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DEPARTMENT OF  
TRANSPORTATION

Federal Aviation Administration  
[14 CFR Parts 21, 25, 37, 121]  
[Docket No. 9605; Notice 69-33]

TRANSPORT CATEGORY AIRPLANES;  
CRASHWORTHINESS AND PASSENGER  
EVACUATION

Notice of Proposed Rule Making

The Federal Aviation Administration is considering amending the emergency evacuation requirements and operating procedures for transport category airplanes.

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Communications should identify the regulatory docket or notice number and be submitted in duplicate to: Federal Aviation Administration, Office of the General Counsel, Attention: Rules Docket, GC-24, 800 Independence Avenue SW., Washington, D.C. 20590. All communications received on or before October 13, 1969, will be considered by the Administrator before taking action on the proposed rule. The proposal contained in this notice may be changed in the light of comments received. All comments submitted will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons.

In Amendment 25-15, adopted on September 15, 1967, which established detailed emergency evacuation equipment and operating requirements for transport category airplanes, the FAA advised that it would consider additional revisions to the regulations as advances in the state-of-the-art allowed in order to further increase the probability of occupant survival in an airplane accident. To this end, Government and industry development programs were established to find ways to increase passenger and crew survivability through improvements in interior materials, fire suppression systems, emergency lighting and exit awareness, and evacuation systems.

This notice reflects the recommendations of the Aerospace Industries Association (AIA) as set forth in their Petition for Rulemaking filed April 30, 1969, and the recommendation of the National Electrical Manufacturers' Association (NEMA) as set forth in their Petition for Rulemaking filed July 25, 1968. It also contains various additional proposals which the FAA considers appropriate.

The following discussion concerns the more significant proposals presented in this notice. For convenience the matters will be considered in the order of their appearance in the Federal Aviation Regulations.

Part 25. It is proposed to increase the ultimate inertia forces currently prescribed in § 25.561(b)(3) for upward and sideward loads, and to specify an ultimate inertia force for aft loads, for transport category airplanes. The FAA has found that seats and seat attachments in airplanes designed to the current standards generally meet the higher ultimate inertia forces proposed herein. It is proposed to amend the regulations accordingly.

The FAA proposes to add a new § 25.562 that is designed to reduce the occurrence of fuel fires in and around an airplane following the initial crash impact. The FAA is particularly concerned with crash landings in which one or more landing gear legs do not remain extended and the airplane consequently slides to a stop. However, the FAA is also concerned with those crash landings that are the result of an excessive sink rate at impact, even though the landing gear remain properly extended. It is therefore proposed to require that the airplane be designed so that it can be landing under these conditions without sustaining a structural component failure that would result in the spillage of enough fuel to constitute a fire hazard, or that would cause serious injury to any occupant.

Current § 25.721 is designed to insure that if the landing gear fails, no part of the fuel system in the fuselage of the airplane will be punctured. It is proposed to extend this protection to the entire fuel system of the airplane. However, since not all punctures of the fuel system would result in a fire hazard, the proposal would protect against those punctures only that would result in the spillage of enough fuel to cause a fire.

The purpose of the proposed change to paragraph (c) of § 25.785 is to make it clear that the applicant for a type certificate may select any one of the three methods prescribed in providing protection for an occupant of other than a sideward facing seat.

It is proposed to amend § 25.787 to make it applicable to all stowage compartments. In addition to cargo and baggage, the regulation would specifically refer to the stowage of carry-on baggage and the stowage of equipment, such as life rafts. It is also proposed to require that each stowage compartment in the passenger cabin, except for underseat and overhead compartments for passenger convenience, be completely enclosed.

A new § 25.789 is proposed, containing substantially the same requirements as are now contained in §§ 25.561(c) and 25.787(c). The purpose of this change is to make the requirement applicable to all items of mass in the airplane (in passenger, crew, and cargo compartments) whether attached to the structure or not.

Section 121.317 of Part 121 requires passenger information signs to notify passengers and cabin attendants when smoking is prohibited and when safety belts should be fastened. These signs are often installed in transport category airplanes at the time of manufacture. However, there are at present no standards for such signs in Part 25 and it is proposed to add a new § 25.791 containing passenger information requirements consistent with Part 121.

The current regulations require that the escape route from each overwing emergency exit must be marked but do not provide a standard for the marking. In its petition, the AIA proposed that the escape route have a reflectance of 80 percent, that the escape route surface be defined by marking with a route surface-to-marking contrast ratio of at least 5:1, and that those markings be extended over the normal flap area or escape assist means or descent route. The FAA agrees with these recommendations. However, the FAA also considers that the size of the escape route marking should be specified and it is proposed to require that the surface of the escape route be at least 4 feet wide at Type A exits and at least 2 feet wide at all other overwing passenger emergency exits.

