat

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68	07 September 2001	Exemption (Partially Granted)	<u>7625</u>	Cessna Model 680	13 Max	25.785(b) Amendment 25-64	Petition for an exemption from the general occupant protection requirements of § 25.785(b) of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would permit the installation of a multiple-occupancy, side-facing divan in the Cessna Model 680 Sovereign airplane. Section 25.785(b), Amendment 25-64, requires general occupant protection for occupants of multiple place side-facing seats that are occupied during takeoff and landing.	Use of the criteria from the FAA Memorandum, side-facing seats. The FAA may refine the compliance criteria for multiple occupancy side-facing seating to establish an equivalent level of safety. This may include additional injury criteria related to neck loads or other injury mechanisms. The guidance will be updated accordingly, and the certification of multiple occupancy seating may be processed with special conditions in lieu of exemptions. Therefore, the FAA does not agree with the petitioner's request for exemption for all Cessna Model 680 airplanes. The FAA will grant an exemption that will cover airplanes that are manufactured for a specific amount of time. During this time, the FAA may refine the compliance criteria for multiple occupancy side-facing seating. Exemption only granted for Cessna Model 680 model airplanes manufactured prior to January 1, 2004. Other limitations as stated in Exemption must be met.	Multiple-place side-facing seat
69	14 June 2002	Exemption (Partially Granted)	<u>7811</u>	Embraer Model EMB135-BJ Legacy	44 Max	25.785(b) Amendment 25-64	Petition for an exemption from § 25.785(b) of Title 14 Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit relief from the general occupant protection requirements for multiple-place side-facing seats on the Embraer Model EMB-135BJ Legacy airplanes. Section 25.785(b), Amendment 25-64, requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	Use of the criteria from the FAA Memorandum, side-facing seats. The FAA may refine the compliance criteria for multiple occupancy side-facing seating to establish an equivalent level of safety. This may include additional injury criteria related to neck loads or other injury mechanisms. The guidance will be updated accordingly, and the certification of multiple occupancy seating may be processed with special conditions in lieu of exemptions. Petitioner's proposed change to criteria for certification agreed and disagreed as stated in Exemption. Other limitations as stated in Exemption must be met. NOTE: no time limitation as "The airplane must not be operated for hire, or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR part 125, 14 CFR part 91, and subpart F, as applicable."	Multiple-place side-facing seat

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70	09 September 2002	Exemption (Partially Granted)	<u>7878</u>	Embraer Model EMB135-BJ Legacy	44 Max	25.785(b) Amendment 25-64	Petition for reconsideration of the operational limitation of Exemption No. 7811. Exemption No. 7811 is a partial grant of exemption from § 25.785(b) of Title 14 Code of Federal Regulations (14 CFR) which permits relief from the general occupant protection requirements for multiple-place side-facing seats on Embraer Model EMB-135BJ airplanes. Section 25.785(b), Amendment 25-64, requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	The petitioner indicated that some exemptions were granted to other petitioners that did not include this operational limitation. However, those exemptions and all other exemptions granted from 25.785(b) for multiple-place side-facing divans (except the exemption granted previously to the petitioner [without time limitation]) have been granted with a time limitation of January 1, 2004. The FAA finds that it is in the public interest to grant time-limited exemptions without an operating limitation while the FAA conducts research to develop standardized criteria for all aircraft exempted from 25.785(b). However, the FAA finds that it is not in the public interest to grant permanent exemptions that include non-private use operation. Therefore, it is in the public interest to not grant relief for airplanes in non-private use operation once criteria for compliance with 25.785(b) is established. The FAA will grant an exemption that will cover only airplanes that are manufactured for a specific amount of time.	Multiple-place side-facing seat

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71	16 September 2002	Exemption (Partially Granted)	<u>7884</u>	Bombardier BD-100-1A10 (Challenger 300)	15 Max, 8 Executive	25.785(b) Amendment 25-88	Petition for an exemption from § 25.785(b) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit relief from the general occupant protection requirements for multiple-place side-facing seats on BD-100-1A10 airplanes. Section 25.785(b) requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing. [The applicant's petition letter requested exemption from 14 CFR 25.785(b) Amendment 25-64. The FAA assumes, however, that the petitioner meant to reference 14 CFR 25.785(b) Amendment 25-88, because that is the amendment level at which the Bombardier Model BD-100-1A10 series airplanes will be certificated.]	The applicant's petition for exemption from 25.785(b) is based on the FAA memorandum "Side-Facing Seats on Transport Category Airplanes"; Proposed changes to the criteria for the certification as addressed in the Exemption; The FAA may refine the compliance criteria for multiple occupancy side-facing seating to establish an equivalent level of safety. This may include additional injury criteria related to neck loads or other injury mechanisms. The guidance will be updated accordingly, and the certification of multiple occupancy seating may be processed with special conditions in lieu of exemptions. For this reason, the FAA does not agree with the petitioner's request for exemption for all Bombardier BD- 100-1A10 airplanes. The FAA will grant an exemption that will cover only airplanes that are manufactured for a specific amount of time. Exemption only granted for Bombardier Global Model BD-7001A10 airplanes manufactured prior to January 1, 2004. Other limitations as stated in Exemption must be met.	Multiple-place side- facing seat

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
72	20 November 2002	Exemption (Partially Granted)	<u>7922</u>	Cessna Model 750 (Citation X)	12 Max	25.785(b) Amendment 25-64	Petition for an exemption from the general occupant protection requirements of § 25.785(b) of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would permit the installation of a multiple-occupancy, side-facing divan in the Cessna Model 750 Citation X airplane. Section 25.785(b), Amendment 25-64, requirements for general occupant protection for occupants of multiple place side-facing seats that are occupied during takeoff and landing.	The applicant's petition for exemption from 25.785(b) is based on the FAA Memorandum, Side-Facing Seats on Transport Category Airplanes. The FAA may refine the compliance criteria for multiple occupancy side-facing seating to establish an equivalent level of safety. This may include additional injury criteria related to neck loads or other injury mechanisms. The guidance will be updated accordingly, and the certification of multiple occupancy seating may be processed with special conditions in lieu of exemptions. Therefore, the FAA does not agree with the petitioner's request for exemption for installation of side-facing seats installed on all Cessna Aircraft Company Model 750 aircraft. The FAA will grant an exemption that will cover airplanes that are manufactured for a specific amount of time. Exemption only granted for Cessna Aircraft Company Model 750 manufactured prior to January 1, 2004. Other limitations as stated in Exemption must be met.	Multiple-place side-facing seat
73	23 December 2002	Exemption (Granted)	<u>7120b</u>	Bombardier BD700-1A10 Global Express	19 Max	25.785(b)	An amendment to Exemption 7120A, previously issued on November 17, 2000. That exemption had granted Bombardier certain relief from the general occupant protection requirements of Title 14 Code of Federal Regulations (14 CFR) 25.785(b) for persons occupying multiple-place side-facing seats during takeoff and landing on BD700-1A10 airplanes. The petitioner now requests that the Federal Aviation Administration (FAA) amend Exemption 7120A to allow non-private use operation of the airplane. Section 25.785(b) requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; all other limits in Exemption 7120A still apply; exemption applicable to aircraft manufactured prior to January 1, 2004.	Multiple-place side-facing seat

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
74	31 March 2003	Exemption (Partially Granted)	<u>8007</u>	Dassault Falcon Model 2000EX	19 Max	25.785(b)	Petition for an exemption from § 25.785(b) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit relief from the general occupant protection requirements for multiple-place side-facing seats on Falcon 2000EX airplanes. Section 25.785(b) requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	The FAA concurs that the limitations in Exemption No. 7104 (exemption gained on basic Falcon 2000) are acceptable for Falcon 2000EX airplanes. Concerning the time limitation, the FAA may refine the compliance criteria for multiple-occupancy side-facing seating to establish an equivalent level of safety. As a result, the FAA will grant an exemption that will cover only airplanes that are manufactured for a specific amount of time. Exemption granted for Dassault Aviation Falcon 2000EX airplanes manufactured prior to January 1, 2004. Other limitations as stated in Exemption must be met.	Multiple-place side-facing seat
75	02 September 2003	Exemption (Granted)	<u>7120c</u>	Bombardier BD700-1A10 Global Express	19 Max	25.785(b)	An amendment to Exemption 7120B, previously issued on December 23, 2003. That exemption granted Bombardier certain relief from the general occupant protection requirements of Title 14 Code of Federal Regulations (14 CFR) 25.785(b) for persons occupying multiple-place side-facing seats during takeoff and landing on Bombardier Model BD700-1A10 airplanes manufactured before January 1, 2004. The petitioner now requests an amendment to Exemption No. 7120B to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004. Section 25.785(b) requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; all other limits in Exemption 7120B still apply.	Multiple-place side-facing seat

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
76	02 September 2003	Exemption (Granted)	<u>7884A</u>	Bombardier BD-100-1A10 (Challenger 300)	15 Max, 8 Executive	25.785(b)	Petition for an amendment to Exemption No. 7884, previously issued on September 16, 2002. That exemption granted Bombardier certain relief from the general occupant protection requirements of Title 14 Code of Federal Regulations (14 CFR) 25.785(b) for persons occupying multiple-place side-facing seats during takeoff and landing on Bombardier Model BD100-1A10 airplanes manufactured prior to January 1, 2004. The petitioner now requests an amendment to Exemption No. 7884 to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004. Section 25.785(b) requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; all other limits in Exemption 7884 still apply.	Multiple-place side-facing seat
77	24 November 2003	Exemption (Granted)	<u>7296A</u>	Gulfstream Model 200 / IAI Galaxy	19 Max	25.785(b) Amendment 25-64	FAA's Partial Grant of Exemption provided certain relief from the general occupant protection requirements of 14 CFR 25.785(b) for persons occupying multiple-place, side-facing seats manufactured by ERDA, Inc. during takeoff and landing. The partial grant applied only to Galaxy model airplanes manufactured prior to January 1, 2004. Subsequently, Gulfstream Aerospace Corporation acquired Galaxy Aerospace Company LP, Type Certificate A53NM, for the Galaxy model airplane and renamed the airplane the Gulfstream 200. The petitioner now requests that Exemption No. 7296 be amended to apply to seats in addition to those manufactured by ERDA, Inc. and to airplanes manufactured after January 1, 2004. Section 25.785(b), Amendment 25-64, is requirements for general protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; applicable to airplanes installed in accordance with Supplemental Type Certificate ST09848SC; all other limits in Exemption 7296 still apply.	Multiple-place side-facing seat

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
78	24 November 2003	Exemption (Granted)	<u>7625A</u>	Cessna Model 680	13 Max	25.785(b)	A petition for an amendment to Exemption 7625, previously issued on September 7, 2001. That exemption granted Cessna certain relief from the general occupant protection requirements of Title 14 Code of Federal Regulations § 25.785(b) 14 CFR 25.785(b) for persons occupying multiple-place side-facing seats during takeoff and landing on Cessna Model 680 airplanes manufactured before January 1, 2004. The petitioner now requests an amendment to Exemption No. 7625 to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004. Section 25.785(b) requires general protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; all other limits in Exemption 7625 still apply.	Multiple-place side-facing seat
79	01 December 2003	Exemption (Granted)	<u>7104A</u>	Dassault Falcon Model 2000	19 Max	25.785(a) Amendment 25-64	Petition for an amendment to Exemption No. 7104, previously issued on January 18, 2000. The petitioner now requests an amendment to Exemption No. 7104 to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004. Section 25.785(a) at Amendment 25-64 requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; all other limits in Exemption 7104 still apply.	Multiple-place side-facing seat
80	01 December 2003	Exemption (Granted)	<u>8007a</u>	Dassault Falcon Model 2000EX	19 Max	25.785(b)	Petition for an amendment to Exemption No. 8007, previously issued on March 31, 2003. That exemption granted Dassault Aviation certain relief from the general occupant protection requirements of Title 14 Code of Federal Regulations (14 CFR) 25.785(b) for persons occupying multiple-place side-facing seats during takeoff and landing on Falcon Model 2000EX airplanes manufactured prior to January 1, 2004. The petitioner now requests an amendment to Exemption No. 8007 to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004. Section 25.785(b) requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; all other limits in Exemption 8007 still apply.	Multiple-place side-facing seat

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
81	24 December 2003	Exemption (Granted)	<u>7878A</u>	Embraer Model EMB135-BJ Legacy	44 Max	25.785(b) Amendment 25-64	Petition for an amendment to Exemption No. 7878, previously issued on September 9, 2002. That exemption granted Embraer Empresa Brasileira de Aeronáutica S.A. certain relief from the general occupant protection requirements of Title 14, Code of Federal Regulations (14 CFR) 25.785(b), for persons occupying multiple-place side-facing seats during takeoff and landing on Embraer EMB 135BJ airplanes manufactured prior to January 1, 2004. The petitioner now requests an amendment to Exemption No. 7878 to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004. Section 25.785(b), Amendment 25-64, requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; all other limits in Exemption 7878 still apply.	Multiple-place side-facing seat
82	24 December 2003	Exemption (Granted)	<u>7922A</u>	Cessna Model 750 (Citation X)	12 Max	25.785(b) Amendment 25-64	Petition for an amendment to Exemption No. 7922, issued on November 20, 2002. That exemption granted Cessna Aircraft Company certain relief from the general occupant protection requirements of Title 14 Code of Federal Regulations (14 CFR) 25.785(b) for persons occupying multiple-place side-facing seats during takeoff and landing on Cessna Model 750 airplanes manufactured prior to January 1, 2004. The petitioner now requests an amendment to Exemption No. 7922 to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004. Section 25.785(b), Amendment 25-64, requirements for general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; all other limits in Exemption 7922 still apply.	Multiple-place side-facing seat
83	22 February 2005	Exemption (Granted)	<u>8498</u>	Gulfstream Model G150	9 Max	25.785(b)	Petition for an exemption from § 25.785(b) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit relief from the general occupant protection requirements for multiple-place side-facing seats on GALP new derivative model Gulfstream 150 (G150) airplanes. Section 25.785(b) requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	No method of compliance is available, FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed; 10 limitations stated in the exemption apply.	Multiple-place side-facing seat

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
84	13 June 2005	Exemption (Granted)	<u>7120D</u>	Bombardier BD700-1A11 Global 5000	19 Max	25.785(b)	An amendment to Exemption No. 7120C, previously issued on September 2, 2003. That exemption granted Bombardier certain relief from the general occupant protection requirements of § 25.785(b) of Title 14, Code of Federal Regulations (14 CFR), for persons occupying multiple-place side-facing seats during takeoff and landing on Bombardier Model BD-700-1A10 airplanes. The petitioner now requests an amendment to Exemption No. 7120C to include Bombardier Model BD-700-1A11 airplanes. Section 25.785(b), requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.	The Bombardier Model BD-700-1A11 airplane is a variant of the Bombardier Model BD-700-1A10 airplane, and both airplanes have the same certification basis; no request for changes to limitations and conditions for the amended exemption (as in 7120c).	Multiple-place side-facing seat
85	01 February 1994	Exemption (Granted)	<u>5832A</u>	Learjet Model 31A Serial Number 084	8 Max	25.811(f)(1), 25.811(f)(2)	Correction to typo in 5832	Correction to typo in 5832	N/A (Correction)
86	26 April 1996	Exemption (Partially Granted)	<u>6420A</u>	Learjet Model 45	10 Max	25.562(c)(5), 25.785(a)	Expiration date of exemption had been omitted.	Amendment to correction omission; Exemption 6420 expires December 31, 1996.	N/A (Correction)
87	01 July 1999	Exemption (Granted)	<u>6911</u>	Gulfstream Model G-V Serial numbers 560, 569, 573.	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25- 64]	Section 25.785(b) [Section 25.785(a) at Amendment 25-64] requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562 specifies dynamic test conditions for qualification of occupant injury criteria, as well as structural retention criteria.	Stretchers were not considered in the context of the dynamic test requirements of 25.562; demonstrating compliance would be very difficult, and applicability of the existing pass/fail criteria to these installations is questionable; cost would be prohibitive, and necessary medical attention will not be available; use of stretcher is limited, and on a case-by-case basis; full compliance with 25.561 for the stretcher required (consistent with standards for all seats prior to the adoption of 25.562).	Stretcher

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
88	13 July 1999	Exemption (Granted)	<u>6920</u>	Dassault Falcon Model 2000	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25- 64]	Section 25.785(b) [Section 25.785(a) at Amendment 25-64] requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562 specifies dynamic test conditions for qualification of occupant injury criteria, as well as structural retention criteria.	Stretchers were not considered in the context of the dynamic test requirements of 25.562; demonstrating compliance would be very difficult, and applicability of the existing pass/fail criteria to these installations is questionable; cost would be prohibitive, and necessary medical attention will not be available; use of stretcher is limited, and on a case-by-case basis; full compliance with 25.561 for the stretcher required (consistent with standards for all seats prior to the adoption of 25.562).	Stretcher
89	23 August 1999	Exemption (Granted)	<u>6952</u>	Cessna Model 560XL	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25- 64]	Section 25.785(b) [Section 25.785(a) at Amendment 25-64] requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562 specifies dynamic test conditions for qualification of occupant injury criteria, as well as structural retention criteria.	Stretchers were not considered in the context of the dynamic test requirements of 25.562; demonstrating compliance would be very difficult, and applicability of the existing pass/fail criteria to these installations is questionable; cost would be prohibitive, and necessary medical attention will not be available; use of stretcher is limited, and on a case-by-case basis; full compliance with 25.561 for the stretcher required (consistent with standards for all seats prior to the adoption of 25.562).	Stretcher
90	02 May 2000	Exemption (Granted)	<u>7189</u>	Gulfstream Model G-V	Air Ambulance	25.562, 25.785(b) Amendment 25-72	Section 25.562, as included by reference in Type Certificate Data Sheet (TCDS) A12EA for G-V airplanes, requires compliance with the structural and occupant protection requirements of § 25.562 as adopted by Amendment 25-64, except that shoulder harnesses on all seats may be provided in lieu of demonstrated compliance with the restraint strap loading, head protection, and femur loading test requirements of § 25.562(c)(1), (c)(5), and (c)(6), respectively. Section 25.785(b), as amended by Amendment 25-72, requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff 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 §§ 25.561 and 25.562.	Stretchers were not considered in the context of the dynamic test requirements of 25.562; demonstrating compliance would be very difficult, and applicability of the existing pass/fail criteria to these installations is questionable; cost would be prohibitive, and necessary medical attention will not be available; use of stretcher is limited, and on a case-by-case basis; full compliance with 25.561 for the stretcher required (consistent with standards for all seats prior to the adoption of 25.562).	Stretcher

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
91	16 August 2000	Exemption (Granted)	<u>7318</u>	Cessna Model 560XL	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25- 64]	Section 25.785(b) [Section 25.785(a) at Amendment 25-64] requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562 specifies dynamic test conditions for qualification of occupant injury criteria, as well as structural retention criteria.	Stretchers were not considered in the context of the dynamic test requirements of 25.562; demonstrating compliance would be very difficult, and applicability of the existing pass/fail criteria to these installations is questionable; cost would be prohibitive, and necessary medical attention will not be available; use of stretcher is limited, and on a case-by-case basis; full compliance with 25.561 for the stretcher required (consistent with standards for all seats prior to the adoption of 25.562).	Stretcher
92	14 May 2002	Exemption (Granted)	<u>7769</u>	Learjet Model 45 Serial Number 168	Air Ambulance	25.562, 25.785(b)	Section 25.785(b) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562 specifies dynamic test conditions for qualification of occupant injury criteria, as well as structural retention criteria.	Stretchers were not considered in the context of the dynamic test requirements of 25.562; demonstrating compliance would be very difficult, and applicability of the existing pass/fail criteria to these installations is questionable; cost would be prohibitive, and necessary medical attention will not be available; use of stretcher is limited, and on a case-by-case basis; full compliance with 25.561 for the stretcher required (consistent with standards for all seats prior to the adoption of 25.562).	Stretcher
93	03 October 2003	Exemption (Granted)	<u>8140</u>	Gulfstream Model G-V	Air Ambulance	25.562 Amendment 25- 64, 25.785(b) Amendment 25-72	Section 25.785(b) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562 specifies dynamic test conditions for qualification of occupant injury criteria, as well as structural retention criteria.	Stretchers were not considered in the context of the dynamic test requirements of 25.562; demonstrating compliance would be very difficult, and applicability of the existing pass/fail criteria to these installations is questionable; cost would be prohibitive, and necessary medical attention will not be available; use of stretcher is limited, and on a case-by-case basis; full compliance with 25.561 for the stretcher required (consistent with standards for all seats prior to the adoption of 25.562).	Stretcher

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
94	(February 1997)	Exemption (Granted)	<u>6625</u>	Cessna Model 750 (Citation X)	Air Ambulance	25.562, 25.785(b) [25.785(a) Amendment 25- 64]	Section 25.785(b) (Section 25.785(a) at Amendment 25-64) requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. Section 25.562 specifies dynamic test conditions for qualification of occupant injury criteria, as well as structural retention criteria. The exemption is for installing the LifePort PLUS and AeroSled system in the Cessna Model 750 (Citation X).	Demonstration of compliance with 25.562 would be very difficult, and applicability of the existing pass/fail criteria to these installations is questionable; the cost implications would be prohibitive, and necessary medical attention will not be available, hence, safety benefit from stretcher meeting requirement is moot; use of stretcher is limited and exposure is less; this is not considered a precedent setting finding; full compliance with 25.561 will be demonstrated for the stretcher; remainder of the seats will fully comply with 25.562.	Stretcher
95	23 August 2002	ELOS	<u>SP2095WI-T-AG-8</u>	Cessna Model 560XL	12 Max	25.815	Cessna Aircraft Company is requesting an Equivalent Level of Safety finding for 14 CFR 25.815, Width of Aisle, for the Model 560XL airplane. An Equivalent Level of Safety was granted by Issue Paper AG-7 dated December 12th, 1997 under FAA Project Number SP2095WI-T. This Equivalent Level of Safety allowed a minimum aisle width of 15 inches instead of 20 inches when measured above 25 inches from the floor for passenger configurations up to and including 12 passengers. Cessna is now requesting an equivalent level of safety to have an aisle width of 13 inches from 25 inches to 27.5 inches measured from the dropped aisle floor and 15 inches above 27.5 inches measured from the dropped aisle floor.	Cabin small compared to other Part 25 aircraft: only three seat rows between exits (11 ft as opposed to the allowed 60 ft), small number of passenger per exit compared to other Part 25 aircraft: only 5 passengers (6 maximum) per Type III exit.	Width of Aisle - Evacuation

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
96	27 September 2002	Exemption (Denied)	<u>7893</u>	Bombardier BD700-1A10 Global Express	19 Max	25.815 Amendment 25-38	Petition for an exemption from § 25.815 Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit a narrower passenger aisle width than required by § 25.815 on a Bombardier Model BD-700-1A10 airplane, serial number 9091. Section 25.815, Amendment 25-38, requires a minimum passenger aisle width of 12 inches below 25 inches from the floor and 20 inches above 25 inches from the floor for airplanes with passenger seating capacities of 11 to 19.	The petitioner indicated that the backrest of a seat on Model BD-700-1A10 airplane, serial number 9091, deformed 10.7 inches during dynamic testing per § 25.562. This deformation results in an aisle width of 12.12 inches above 25 inches from the floor on this airplane. This 33 percent reduction in aisle width is considered significant and would reduce the egress capability of 6 passengers on the airplane. Note that a 12.12-inch aisle is not acceptable per § 25.815 even for airplanes with passenger seating capacities of 10 or less; Although a grant of exemption clearly benefits the petitioner as a private entity, the FAA considers meeting the aisle requirements of § 25.815 to be in the traveling public's interest.	Width of Aisle - Evacuation
97	26 October 1999	Exemption (Partially Granted)	<u>7054</u>	Gulfstream Model G-IV Serial Numbers 1348 to 1390	19 Max	25.815	The proposed exemption, if granted, would permit movement of passenger seats into the required aisle space under certain circumstances on Gulfstream Model G-IV airplanes, airplane serial numbers 1348 through 1390. 14 CFR § 25.815 - Requires that minimum main aisle width in the passenger cabin be provided for all phases of airplane operation.	During a Cabin Safety Workshop sponsored by the FAA's Transport Airplane Directorate it became clear that there has been a non-standardized approach to compliance with § 25.815. Section 25.815 requires minimum aisle widths and, in the absence of exceptions in the rule, applies to all phases of flight, including taxi, takeoff, and landing. At the time the policy was developed for this rule, this requirement was intended to apply to all phases of flight. The FAA is giving great attention to the issue of transport category airplanes operated in private use. There are several regulatory requirements, including those relating to aisle width, for which it may be in the public interest to develop new criteria that take into account the differences between private use and air carrier operations. It is anticipated that, by October 1, 2004, any regulatory revisions described previously will have been adopted, and will address future operations of the subject airplanes. Provisions as stated in exemption must be met. Exemption expires on October 1, 2004.	Width of Aisle - Executive Seats

NO	DATE	ELOS/ EXEMPTION	DOCUMENT REFERENCE	AIRCRAFT	NO OF PASSENGER SEAT	CFR SECTIONS AFFECTED	BACKGROUND	ALTERNATE MEANS OF COMPLIANCE/REASON FOR GRANTING OR NOT GRANTING THE EXEMPTION	CATEGORY
98	26 October 1999	Exemption (Partially Granted)	<u>7055</u>	Gulfstream Model G-V Serial Numbers 554 to 583	19 Max	25.815	The proposed exemption, if granted, would permit movement of passenger seats into the required aisle space under certain circumstances on Gulfstream Model G-V airplanes, airplane serial numbers 554 through 583. 14 CFR § 25.815 - Requires that minimum main aisle width in the passenger cabin be provided for all phases of airplane operation.	During a Cabin Safety Workshop sponsored by the FAA's Transport Airplane Directorate it became clear that there has been a non-standardized approach to compliance with § 25.815. Section 25.815 requires minimum aisle widths and, in the absence of exceptions in the rule, applies to all phases of flight, including taxi, takeoff, and landing. At the time the policy was developed for this rule, this requirement was intended to apply to all phases of flight. The FAA is giving great attention to the issue of transport category airplanes operated in private use. There are several regulatory requirements, including those relating to aisle width, for which it may be in the public interest to develop new criteria that take into account the differences between private use and air carrier operations. It is anticipated that, by October 1, 2004, any regulatory revisions described previously will have been adopted, and will address future operations of the subject airplanes. Provisions as stated in exemption must be met. Exemption expires on October 1, 2004.	Width of Aisle - Executive Seats

APPENDIX B—AFFECTED CFR SECTIONS

Appendix B contains the Title 14 Code of Federal Regulations (CFR) Sections affected by the ELOS and Exemptions of the six Categories discussed in section 5.2 of the report, and their amendment list. When cited in the document, the particular requirement of the affected CFR Sections is highlighted.

Table B-1 shows the amendment list, which includes the amendment number, the effective date, and the current amendment number applicable.

Table B-1. Amendment List of Affected CFR Sections

CFR SECTION		Amendment Number	Effective Date	Status
Sec. 25.562	[Emergency landing dynamic conditions.]	25-64	06/16/1988	Current
Sec. 25.785	Seats, berths, safety belts, and harnesses.		02/01/1965	
	Seats, berths, safety belts, and harnesses.	25-15	10/24/1967	
	Seats, berths, safety belts, and harnesses.	25-20	04/23/1969	
	Seats, berths, safety belts, and harnesses.	25-32	05/01/1972	
	Seats, berths, safety belts, and harnesses.	25-51	03/06/1980	
	Seats, berths, safety belts, and harnesses.	25-64	06/16/1988	
	Seats, berths, safety belts, and harnesses.	25-72	08/20/1990	
	Seats, berths, safety belts, and harnesses.	25-88	12/09/1996	Current
Sec. 25.807	Passenger emergency exits.		02/01/1965	
	Passenger emergency exits.	25-15	10/24/1967	
	Passenger emergency exits.	25-32	05/01/1972	
	Passenger emergency exits.	25-39	02/10/1977	
	Passenger emergency exits.	25-46	12/01/1978	
	Passenger emergency exits.	25-55	04/28/1982	
	Passenger emergency exits.	25-67	07/24/1989	
	[Emergency exits.]	25-72	08/20/1990	
	Emergency exits.	25-88	12/09/1996	
	Emergency exits.	25-94	03/25/1998	
	Emergency exits.	25-114	06/02/2004	Current

CFR SECTION		Amendment Number	Effective Date	Status
Sec. 25.809	Emergency exit arrangement.		02/01/1965	
	Emergency exit arrangement.	25-1	06/07/1965	
	Emergency exit arrangement.	25-9	06/30/1966	
	Emergency exit arrangement.	25-15	10/24/1967	
	Emergency exit arrangement.	25-32	05/01/1972	
	Emergency exit arrangement.	25-34	12/31/1972	
	Emergency exit arrangement.	25-46	12/01/1978	
	Emergency exit arrangement.	25-47	12/24/1979	
	Emergency exit arrangement.	25-72	08/20/1990	
	Emergency exit arrangement.	25-114	06/02/2004	
	Emergency exit arrangement.	25-116	11/16/2004	Current
Sec. 25.810	[Emergency egress assist means and escape routes.]	25-72	08/20/1990	
	Emergency egress assist means and escape routes.	25-88	12/09/1996	
	Emergency egress assist means and escape routes.	25-114	06/02/2004	Current
Sec. 25.811	Emergency exit marking.		02/01/1965	
	Emergency exit marking.	25-1	06/07/1965	
	Emergency exit marking.	25-15	10/24/1967	
	Emergency exit marking.	25-32	05/01/1972	
	Emergency exit marking.	25-46	12/01/1978	
	Emergency exit marking.	25-79	09/27/1993	
	Emergency exit marking.	25-88	12/09/1996	Current
Sec. 25.812	[Emergency lighting.]	25-15	10/24/1967	
	Emergency lighting.	25-28	09/25/1971	
	Emergency lighting.	25-32	05/01/1972	
	Emergency lighting.	25-46	12/01/1978	
	Emergency lighting.	25-58	11/26/1984	

CFR SECTION		Amendment Number	Effective Date	Status
	Emergency lighting.	25-88	12/09/1996	
	Emergency lighting.	25-116	11/26/2004	Current
Sec. 25.813	Emergency exit access.		02/01/1965	
	Emergency exit access.	25-1	06/07/1965	
	Emergency exit access.	25-15	10/24/1967	
	Emergency exit access.	25-17	06/20/1968	
	Emergency exit access.	25-32	05/01/1972	
	Emergency exit access.	25-46	12/01/1978	
	Emergency exit access.	25-72	08/20/1990	
	Emergency exit access.	25-76	06/03/1992	
	Emergency exit access.	25-88	12/09/1996	
	Emergency exit access.	25-116	11/26/2004	Current
Sec. 25.815	Width of main aisle.		02/01/1965	
	[Width of aisle.]	25-15	10/24/1967	
	Width of aisle.	25-38	02/01/1977	Current

Sec. 25.562 (Amendment 25-64)

[Emergency landing dynamic conditions.]

[(a) The seat and restrain system in the airplane must be designed as prescribed in this section to protect each occupant during an emergency landing condition when—

(1) Proper use is made of seats, safety belts, and shoulder harnesses provided for in the design; and

(2) The occupant is exposed to loads resulting from the conditions prescribed in this section.

(b) Each seat type design approved for crew or passenger occupancy during takeoff and landing must successfully complete dynamic tests or be demonstrated by rational analysis based on dynamic tests of a similar type seat, in accordance with each of the following emergency landing conditions. The tests must be conducted with an occupant simulated by a 170-pound anthropomorphic test dummy, as defined by 49 CFR Part 572, Subpart B, or its equivalent, sitting in the normal upright position.

(1) A change in downward vertical velocity (Δv) of not less than 35 feet per second, with the airplane's longitudinal axis canted downward 30 degrees with respect to the horizontal plane and with the wings level. Peak floor deceleration must occur in not more than 0.08 seconds after impact and must reach a minimum of 14g.

(2) A change in forward longitudinal velocity (Δv) of not less than 44 feet per second, with the airplane's longitudinal axis horizontal and yawed 10 degrees either right or left, whichever would cause the greatest likelihood of the upper torso restraint system (where installed) moving off the occupant's shoulder, and with the wings level. Peak floor deceleration must occur in not more than 0.09 seconds after impact and must reach a minimum of 16g. Where floor rails or floor fittings are used to attach the seating devices to the test fixture, the rails or fittings must be misaligned with respect to the adjacent set of rails or fittings by at least 10 degrees vertically (i.e., out of parallel) with one rolled 10 degrees.

(c) The following performance measures must not be exceeded during the dynamic tests conducted in accordance with paragraph (b) of this section:

(1) Where upper torso straps are used for crewmembers, tension loads in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.

(2) The maximum compressive load measured between the pelvis and the lumbar column of the anthropomorphic dummy must not exceed 1,500 pounds.

(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 paragraph (b) of this section. 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 1,000 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 2,250 pounds 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 paragraphs (b)(1) and (b)(2) of this section to the extent they would impede rapid evacuation of the airplane occupants.]

Amdt. 25-64, Eff. 6/16/88

Sec. 25.783 (Amendment 25-72)

Doors.

- (a) Each 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 must be openable from both the inside and the outside, even though persons may be crowded against the door on the inside of the airplane. 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.
- (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 propellers when appropriate operating procedures are used.
- (e) There must be a 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 crewmembers using a flashlight or equivalent lighting source. In addition, there must be a visual warning means to signal the appropriate flight crewmembers 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 pressurization of the airplane 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 only meet paragraphs (e) and (f) of this section and be safeguarded against opening in flight as a result of mechanical failure or failure of a single structural element.]
- (h) Each passenger entry door in the side of the fuselage must qualify as a Type A, Type I, or Type II passenger emergency exit and must meet the requirements of Secs. 25.807 through 25.813 that apply to that type of passenger emergency exit.
- (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 Sec. 25.561(b)(3), acting separately relative to the surrounding structure.
 - (2) The airplane 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 be capable of being unlocked from the outside without the aid of special tools.

Sec. 25.785 (Amendment 25-64)

Seats, berths, safety belts, and harnesses.

[(a) Each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff 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 inertia forces specified in Sec. 25.561 and 25.562.]

(b) Each seat and berth must be approved.

(c) Each occupant of a seat that makes more than an 18 degree angle with the vertical plane containing the airplane centerline, must be protected from head injury by a safety belt and an energy absorbing rest that will support the arms, shoulders, head, and sine, or by a safety belt and shoulder harness that will prevent the head from contacting any injurious object. Each occupant of any other seat must be protected from head injury by a safety belt and, as appropriate to the type, location, and angle of facing of each seat, by one or more of the following:

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

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

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

(d) If the seat backs do not have a firm hand hold, there must be a hand grip or rail along each aisle to enable occupants to steady themselves while using the aisles in moderately rough air.

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

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

(g) Each seat at a flight deck station must have a combined safety belt and shoulder harness with a single-point release that permits the flight deck occupant, when seated with safety belt and shoulder harness fastened, to perform all of the occupant's necessary flight deck functions. There must be a means to secure each combined safety belt and shoulder harness when not in use, to prevent interference with the operation of the airplane and with rapid egress in an emergency.

(h) Flight attendant seats in passenger compartments must be near required floor level emergency exits and be 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 combined safety belt and shoulder harness, when not in use, to prevent interference with rapid egress in an emergency. In addition—

(1) To the extent possible without compromising their proximity to required floor level emergency exits, flight attendant seats must be located to provide a direct view of the cabin area for which the flight attendant is individually responsible.

(2) Flight attendant seats must—

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

(ii) Be positioned so that when not in use they will not interfere with the use of passageways and exits.

(i) Each seat, berth, and its supporting structure, must be designed for an occupant weight of 170 pounds, considering the maximum load factors, inertia forces, and reactions between the occupant, seat, and safety belt, harness or both at each relevant flight and ground load condition (including the emergency landing conditions prescribed in Sec. 25.561). For berths, the forward inertia force must be considered in accordance with paragraph (f) of this section and need not be considered with respect to the safety belt. In addition—

(1) The structural analysis and testing of the seats, berths, and their supporting structures may be determined by--

(i) Assuming that the critical load in the forward, sideward, downward, and rearward directions (as determined from the prescribed flight, ground, and emergency landing conditions) acts separately; and

(ii) 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 pilot forces prescribed in Sec. 25.395; and

(3) The inertia forces specified in Sec. 25.561 must be multiplied by a factor of 1.33 (instead of the fitting factor prescribed in Sec. 25.625) in determining the strength of the attachment of--

(i) Each seat to the structure; and

(ii) Each belt or harness to the seat or structure.

(j) Each flight attendant seat must be located to minimize the probability of its occupant suffering injury by being struck by items dislodged in a galley, or from a stowage compartment or serving cart. All items expected in these locations in service must be considered.

(k) Each forward observer's seat required by the operating rules must be shown to be suitable for use in conducting the enroute inspections prescribed by Sec. 121.581(a).

Amdt. 25-64, Eff. 6/16/88

Sec. 25.785 (Amendment 25-72)

Seats, berths, safety belts, and harnesses.

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

(b) Each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff 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 Secs. 25.561 and 25.562.

(c) Each seat or berth must be approved.

(d) Each occupant of a seat that makes more than an 18° angle with the vertical plane containing the airplane centerline must be protected from head injury by a safety belt and an energy absorbing rest that will support the arms, shoulders, head, and spine, or by a safety belt and shoulder harness that will prevent the head from contacting any injurious object. Each occupant of any other seat must be protected from head injury by a safety belt and, as appropriate to the type, location, and angle of facing of each seat, by one or more of the following:

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

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

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

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

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

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

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

(3) The inertia forces specified in Sec. 25.561 must be multiplied by a factor of 1.33 (instead of the fitting factor prescribed in Sec. 25.625) in determining the strength of the attachment of each seat to the structure and each belt or harness to the seat or structure.

(g) Each seat at a flight deck station must have a restraint system consisting of a combined safety belt and shoulder harness with a single-point release that permits the flight deck occupant, when seated with the restraint system fastened, to perform all of the occupant's necessary flight deck

functions. There must be a means to secure each combined restraint system when not in use to prevent interference with the operation of the airplane and with rapid egress in an emergency.

(h) Each seat located in the passenger compartment and designated for use during takeoff and landing by a flight attendant required by the operating rules of this chapter must be:

(1) Near a required floor level emergency exit, except that another location if the emergency egress of passengers would be enhanced with that location. A flight attendant seat must be located adjacent to each Type A emergency exit. Other flight attendant 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 flight attendant 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 minimize 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 airplane 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 enroute inspection.]

Amdt. 25-72, Eff. 8/20/90

Sec. 25.785 (Amendment 25-88)

Seats, berths, safety belts, and harnesses.

- (a) A seat (or berth for a nonambulant person) must be provided for each occupant who has reached his or her second birthday.
- (b) Each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff 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 Secs. 25.561 and 25.562.
- (c) Each seat or berth must be approved.
- (d) Each occupant of a seat that makes more than an 18° angle with the vertical plane containing the airplane centerline 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 the head injury by a safety belt and, as appropriate to the type, location, and angle of facing of each seat, by one or more of the following:
 - (1) A shoulder harness that will prevent the head from contacting any injurious object.
 - (2) The elimination of any injurious object within striking radius of the head.
 - (3) An energy absorbing rest that will support the arms, shoulders, head, and spine.
- (e) Each berth must be designed so that the forward part has a padded end board, canvas diaphragm, or equivalent means, that can withstand the static load reaction of the occupant when subjected to the forward inertia force specified in Sec. 25.561. Berths must be free from corners and protuberances likely to cause injury to a person occupying the berth during emergency conditions.
- (f) Each seat or berth, and its supporting structure, and each safety belt or harness and its anchorage must be designed for an occupant weight of 170 pounds, considering the maximum load factors, inertia forces, and reactions among the occupant seat, safety belt, and harness for each relevant flight and ground load condition (including the emergency landing conditions prescribed in Sec. 25.561).

In addition—

 - (1) The structural analysis and testing of the seats, berths, and their supporting structures may be determined by assuming that the critical load in the forward, sideward, downward, upward, and rearward directions (as determined from the prescribed flight, ground, and emergency landing conditions) acts separately or using selected combinations of loads if the required strength in each specified direction is substantiated. The forward load factor need not be applied to safety belts for berths.
 - (2) Each pilot seat must be designed for the reactions resulting from the application of the pilot forces prescribed in Sec. 25.395.
 - (3) The inertia forces specified in Sec. 25.561 must be multiplied by a factor of 1.33 (instead of the fitting factor prescribed in Sec. 25.625) in determining the strength of the attachment of each seat to the structure and each belt or harness to the seat or structure.
- (g) Each seat at a flight deck station must have a restraint system consisting of a combined safety belt and shoulder harness with a single-point release that permits the flight deck occupant, when seated with the restraint system fastened, to perform all of the occupant's necessary flight deck

functions. There must be a means to secure each combined restraint system when not in use to prevent interference with the operation of the airplane and with rapid egress in an emergency.

(h) Each seat located in the passenger compartment and designated for use during takeoff and landing by a flight attendant required by the operating rules of this chapter 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 flight attendant seat must be located adjacent to each Type A or B emergency exit. Other flight attendant 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 flight attendant 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 minimize 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 airplane 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 enroute inspection.

Amdt. 25-88, Eff. 12/9/96

Sec. 25.807 (Amendment 25-15)

Passenger emergency exits.

[(a) *Type and location.* For the purpose of this part, the types and locations of exits are as follows:

(1) *Type I.* This type must have a rectangular opening of not less than 24 inches wide by 48 inches high, with corner radii not greater than one-third the width of the exit. Type I exits must be floor level exits.

(2) *Type II.* This type must have a rectangular opening of not less than 20 inches wide by 44 inches 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 airplane of more than 10 inches nor a step-down outside the airplane of more than 17 inches.

(3) *Type III.* This type must have a rectangular opening of not less than 20 inches wide by 36 inches high, with corner radii not greater than one-third the width of the exit, located over the wing, with a step-up inside the airplane of not more than 20 inches and a step-down outside the airplane of not more than 27 inches.

(4) *Type IV.* This type must have a rectangular opening of not less than 19 inches wide by 26 inches high, with corner radii not greater than one-third the width of the exit, located over the wing, with a step-up inside the airplane of not more than 29 inches and a step-down outside the airplane of not more than 36 inches.

(5) *Ventral.* This type is an exit from the passenger compartment through the pressure shell and the bottom fuselage skin. The dimensions and physical configuration of this type of exit must allow at least the same rate of egress as a Type I with the airplane in the normal ground attitude, with landing gear extended.

(6) *Tail cone.* This type is an aft exit from the passenger compartment through the pressure shell and through an openable cone of the fuselage aft of the pressure shell. The means of opening the tail cone must be simple and obvious, and must employ a single operation.

(7) *Type A.* An emergency exit may be designated as a Type A exit if the following criteria are met:

(i) There must be a rectangular opening not less than 42 inches wide by 72 inches high, with corner radii not greater than one-sixth of the width of the exit.

(ii) It must be a floor level exit.

(iii) Unless there are two or more main (fore and aft) aisles, the exit must be located so that there is passenger flow along the main aisle to that exit from both the forward and aft direction.

(iv) There must be an unobstructed passageway at least 36 inches wide leading from each exit to the nearest main aisle.

(v) If two or more main aisles are provided, there must be unobstructed cross aisles at least 20 inches wide between main aisles. There must be a cross aisle leading directly to each passageway between the exit and the nearest main aisle.

(vi) There must be at least one seat adjacent to each such exit that could be occupied by a flight attendant.

(vii) Adequate assist space next to each Type A exit must be provided at each side of the passageway, to allow the crewmember(s) to assist in the evacuation of passengers without

reducing the unobstructed width of the passageway below that required by subdivision (iv) of this subparagraph.

(viii) At each non-over-wing exit there must be installed a slide capable of carrying simultaneously two parallel lines of evacuees.

(ix) Each overwing exit having a step-down must have an assist means 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. Step-down distance as used in this section means the actual distance between the bottom of the required opening and a usable foothold, extending out from the fuselage, that is large enough to be effective without searching by sight or feel.]

(b) *Accessibility.* Each required passenger emergency exit must be accessible to the passengers and located where it will afford the most effective means of passenger evacuation. Openings larger than those specified in this section, whether or not of rectangular shape, may be used if—

(1) The specified rectangular opening can be inscribed within the opening; and

(2) The base of the inscribed rectangular opening meets the specified step-up and step-down heights.

[(c) *Passenger emergency exits.* The prescribed exits need not be diametrically opposite each other nor identical in size and location on both sides. They must be distributed as uniformly as practicable taking into account passenger distribution. The first floor level exit on each side of the fuselage must be in the rearward part of the passenger compartment unless another location affords a more effective means of passenger evacuation. Where more than one floor level exit per side is prescribed, at least one floor level exit per side must be located near each end of the cabin, except that this provision does not apply to combination cargo/passenger configurations. Exits must be provided as follows:

(1) Except as provided in subparagraphs (2) through (8) of this paragraph, the number and type of passenger emergency exits must be in accordance with the following table:

Passenger seating capacity (cabin attendants not included)	Emergency exits for each side of the fuselage			
	Type I	Type II	Type III	Type IV
1 through 10	-----	-----	-----	1
11 through 19	-----	-----	1	-----
20 through 39	-----	1	-----	1
40 through 59	1	-----	-----	1
60 through 79	1	-----	1	-----
80 through 109	1	-----	1	1
110 through 139	2	-----	1	-----
140 through 179	2	-----	2	-----

(2) Two Type IV exits may be installed instead of each required Type III exit prescribed in subparagraph (1) of this paragraph.

(3) If slides meeting the requirements of Sec. 25.809(f)(1) are installed at floor level exits (other than overwing exits), the passenger/emergency exit relationship specified in subparagraph (1) of this paragraph may be increased by—

- (i) Not more than five passengers on airplanes with at least two of these exits; and
- (ii) Not more than 10 passengers on airplanes with at least four of these exits. However, no increase in passenger seating capacity is allowed under this subparagraph if an increase in passenger seating capacity is obtained under subparagraph (4) of this paragraph.

(4) An increase in passenger seating capacity above the maximum permitted under subparagraph (1) of this paragraph but not to exceed a total of 299 may be allowed in accordance with the following table for each additional pair of emergency exits in excess of the minimum number prescribed in subparagraph (1) of this paragraph for 179 passengers:

<i>Additional emergency exits (each side of fuselage)</i>	<i>Increase in passenger seating capacity allowed</i>
Type A	100
Type I	45
Type II	40
Type III	35

(5) For passenger capacities in excess of 299, each emergency exit in the side of the fuselage must be either a Type A or a Type I. A passenger seating capacity of 100 is allowed for each pair of Type A exits and a passenger seating capacity of 45 is allowed for each pair of Type I exits.

(6) If a passenger ventral or tail cone exit is installed and can be shown to allow a rate of egress at least equivalent to that of Type III exit with the airplane in the most adverse exit opening condition because of the collapse of one or more legs of the landing gear, an increase in passenger seating capacity beyond the limits specified in subparagraph (1), (4), or (5) of this paragraph may be allowed as follows:

- (i) For a ventral exit, 12 additional passengers.
- (ii) For a tail cone exit incorporating a floor level opening of not less than 20 inches wide by 60 inches high, with corner radii not greater than one-third the width of the exit, in the pressure shell and incorporating an approved assist means in accordance with Sec. 25.809(f)(1), 25 additional passengers; or
- (iii) For a tail cone exit incorporating an opening in the pressure shell which is at least equivalent to a Type III emergency exit with respect to dimensions, step-up and step-down distance, and with the top of the opening not less than 56 inches from the passenger compartment floor, 15 additional passengers.

(7) For airplanes on which the vertical location of the wing does not allow the installation of overwing exits, an exit of at least the dimensions of a Type III must be installed instead of each Type III and each Type IV exit required by subparagraph (1) of this paragraph.

(8) Each emergency exit in the passenger compartment in excess of the minimum number of required emergency exits must meet the applicable requirements of Secs. 25.809 through 25.812, and must be readily accessible.

(d) *Ditching emergency exits for passengers.* If the emergency exits required by paragraph (c) of this section do not meet subparagraphs (1) and (2) of this paragraph, exits must be added to meet them:

(1) A Type IV exit on each side of the airplane, both above the waterline, with a passenger seating capacity of 10 or less.

(2) A Type III exit for airplanes with a passenger seating capacity of 11 or more, with at least one emergency exit above the waterline for each unit (or part of a unit) of 35 passengers, but no less than two such exits, with one on each side of the airplane. However, where it has been shown through analysis, ditching demonstrations, or any other tests found necessary by the Administrator, that the evacuation capability of the airplane during ditching is improved by the use of larger exits or by other means, the passenger/exit ratio may be increased.

(3) If side exits cannot be 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 airplanes with a passenger capacity of 35 or less, the two required Type III side exits need be replaced by only one overhead hatch.

(4) Two Type IV exits may be installed instead of each required Type III exit.]

Amdt. 25-15, Eff. 10/24/67

Sec. 25.807 (Amendment 25-46)

Passenger emergency exits.

(a) *Type and location.* For the purpose of this Part, the types and locations of exits are as follows:

(1) *Type I.* This type must have a rectangular opening of not less than 24 inches wide by 48 inches high, with corner radii not greater than one-third the width of the exit. Type I exits must be floor level exits.

(2) *Type II.* This type must have a rectangular opening of not less than 20 inches wide by 44 inches 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 airplane of more than 10 inches nor a stepdown outside the airplane of more than 17 inches.

(3) *Type III.* This type must have a rectangular opening of not less than 20 inches wide by 36 inches high, with corner radii not greater than one-third the width of the exit, and with a step-up inside the airplane of not more than 20 inches. If the exit is located over-the-wing the step-down outside the airplane may not exceed 27 inches.

(4) *Type IV.* This type must have a rectangular opening of not less than 19 inches wide by 26 inches high, with corner radii not greater than one-third the width of the exit, located over the wing, with a step-up inside the airplane of not more than 29 inches and a stepdown outside the airplane of not more than 36 inches.

(5) *Ventral.* This type is an exit from the passenger compartment through the pressure shell and the bottom fuselage skin. The dimensions and physical configuration of this type of exit must allow at least the same rate of egress as a Type I with the airplane in the normal ground attitude, with landing gear extended.

(6) *Tail cone.* This type is an aft exit from the passenger compartment through the pressure shell and through an openable cone of the fuselage aft of the pressure shell. The means of opening the tail cone must be simple and obvious, and must employ a single operation.

(7) *Type A.* An emergency exit may be designated as a Type A exit if the following criteria are met:

(i) There must be a rectangular opening not less than 42 inches wide by 72 inches high, with corner radii not greater than one-sixth of the width of the exit.

(ii) It must be a floor level exit.

(iii) Unless there are two or more main (fore and aft) aisles, the exit must be located so that there is passenger flow along the main aisle to that exit from both the forward and aft direction.

(iv) There must be an unobstructed passageway at least 36 inches wide leading from each exit to the nearest main aisle.

(v) If two or more main aisles are provided, there must be unobstructed cross aisles at least 20 inches wide between main aisles. There must be a cross aisle leading directly to each passageway between the exit and the nearest main aisle.

[(vi) There must be at least one flight attendant seat, which meets the requirements of Secs. 25.785(h) and (i), adjacent to each such exit.]

(vii) Adequate assist space next to each Type A exit must be provided at each side of the passageway, to allow the crewmember(s) to assist in the evacuation of passengers without

reducing the unobstructed width of the passageway below that required by subdivision (iv) of this subparagraph.

(viii) At each non-over-wing exit there must be installed a slide capable of carrying simultaneously two parallel lines of evacuees.

(ix) Each overwing exit having a step-down must have an assist means 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.

Stepdown distance as used in this section means the actual distance between the bottom of the required opening and a usable foothold, extending out from the fuselage, that is large enough to be effective without searching by sight or feel.

(b) *Accessibility.* Each required passenger emergency exit must be accessible to the passengers and located where it will afford the most effective means of passenger evacuation. Openings larger than those specified in this section, whether or not of rectangular shape, may be used if—

(1) The specified rectangular opening can be inscribed within the opening; and

(2) The base of the inscribed rectangular opening meets the specified step-up and step-down heights.

(c) *Passenger emergency exits.* The prescribed exits need not be diametrically opposite each other nor identical in size and location on both sides. They must be distributed as uniformly as practicable taking into account passenger distribution. If only one floor level exit per side is prescribed, and the airplane does not have a tail cone or ventral emergency exit, the floor level exits must be in the rearward part of the passenger compartment, unless another location affords a more effective means of passenger evacuation. Where more than one floor level exit per side is prescribed, at least one floor level exit per side must be located near each end of the cabin, except that this provision does not apply to combination cargo/passenger configurations. Exits must be provided as follows:

(1) Except as provided in subparagraphs (2) through (6) of this paragraph, the number and type of passenger emergency exits must be in accordance with the following table:

Passenger seating configuration (crewmember seats not included)	Emergency exits for each side of the fuselage			
	Type I	Type II	Type III	Type IV
1 through 9	-----	-----	-----	1
10 through 19	-----	-----	1	-----
20 through 39	-----	1	1	-----
40 through 79	1	-----	1	-----
80 through 109	1	-----	2	-----
110 through 139	2	-----	1	-----
140 through 179	2	-----	2	-----

(2) An increase in the passenger seating configuration above the maximum permitted under subparagraph (1) of this paragraph but not to exceed a total of 299 seats may be allowed in accordance with the following table for each additional pair of emergency exits in excess of the minimum number prescribed in subparagraph (1) of this paragraph for 179 passenger seats:

<i>Additional emergency exits (each side of fuselage)</i>	<i>Increase in passenger seating configuration allowed</i>
Type A	110
Type I	45
Type II	40
Type III	35

(3) For passenger seating configurations in excess of 299 seats, each emergency exit in the side of the fuselage must be either a Type A or Type I. A passenger seating configuration of 110 seats is allowed for each pair of Type A exits and a passenger seating configuration of 45 seats is allowed for each pair of Type I exits.

(4) If a passenger ventral or tail cone exit is installed and can be shown to allow a rate of egress at least equivalent to that of a Type III exit with the airplane in the most adverse exit opening condition because of the collapse of one or more legs of the landing gear, an increase in the passenger seating configuration beyond the limits specified in subparagraph (1), (2), or (3) of this paragraph may be allowed as follows:

(i) For a ventral exit, 12 additional passenger seats.

(ii) For a tail cone exit incorporating a floor level opening of not less than 20 inches wide by 60 inches high, with corner radii not greater than one-third the width of the exit, in the pressure shell and incorporating an approved assist means in accordance with Sec. 25.809(f)(1), 25 additional passenger seats.

(iii) For a tail cone exit incorporating an opening in the pressure shell which is at least equivalent to a Type III emergency exit with respect to dimensions, step-up and step-down distance, and with the top of the opening not less than 56 inches from the passenger compartment floor, 15 additional passenger seats.

(5) For airplanes on which the vertical location of the wing does not allow the installation of overwing exits, an exit of at least the dimensions of a Type III exit must be installed instead of each Type IV exit required by subparagraph (1) of this paragraph.

(6) Each emergency exit in the passenger compartment in excess of the minimum number of required emergency exits must meet the applicable requirements of Secs. 25.809 through 25.812, and must be readily accessible.

(d) *Ditching emergency exits for passengers.* Ditching emergency exits must be provided in accordance with the following requirements, unless the emergency exits required by paragraph (c) of this section already meet them:

(1) For airplanes that have a passenger seating configuration, excluding pilots seats, of nine seats or less, one exit above the waterline in each side of the airplane, meeting at least the dimensions of a Type IV exit.

(2) For airplanes that have a passenger seating configuration, excluding pilots seats, of 10 seats or more, one exit above the waterline in a side of the airplane, 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 airplane. However, where it has been shown through analysis, ditching demonstrations, or any other tests found necessary by the Administrator, that the evacuation capability of the airplane during ditching is improved by the use of larger exits, or by other means, the passenger seat/exit ratio may be increased.

(3) If side exits cannot be 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 airplanes with a passenger configuration, excluding pilots seats, of 35 seats or less, the two required Type III side exits need be replaced by only one overhead hatch.

Amdt. 25-46, Eff. 12/1/78

Sec. 25.807 (Amendment 25-55)

Passenger emergency exits.

(a) *Type and location.* For the purpose of this Part, the types and locations of exits are as follows:

(1) *Type I.* This type must have a rectangular opening of not less than 24 inches wide by 48 inches high, with corner radii not greater than one-third the width of the exit. Type I exits must be floor level exits.

(2) *Type II.* This type must have a rectangular opening of not less than 20 inches wide by 44 inches 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 airplane of more than 10 inches nor a stepdown outside the airplane or more than 17 inches.

(3) *Type III.* This type must have a rectangular opening of not less than 20 inches wide by 36 inches high, with corner radii not greater than one-third the width of the exit, and with a step-up inside the airplane of not more than 20 inches. If the exit is located over-the-wing the step-down outside the airplane may not exceed 27 inches.

(4) *Type IV.* This type must have a rectangular opening of not less than 19 inches wide by 26 inches high, with corner radii not greater than one-third the width of the exit, located over the wing, with a step-up inside the airplane of not more than 29 inches and a stepdown outside the airplane of not more than 36 inches.

(5) *Ventral.* This type is an exit from the passenger compartment through the pressure shell and the bottom fuselage skin. The dimensions and physical configuration of this type of exit must allow at least the same rate of egress as a type I with the airplane in the normal ground attitude, with landing gear extended.

(6) *Tail cone.* This type is an aft exit from the passenger compartment through the pressure shell and through an openable cone of the fuselage aft of the pressure shell. The means of opening the tail cone must be simple and obvious, and must employ a single operation.

(7) *Type A.* An emergency exit may be designated as a Type A exit if the following criteria are met:

(i) There must be a rectangular opening not less than 42 inches wide by 72 inches high, with corner radii not greater than one-sixth of the width of the exit.

(ii) It must be a floor level exit.

(iii) Unless there are two or more main (fore and aft) aisles, the exit must be located so that there is passenger flow along the main aisle to that exit from both the forward and aft direction.

(iv) There must be an unobstructed passageway at least 36 inches wide leading from each exit to the nearest main aisle.

(v) If two or more main aisles are provided, there must be unobstructed cross aisles at least 20 inches wide between main aisles. There must be a cross aisle leading directly to each passageway between the exit and the nearest main aisle.

(vi) There must be at least one flight attendant seat, which meets the requirements of Secs. 25.785(h) and (i), adjacent to each such exit.

(vii) Adequate assist space next to each Type A exit must be provided at each side of the passageway, to allow the crewmember(s) to assist in the evacuation of passengers without

reducing the unobstructed width of the passageway below that required by subdivision (iv) of this subparagraph.

(viii) At each non-over-wing exit there must be installed a slide capable of carrying simultaneously two parallel lines of evacuees.

(ix) Each overwing exit having a stepdown must have an assist means 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.

Stepdown distance as used in this section means the actual distance between the bottom of the required opening and a usable foothold, extending out from the fuselage, that is large enough to be effective without searching by sight or feel.

(b) *Accessibility.* Each required passenger emergency exit must be accessible to the passengers and located where it will afford the most effective means of passenger evacuation. Openings larger than those specified in this section, whether or not of rectangular shape, may be used if—

- (1) The specified rectangular opening can be inscribed within the opening; and
- (2) The base of the inscribed rectangular opening meets the specified step-up and step-down heights.

(c) *Passenger emergency exits.* The prescribed exits need not be diametrically opposite each other nor identical in size and location on both sides. They must be distributed as uniformly as practicable taking into account passenger distribution. If only one floor level exit per side is prescribed, and the airplane does not have a tail cone or ventral emergency exit, the floor level exits must be in the rearward part of the passenger compartment, unless another location affords a more effective means of passenger evacuation. Where more than one floor level exit per side is prescribed, at least one floor level exit per side must be located near each end of the cabin, except that this provision does not apply to combination cargo/passenger configurations. Exits must be provided as follows:

(1) Except as provided in subparagraphs (2) through (6) of this paragraph, the number and type of passenger emergency exits must be in accordance with the following table:

Passenger seating configuration (crewmember seats not included)	Emergency exits for each side of the fuselage			
	Type I	Type II	Type III	Type IV
1 through 9	-----	-----	-----	1
10 through 19	-----	-----	1	-----
20 through 39	-----	1	1	-----
40 through 70	1	-----	1	-----
80 through 109	1	-----	2	-----
110 through 139	2	-----	1	-----
140 through 170	2	-----	2	-----

(2) An increase in the passenger seating configuration above the maximum permitted under subparagraph (1) of this paragraph but not to exceed a total of 299 seats may be allowed in accordance with the following table for each additional pair of emergency exits in excess of the minimum number prescribed in subparagraph (1) of this paragraph for 179 passenger seats:

<i>Additional emergency exits (each side of fuselage)</i>	<i>Increase in passenger seating configuration allowed</i>
Type A -----	110
Type I -----	45
Type II ----- -	40
Type III ----- -	35

(3) For passenger seating configurations in excess of 299 seats, each emergency exit in the side of the fuselage must be either a Type A or Type I. A passenger seating configuration of 110 seats is allowed for each pair of Type A exits and a passenger seating configuration of 45 seats is allowed for each pair of Type I exits.

(4) If a passenger ventral or tail cone exit is installed and can be shown to allow a rate of egress at least equivalent to that of a Type III exit with the airplane in the most adverse exit opening condition because of the collapse of one or more legs of landing gear, an increase in the passenger seating configuration beyond the limits specified in subparagraph (1), (2), or (3) of this paragraph may be allowed as follows:

(i) For a ventral exit, 12 additional passenger seats.

(ii) For a tail cone exit incorporating a floor level opening of not less than 20 inches wide by 60 inches high, with corner radii not greater than one-third the width of the exit, in the pressure shell and incorporating an approved assist means in accordance with Sec. 25.809(f)(1), 25 additional passenger seats.

(iii) For a tail cone exit incorporating an opening in the pressure shell which is at least equivalent to a Type III emergency exit with respect to dimensions, step-up and step-down distance, and with the top of the opening not less than 56 inches from the passenger compartment floor, 15 additional passenger seats.

(5) For airplanes on which the vertical location of the wing does not allow the installation of overwing exits, an exit of at least the dimensions of a Type III exit must be installed instead of each Type IV exit required by subparagraph (1) of this paragraph.

(6) Each emergency exit in the passenger compartment in excess of the minimum number of required emergency exits must meet the applicable requirements of Secs 25.809 through 25.812 and must be readily accessible.

(d) *Ditching emergency exits for passengers.* [Whether or not ditching certification is requested, ditching emergency exits must be provided in accordance with the following requirements,] unless the emergency exits required by paragraph (c) of this section already meet them:

(1) For airplanes that have a passenger seating configuration, excluding pilots seats, of nine seats or less, one exit above the waterline in each side of the airplane, meeting at least the dimensions of a Type IV exit.

(2) For airplanes that have a passenger seating configuration, excluding pilots seats, of 10 seats or more, one exit above the waterline in a side of the airplane, meeting at least the dimensions of a Type III exit, for each unit (or part of a unit) of 35 passenger seats, but not less than two such exits in the passenger cabin, with one on each side of the airplane. However, where it has been shown through analysis, ditching demonstrations, or any other test found necessary by the Administrator, that the evacuation capability of the airplane during ditching is improved by the use of larger exits, or by other means, the passenger seat/exit ratio may be increased.

(3) If side exits cannot be 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 airplanes with a passenger configuration, excluding pilots seats, of 35 seats or less, the two required Type III side exits need be replaced by only one overhead hatch.

Amdt. 25-55, Eff. 4/28/82

Sec. 25.807 (Amendment 25-94)

Emergency exits.

(a) *Type.* For the purpose of this part, 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 wide by 48 inches high, with corner radii not greater than eight inches.

(2) *Type II.* This type is a rectangular opening of not less than 20 inches wide by 44 inches high, with corner radii not greater than seven inches. Type II exits must be floor-level exits unless located over the wing, in which case they must not have a step-up inside the airplane of more than 10 inches nor a step-down outside the airplane of more than 17 inches.

(3) *Type III.* This type is a rectangular opening of not less than 20 inches wide by 36 inches high with corner radii not greater than seven inches, and with a step-up inside the airplane of not more than 20 inches. If the exit is located over the wing, the step-down outside the airplane may not exceed 27 inches.

(4) *Type IV.* This type is a rectangular opening of not less than 19 inches wide by 26 inches high, with corner radii not greater than 6.3 inches, located over the wing, with a step-up inside the airplane of not more than 29 inches and a step-down outside the airplane of not more than 36 inches.

(5) *Ventral.* This type is an exit from the passenger compartment through the pressure shell and the bottom of the fuselage skin. The dimensions and physical configuration of this type of exit must allow at least the same rate of egress as a Type I exit with the airplane in the normal ground attitude, with landing gear extended.

(6) *Tailcone.* This type is an aft exit from the passenger compartment through the pressure shell and through an openable cone of the fuselage aft of the pressure shell. The means of opening the tailcone must be simple and obvious and must employ a single operation.

(7) *Type A.* This type is a floor-level exit with a rectangular opening of not less than 42 inches wide by 72 inches high, with corner radii not greater than seven inches.

(8) *Type B.* This type is a floor-level exit with a rectangular opening of not less than 32 inches wide by 72 inches high, with corner radii not greater than six inches.

(9) *Type C.* This type is a floor-level exit with a rectangular opening of not less than 30 inches wide by 48 inches high, with corner radii not greater than 10 inches.

(b) *Step down distance.* Step down distance, as used in this section, 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 section, 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 step-down heights.

(d) *Asymmetry.* Exits of an exit pair need not be diametrically opposite each other nor of the same size; however, the number of passenger seats permitted under paragraph (g) of this section is based on the smaller of the two exits.

(e) *Uniformity.* Exits must be distributed as uniformly as practical, taking into account passenger seat distribution.

(f) *Location.*

(1) Each required passenger emergency exit must be accessible to the passengers and located where it will afford the most effective means of passenger evacuation.

(2) If only one floor-level exit per side is prescribed, and the airplane does not have a tailcone or ventral emergency exit, the floor-level exits must be in the rearward part of the passenger compartment unless another location affords a more effective means of passenger evacuation.

(3) If more than one floor-level exit per side is prescribed, and the airplanes does not have a combination cargo and passenger configuration, at least one floor-level exit must be located in each side near each end of the cabin.

[(4) For an airplane that is required to have more than one passenger emergency exit for each side of the fuselage, no passenger emergency exit shall be more than 60 feet from any adjacent passenger emergency exit on the same side of the same deck of the fuselage, as measured parallel to the airplane's longitudinal axis between the nearest exit edges.]

(g) *Type and number required.* The maximum number of passenger seats permitted depends on the type and number of exits installed in each side of the fuselage. Except as further restricted in paragraphs (g)(1) through (g)(9) of this section, the maximum number of passenger seats permitted for each exit of a specific type installed in each side of the fuselage is as follows:

Type A	110
Type B	75
Type C	55
Type I	45
Type II	40
Type III	35
Type IV	9

(1) For a passenger seating configuration of 1 to 9 seats, there must be at least one Type IV or larger overwing exit in each side of the fuselage or, if overwing exits are not provided, at least one exit in each side that meets the minimum dimensions of a Type III exit.

(2) For a passenger seating configuration of more than 9 seats, each exit must be a Type III or larger exit.

(3) For a passenger seating configuration of 10 to 19 seats, there must be at least one Type III or larger exit in each side of the fuselage.

(4) For a passenger seating configuration of 20 to 40 seats, there must be at least two exits, one of which must be a Type II or larger exit, in each side of the fuselage.

(5) For a passenger seating configuration of 41 to 110 seats, there must be at least two exits, one of which must be a Type I or larger exit, in each side of the fuselage.

(6) For a passenger seating configuration of more than 110 seats, the emergency exits in each side of the fuselage must include at least two Type I or larger exits.

(7) The combined maximum number of passenger seats permitted for all Type III exits is 70, and the combined maximum number of passenger seats permitted for two Type III exits in each side of the fuselage that are separated by fewer than three passenger seat rows is 65.

(8) If a Type A, Type B, or Type C exit is installed, there must be at least two Type C or larger exits in each side of the fuselage.

(9) If a passenger ventral or tailcone exit is installed and that exit provides at least the same rate of egress as a Type III exit with the airplane in the most adverse exit opening condition that

would result from the collapse of one or more legs of the landing gear, an increase in the passenger seating configuration is permitted as follows:

(i) For a ventral exit, 12 additional passenger seats.

(ii) For a tailcone exit incorporating a floor level opening of not less than 20 inches wide by 60 inches high, with corner radii not greater than seven inches, in the pressure shell and incorporating an approved assist means in accordance with Sec. 25.810(a), 25 additional passenger seats.

(iii) For a tailcone exit incorporating an opening in the pressure shell which is at least equivalent to a Type III emergency exit with respect to dimensions, step-up and step-down distance, and with the top of the opening not less than 56 inches from the passenger compartment floor, 15 additional passenger seats.

(h) *Excess exits.* Each emergency exit in the passenger compartment in excess of the minimum number of required emergency exits must meet the applicable requirements of Sec. 25.809 through 25.812, and must be readily accessible.

(i) *Ditching emergency exits for passengers.* Whether or not ditching certification is requested, ditching emergency exits must be provided in accordance with the following requirements, unless the emergency exits required by paragraph (g) of this section already meet them:

(1) For airplanes that have a passenger seating configuration of nine or fewer seats, excluding pilot seats, one exit above the waterline in each side of the airplane, meeting at least the dimensions of a Type IV exit.

(2) For airplanes that have a passenger seating configuration of 10 or more seats, excluding pilot seats, one exit above the waterline in a side of the airplane, 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 airplane. 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 airplanes with a passenger configuration of 35 or fewer seats, excluding pilot seats, the two required Type III side exits need be replaced by only one overhead hatch.

[(j) *Flightcrew emergency exits.* For airplanes in which the proximity of passenger emergency exits to the flightcrew area does not offer a convenient and readily accessible means of evacuation of the flightcrew, and for all airplanes having a passenger seating capacity greater than 20, flightcrew exits shall be located in the flightcrew 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 airplane; or, alternatively, a top hatch shall be provided. Each exit must encompass an unobstructed rectangular opening of at least 19 by 20 inches unless satisfactory exit utility can be demonstrated by a typical crewmember.]

Amdt. 25-94, Eff. 3/25/98

Sec. 25.809 (Amendment 25-72)

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 airplane 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 ten 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 crewmembers trained in their use.

[(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 paragraph (b) of this section 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 paragraphs (b) and (c) of this section.

[(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 crewmembers to determine that each emergency exit, for which the initial opening movement is outward, is fully locked.

[(g)] There must be provisions to minimize the probability of jamming of the emergency exits resulting from fuselage deformation in a minor crash landing.

[(h)] When required by the operating rules for any large passenger-carrying turbojet-powered airplane, each ventral exit and tailcone exit must be—

(1) Designed and constructed so that it cannot be opened during flight; and

(2) Marked with a placard readable from a distance of 30 inches and installed at a conspicuous location near the means of opening the exit, stating that the exit has been designed and constructed so that it cannot be opened during flight.

Amdt. 25-72, Eff. 8/20/90

Sec. 25.811 (Amendment 25-79)

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 airplane 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 30 inches.
 - [(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) Each Type A, Type I, and Type II passenger emergency exit with a locking mechanism released by rotary motion of the handle must be marked—
 - (i) With a red arrow, with a shaft at least three-fourths of an inch wide and a head twice the width of the shaft, extending along at least 70 degrees of arc at a radius approximately equal to three-fourths of the handle length.
 - (ii) So that the centerline of the exit handle is within ± 1 inch of the projected point of the arrow when the handle has reached full travel and has released the locking mechanism, and
 - (iii) With the word "open" in red letters 1 inch high, placed horizontally near the head of the arrow.
- (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 airplane. In addition, the following apply:
 - (1) The outside marking for each passenger emergency exit in the side of the fuselage must include a 2-inch colored band outlining the exit.
 - (2) Each outside marking including the band, must have color contrast to be readily distinguishable from the surrounding fuselage surface. The contrast must be such that if the

reflectance of the darker color is 15 percent or less, the reflectance of the lighter color must be at least 45 percent. "Reflectance" is the ratio of the luminous flux reflected by a body to the luminous flux it receives. When the reflectance of the darker color is greater than 15 percent, at least a 30-percent difference between its reflectance and the reflectance of the lighter color must be provided.

(3) In the case of exits other than those in the side of the fuselage, such as ventral or tail cone exits, the external means of opening, including instructions if applicable, must be conspicuously marked in red, or bright chrome yellow if the background color is such that red is inconspicuous. When the opening means 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 paragraph (d) of this section may use the word "exit" in its legend in place of the term "emergency exit".

Amdt. 25-79, Eff. 9/27/93

Sec. 25.811 (Amendment 25-88)

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 airplane 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 30 inches.
 - [(2) Each Type A, Type B, Type C or Type I passenger emergency exit operating handle 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) Each Type A, Type B, Type C, Type I, or Type II passenger emergency exit with a locking mechanism released by rotary motion of the handle must be marked--]
 - (i) With a red arrow, with a shaft at least three-fourths of an inch wide and a head twice the width of the shaft, extending along at least 70 degrees of arc at a radius approximately equal to three-fourths of the handle length.
 - (ii) So that the centerline of the exit handle is within ± 1 inch of the projected point of the arrow when the handle has reached full travel and has released the locking mechanism, and
 - (iii) With the word "open" in red letters 1 inch high, placed horizontally near the head of the arrow.
- (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 airplane. In addition, the following apply:
 - (1) The outside marking for each passenger emergency exit in the side of the fuselage must include a 2-inch colored band outlining the exit.
 - (2) Each outside marking including the band, must have color contrast to be readily distinguishable from the surrounding fuselage surface. The contrast must be such that if the reflectance of the darker color is 15 percent or less, the reflectance of the lighter color must be at

least 45 percent. "Reflectance" is the ratio of the luminous flux reflected by a body to the luminous flux it receives. When the reflectance of the darker color is greater than 15 percent, at least a 30-percent difference between its reflectance and the reflectance of the lighter color must be provided.

(3) In the case of exits other than those in the side of the fuselage, such as ventral or tailcone exits, the external means of opening, including instructions if applicable, must be conspicuously marked in red, or bright chrome yellow if the background color is such that red is inconspicuous. When the opening means 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 paragraph (d) of this section may use the word "exit" in its legend in place of the term "emergency exit".

Amdt. 25-88, Eff. 12/9/96

Sec. 25.812 (Amendment 25-88)

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 airplanes 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 Sec. 25.811(d)(1) and each passenger emergency exit marking sign required by Sec. 25.811(d)(2) must have red letters at least 1½ 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 Sec. 25.811(d)(3) must have red letters at least 1½ 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 colors may be reversed in the case of a sign that is self-illuminated by other than electrical means.

(2) For airplanes that have a passenger seating configuration, excluding pilot seats, of nine seats or less, that are required by Sec. 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 colors may be reversed in the case of a sign that is self-illuminated by other than electrical means.

(c) General illumination in the passenger cabin must be provided so that when measured along the centerline 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(s) 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 left.

(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 six inches of and parallel to the floor and is centered 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 feet 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 feet above the cabin floor.

(f) Except for subsystems provided in accordance with paragraph (h) of this section that serve no more than one assist means, are independent of the airplane'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 flight attendant seat.

(2) There must be a flight crew warning light which illuminates when power is on in the airplane 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 flight attendant 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 airplane's normal electric power. There must be a means to safeguard against inadvertent operation of the control device from the "armed" or "on" positions.

(g) Exterior emergency lighting must be provided as follows:

(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 incident light) along the 30 percent of the slip-resistant portion of the escape route required in Sec. 25.810(c) that is farthest from the exit for the minimum required width of the escape route; 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 Sec. 25.809(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 Sec. 25.809(f)(1) and (h) to assist the occupants in descending to the ground must be illuminated so that the erected assist means is visible from the airplane.

(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 airplane 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 airplane'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 incident light) at the ground end of the erected assist means where an evacuee would normally make first contact with the ground, with the airplane 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 airplane'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 Sec. 25.561(b).
- (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 percent 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 Sec. 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 airplane remains operative exclusive of those that are directly damaged by the separation.

Amdt. 25-88, Eff. 12/9/96

Sec. 25.812 (Amendment 25-116)

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 airplanes 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 Sec. 25.811(d)(1) and each passenger emergency exit marking sign required by Sec. 25.811(d)(2) must have red letters at least 1½ 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 Sec. 25.811(d)(3) must have red letters at least 1½ 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 colors may be reversed in the case of a sign that is self-illuminated by other than electrical means.

(2) For airplanes that have a passenger seating configuration, excluding pilot seats, of nine seats or less, that are required by Sec. 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 colors may be reversed in the case of a sign that is self-illuminated by other than electrical means.

(c) General illumination in the passenger cabin must be provided so that when measured along the centerline 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(s) 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 left.

(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 six inches of and parallel to the floor and is centered 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 feet 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 feet above the cabin floor.

(f) Except for subsystems provided in accordance with paragraph (h) of this section that serve no more than one assist means, are independent of the airplane'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 flight attendant seat.

(2) There must be a flight crew warning light which illuminates when power is on in the airplane 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 flight attendant 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 airplane's normal electric power. There must be a means to safeguard against inadvertent operation of the control device from the "armed" or "on" positions.

(g) Exterior emergency lighting must be provided as follows:

(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 incident light) for a minimum width of 42 inches for a Type A overwing emergency exit and two feet for all other overwing emergency exits along the 30 percent of the slip-resistant portion of the escape route required in Sec. 25.810(c) 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 Sec. 25.810(a) 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 Sec. 25.810(a) and (d) to assist the occupants in descending to the ground must be illuminated so that the erected assist means is visible from the airplane.]

(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 airplane 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 airplane'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 incident light) at the ground end of the erected assist means where an evacuee would normally make first contact with the ground, with the airplane 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 airplane'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 Sec. 25.561(b).
- (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 percent 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 Sec. 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 airplane remains operative exclusive of those that are directly damaged by the separation.

Amdt. 25-116, Eff. 11/26/2004

Sec. 25.813 (Amendment 25-46)

Emergency exit access.

- (a) There must be a passageway between individual passenger areas, and leading from each aisle to each Type I and Type II emergency exit. These passageways must be unobstructed and at least 20 inches wide.
- (b) For each passenger emergency exit covered by Sec. 25.809(f), there must be enough space next to the exit to allow a crewmember to assist in the evacuation of passengers without reducing the unobstructed width of the passageway below that required for the exit.
- (c) There must be access from each aisle to each Type III or Type IV exit, and—
 - [(1) For airplanes that have a passenger seating configuration, excluding pilot's seats, of 20 or more, the projected opening of the exit provided may not be obstructed and there must be no interference in opening the exit by seats, berths, or other protrusions (including seatbacks in any position) for a distance from that exit not less than the width of the narrowest passenger seat installed on the airplane;]
 - (2) For airplanes that have a passenger seating configuration, excluding pilots seats, of 19 or less, there may be minor obstructions in this region, if there are compensating factors to maintain the effectiveness of the 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) No door may be installed in any partition between passenger compartments.
- (f) If it is necessary to pass through a doorway separating the passenger cabin from other areas to reach any required emergency exit from any passenger 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 Sec. 25.561(b).

Amdt. 25-46, Eff. 12/1/78

Sec. 25.813 (Amendment 25-76)

Emergency exit access.

Each required emergency exit must be accessible to the passengers and located where it will afford an effective means of evacuation. Emergency exit distribution must be as uniform as practical, taking passenger distribution into account; however, the size and location of exits on both sides of the cabin need not be symmetrical. If only one floor level exit per side is prescribed, and the airplane does not have a tail cone or ventral emergency exit, the floor level exit must be in the rearward part of the passenger compartment, unless another location affords a more effective means of passenger evacuation. Where more than one floor level exit per side is prescribed, at least one floor level exit per side must be located near each end of the cabin, except that this provision does not apply to combination cargo/passenger configurations. In addition—

[(a) There must be a passageway leading from the nearest main aisle to each Type I, Type II, or Type A emergency exit and between individual passenger areas. Each passageway leading to a Type A exit must be unobstructed and at least 36 inches wide. Passageways between individual passenger areas and those leading to Type I or Type II emergency exits must be unobstructed and at least 20 inches wide. Unless there are two or more main aisles, each Type A exit must be located so that there is passenger flow along the main aisle to that exit from both the forward and aft directions. If two or more main aisles are provided, there must be unobstructed cross-aisles at least 20 inches wide between main aisles. There must be—

(1) A cross-aisle which leads directly to each passageway between the nearest main aisle and a Type A exit; and

(2) A cross-aisle which leads to the immediate vicinity of each passageway between the nearest main aisle and a Type I, Type II, or Type III exit except that when two Type III exits are located within three passenger rows of each other, a single cross-aisle may be used if it leads to the vicinity between the passageways from the nearest main aisle to each exit.]

(b) Adequate space to allow crewmember(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 Sec. 25.810(a).

(3) For any other type exit that is covered by Sec. 25.810(a), space must be at least be provided at one side of the passageway.

[(c) The following must be provided for each Type III or Type IV exit—

(1) There must be access from the nearest aisle to each exit. In addition, for each Type III exit in an airplane that has a passenger seating configuration of 60 or more--

(i) Except as provided in paragraph (c)(1)(ii), the access must be provided by an unobstructed passageway that is at least 10 inches in width for interior arrangements in which the adjacent seat rows on the exit side of the aisle contain no more than two seats, or 20 inches in width for interior arrangements in which those rows contain three seats. The width of the passageway must be measured with adjacent seats adjusted to their most adverse position. The centerline of the required passageway width must not be displaced more than 5 inches horizontally from that of the exit.

(ii) In lieu of one 10- or 20-inch passageway, there may be two passageways, between seat rows only, that must be at least 6 inches in width and lead to an unobstructed space adjacent to each exit. (Adjacent exits must not share a common passageway.) The width of the passageways must be measured with adjacent seats adjusted to their most adverse position. The unobstructed space adjacent to the exit must extend vertically from the floor to the ceiling (or bottom of sidewall stowage bins), inboard from the exit for a distance not less than the width of the narrowest passenger seat installed on the airplane, and from the forward edge of the forward passageway to the aft edge of the aft passageway. The exit opening must be totally within the fore and aft bounds of the unobstructed space.

(2) In addition to the access-

(i) For airplanes that have a passenger seating configuration of 20 or more, the projected opening of the exit provided must not be obstructed and there must be no interference in opening the exit by seats, berths, or other protrusions (including any seatback in the most adverse position) for a distance from that exit not less than the width of the narrowest passenger seat installed on the airplane.

(ii) For airplanes that have a passenger seating configuration of 19 or fewer, there may be minor obstructions in this region, if there are compensating factors to maintain the effectiveness of the exit.

(3) For each Type III exit, regardless of the passenger capacity of the airplane in which it is installed, there must be placards that—

(i) Are readable by all persons seated adjacent to and facing a passageway to the exit:

(ii) Accurately state or illustrate the proper method of opening the exit, including the use of handholds; and

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

(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) No door may be installed in any partition between passenger compartments.

(f) If it is necessary to pass through a doorway separating the passenger cabin from other areas to reach any required emergency exit from any passenger 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 Sec. 25.561(b).

Amdt. 25-76, Eff. 6/3/92

Sec. 25.813 (Amendment 25-88)

Emergency exit access.

Each required emergency exit must be accessible to the passengers and located where it will afford an effective means of evacuation. Emergency exit distribution must be as uniform as practical, taking passenger distribution into account; however, the size and location of exits on both sides of the cabin need not be symmetrical. If only one floor level exit per side is prescribed, and the airplane does not have a tailcone or ventral emergency exit, the floor level exit must be in the rearward part of the passenger compartment, unless another location affords a more effective means of passenger evacuation. Where more than one floor level exit per side is prescribed, at least one floor level exit per side must be located near each end of the cabin, except that this provision does not apply to combination cargo/passenger configurations. In addition—

[(a) There must be a passageway leading from the nearest main aisle to each Type A, Type B, Type C, Type I, or Type II emergency exit and between individual passenger areas. Each passageway leading to a Type A or Type B exit must be unobstructed and at least 36 inches wide. Passageways between individual passenger areas and those leading to Type I, Type II, or Type C emergency exits must be unobstructed and at least 20 inches wide. Unless there are two or more main aisles, each Type A or B exit must be located so that there is passenger flow along the main aisle to that exit from both the forward and aft directions. If two or more main aisles are provided, there must be unobstructed cross-aisles at least 20 inches wide between main aisles. There must be—

(1) A cross-aisle which leads directly to each passageway between the nearest main aisle and a Type A or B exit; and]

(2) A cross-aisle which leads to the immediate vicinity of each passageway between the nearest main aisle and a Type I, Type II, or Type III exit; except that when two Type III exits are located within three passenger rows of each other, a single cross-aisle may be used if it leads to the vicinity between the passageways from the nearest main aisle to each exit.

[(b) Adequate space to allow crewmember(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 or Type B exit, assist space must be provided at each side of the exit regardless of whether a means is required by Sec. 25.810(a) to assist passengers in descending to the ground from that exit.

(3) Assist space must be provided at one side of any other type exit required by Sec. 25.810(a) to have a means to assist passengers in descending to the ground from that exit.]

(c) The following must be provided for each Type III or Type IV exit—

(1) There must be access from the nearest aisle to each exit. In addition, for each Type III exit in an airplane that has a passenger seating configuration of 60 or more--

(i) Except as provided in paragraph (c)(1)(ii), the access must be provided by an unobstructed passageway that is at least 10 inches in width for interior arrangements in which the adjacent seat rows on the exit side of the aisle contain no more than two seats, or 20 inches in width for interior arrangements in which those rows contain three seats. The width of the passageway must

be measured with adjacent seats adjusted to their most adverse position. The centerline of the required passageway width must not be displaced more than 5 inches horizontally from that of the exit.

(ii) In lieu of one 10- or 20-inch passageway, there may be two passageways, between seat rows only, that must be at least 6 inches in width and lead to an unobstructed space adjacent to each exit. (Adjacent exits must not share a common passageway.) The width of the passageways must be measured with adjacent seats adjusted to their most adverse position. The unobstructed space adjacent to the exit must extend vertically from the floor to the ceiling (or bottom of sidewall stowage bins), inboard from the exit for a distance not less than the width of the narrowest passenger seat installed on the airplane, and from the forward edge of the forward passageway to the aft edge of the aft passageway. The exit opening must be totally within the fore and aft bounds of the unobstructed space.

(2) In addition to the access—

(i) For airplanes that have a passenger seating configuration of 20 or more, the projected opening of the exit provided must not be obstructed and there must be no interference in opening the exit by seats, berths, or other protrusions (including any seatback in the most adverse position) for a distance from that exit not less than the width of the narrowest passenger seat installed on the airplane.

(ii) For airplanes that have a passenger seating configuration of 19 or fewer, there may be minor obstructions in this region, if there are compensating factors to maintain the effectiveness of the exit.

(3) For each Type III exit, regardless of the passenger capacity of the airplane in which it is installed, there must be placards that--

(i) Are readable by all persons seated adjacent to and facing a passageway to the exit;

(ii) Accurately state or illustrate the proper method of opening the exit, including the use of handholds; and

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

(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) No door may be installed in any partition between passenger compartments.

(f) If it is necessary to pass through a doorway separating the passenger cabin from other areas to reach any required emergency exit from any passenger 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 Sec. 25.561(b).

Amdt. 25-88, Eff. 12/9/96

Sec. 25.813 (Amendment 25-116)

Emergency exit access.

Each required emergency exit must be accessible to the passengers and located where it will afford an effective means of evacuation. Emergency exit distribution must be as uniform as practical, taking passenger distribution into account; however, the size and location of exits on both sides of the cabin need not be symmetrical. If only one floor level exit per side is prescribed, and the airplane does not have a tailcone or ventral emergency exit, the floor level exit must be in the rearward part of the passenger compartment, unless another location affords a more effective means of passenger evacuation. Where more than one floor level exit per side is prescribed, at least one floor level exit per side must be located near each end of the cabin, except that this provision does not apply to combination cargo/passenger configurations. In addition—

(a) There must be a passageway leading from the nearest main aisle to each Type A, Type B, Type C, Type I, or Type II emergency exit and between individual passenger areas. Each passageway leading to a Type A or Type B exit must be unobstructed and at least 36 inches wide. Passageways between individual passenger areas and those leading to Type I, Type II, or Type C emergency exits must be unobstructed and at least 20 inches wide. Unless there are two or more main aisles, each Type A or B exit must be located so that there is passenger flow along the main aisle to that exit from both the forward and aft directions. If two or more main aisles are provided, there must be unobstructed cross-aisles at least 20 inches wide between main aisles. There must be—

(1) A cross-aisle which leads directly to each passageway between the nearest main aisle and a Type A or B exit; and

(2) A cross-aisle which leads to the immediate vicinity of each passageway between the nearest main aisle and a Type I, Type II, or Type III exit; except that when two Type III exits are located within three passenger rows of each other, a single cross-aisle may be used if it leads to the vicinity between the passageways from the nearest main aisle to each exit.

(b) Adequate space to allow crewmember(s) to assist in the evacuation of passengers must be provided as follows:

[(1) Each assist space must be a rectangle on the floor, of sufficient size to enable a crewmember, standing erect, to effectively assist evacuees. The assist space must not reduce the unobstructed width of the passageway below that required for the exit.

(2) For each Type A or B exit, assist space must be provided at each side of the exit regardless of whether an assist means is required by Sec. 25.810(a).

(3) For each Type C, I or II exit installed in an airplane with seating for more than 80 passengers, an assist space must be provided at one side of the passageway regardless of whether an assist means is required by Sec. 25.810(a).

(4) For each Type C, I or II exit, an assist space must be provided at one side of the passageway if an assist means is required by Sec. 25.810(a).

(5) For any tailcone exit that qualifies for 25 additional passenger seats under the provisions of Sec. 25.807(d)(3)(ii), an assist space must be provided, if an assist means is required by Sec. 25.810(a). (6) There must be a handle, or handles, at each assist space, located to enable the crewmember to steady himself or herself:

(i) While manually activating the assist means (where applicable) and,

- (ii) While assisting passengers during an evacuation.]
- (c) The following must be provided for each Type III or Type IV exit—
 - (1) There must be access from the nearest aisle to each exit. In addition, for each Type III exit in an airplane that has a passenger seating configuration of 60 or more--
 - (i) Except as provided in paragraph (c)(1)(ii), the access must be provided by an unobstructed passageway that is at least 10 inches in width for interior arrangements in which the adjacent seat rows on the exit side of the aisle contain no more than two seats, or 20 inches in width for interior arrangements in which those rows contain three seats. The width of the passageway must be measured with adjacent seats adjusted to their most adverse position. The centerline of the required passageway width must not be displaced more than 5 inches horizontally from that of the exit.
 - (ii) In lieu of one 10- or 20-inch passageway, there may be two passageways, between seat rows only, that must be at least 6 inches in width and lead to an unobstructed space adjacent to each exit. (Adjacent exits must not share a common passageway.) The width of the passageways must be measured with adjacent seats adjusted to their most adverse position. The unobstructed space adjacent to the exit must extend vertically from the floor to the ceiling (or bottom of sidewall stowage bins), inboard from the exit for a distance not less than the width of the narrowest passenger seat installed on the airplane, and from the forward edge of the forward passageway to the aft edge of the aft passageway. The exit opening must be totally within the fore and aft bounds of the unobstructed space.
 - (2) In addition to the access—
 - (i) For airplanes that have a passenger seating configuration of 20 or more, the projected opening of the exit provided must not be obstructed and there must be no interference in opening the exit by seats, berths, or other protrusions (including any seatback in the most adverse position) for a distance from that exit not less than the width of the narrowest passenger seat installed on the airplane.
 - (ii) For airplanes that have a passenger seating configuration of 19 or fewer, there may be minor obstructions in this region, if there are compensating factors to maintain the effectiveness of the exit.
 - (3) For each Type III exit, regardless of the passenger capacity of the airplane in which it is installed, there must be placards that--
 - (i) Are readable by all persons seated adjacent to and facing a passageway to the exit;
 - (ii) Accurately state or illustrate the proper method of opening the exit, including the use of handholds; and
 - (iii) If the exit is a removable hatch, state the weight of the hatch and indicate an appropriate location to place the hatch after removal.
 - (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) No door may be installed between any passenger seat that is occupiable for takeoff and landing and any passenger emergency exit, such that the door crosses any egress path (including aisles, crossaisles and passageways).
 - (f) If it is necessary to pass through a doorway separating any crewmember seat (except those seats on the flightdeck), occupiable for takeoff and landing, from any emergency exit, the door must have a means to latch it in the 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 Sec. 25.561(b).]

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