Under the current regulations a Type III exit must, in addition to other things, be located over the wing. Since the regulations also require that all emergency exits be distributed as uniformly as practicable, there is an advantage in allowing flexibility in the location of the Type III exits and it is proposed to delete the requirements that the Type III exit be located over the wing. It should be noted, however, that any Type III exit not over a wing and more than 6 feet from the ground with the landing gear extended must meet additional requirements not applicable to such exits when located over the wing.

It appears to the FAA that because of the relatively little difference in size between the Type III and Type IV exits and the significant improvement in egress rate afforded by the Type III exit, there is very little justification for continuing to provide for the Type IV exit. It is, therefore, proposed to amend the regulations to delete the requirement providing for Type IV exits and to require Type III exits instead. This change would not result in a reduction in the number of required emergency exits.

(As published in the Federal Register /34 F.R.13036/ on August 12, 1969)

Section 25.807(c)(3) currently permits an increase in the passenger/emergency exit relationship if slides meeting the requirements of § 25.809(f)(1) are installed. Since all slides, when prescribed, must now meet the requirements of § 25.809(f)(1) requiring automatic deployment and erection concurrent with the opening of the exit, there appears to be no rational basis for the current rule. It is, therefore, proposed to improve the exit-to-occupant ratio of the current regulations by striking out paragraph (c)(3) of § 25.807.

With the advent of the large capacity aircraft and the large, heavy Type A size emergency exit, the means of opening the emergency exit by a cabin attendant or passenger in an emergency takes on added importance. To insure that these and other emergency exits do not incorporate design features that might adversely affect their operational performance and reliability, it is proposed to require that each emergency exit must be designed so that it can be opened within 10 seconds with the airplane in each of the attitudes corresponding to a collapse of one or more of the landing gear legs. If a power-boost or power-operated system is used to operate the exit, an alternate means must be available for opening the exit in the event of failure of the primary system.

In accordance with the recommendation made by the AIA, it is proposed to change § 25.809(f)(1) to require that the assisting means for each passenger emergency exit be automatically erected within 10 seconds after its deployment is begun. In addition, the FAA agrees with AIA's recommendation that the regulation should be further amended to require that passenger entrance doors and service doors be provided with means to prevent deployment of the assisting means when there is no emergency and the door is opened for normal use.

In the area of emergency exit markings, various changes are proposed in line with the recommendations of the AIA. At the present time, the regulations require that signs be above the aisle near each over-the-wing exit and that signs be placed next to each floor level exit. To provide for a more uniform application of the requirement, it is proposed to require that there must be a passenger emergency exit locator sign above the aisle near each emergency exit and that there must also be an emergency exit marking sign next to each such exit. However, the proposal would permit one sign to serve more than one exit if each exit can be readily seen from the sign. In addition, the current rules do not provide adequate illumination for the operating handles on Type III exits. To this end the proposal would require that the operating handle on Type III exits be self-illuminated with initial brightness of at least 160 nicrolam/fts.

Various changes have been proposed to § 25.812 dealing with emergency lighting. In this connection, detailed changes to the requirements governing the exit locator and marking signs have been proposed substantially along the lines

recommended by the AIA. The exceptions being that while the AIA recommended that the lettering be 1 inch high, the proposal requires lettering of 1½ inches. The FAA believes that this increase in size is necessary to make the signs sufficiently conspicuous. In addition, the AIA recommended that the bulkhead and divider signs be exempt from the emergency lighting requirement of § 25.812. However, the FAA considers that while these signs need not have the same level of illumination as the other signs, a minimum level of illumination should be specified.

Since the regulations will no longer provide for nonautomatic assisting means in meeting the emergency evacuation requirements, the AIA's recommendation for emergency lighting requirements for such means has not been incorporated into this proposal.

The AIA recommended that § 25.812 (k) be amended to provide that not more than 25 percent of all required electrically illuminated locator and marking signs may be rendered inoperative during any single vertical separation of the fuselage during crash landing. While the regulations currently permit an emergency lighting system in which 25 percent of the exit locator signs may be rendered inoperative during any single vertical separation of the fuselage, the rule presently requires that all required exit marking signs must remain operative. The FAA does not consider that it would be in the interest of safety to require an emergency lighting system in which 25 percent of the exits would not remain identified by exit markings in the event of an emergency and AIA's proposal has not been incorporated into this notice.

At the present time, § 25.813, prohibits the obstruction of the projected emergency exit opening by outboard seat backs in any position but allows obstruction of the projected opening by other objects (such as arm rests) if they do not reduce the effectiveness of the exit. The FAA now considers that it is necessary in the interest of safety to apply this prohibition to any form of obstruction, not just seat backs. This would leave the projected exit opening completely clear for at least the width of a passenger seat.

As indicated in the petition for rule making filed by the AIA, materials suitable for use in passenger and crew compartments are now available which resist fire more effectively. In accordance with the recommendation made by the AIA and based on its findings under its development program, it is proposed to amend § 25.853 to require, among other things, that specified materials used in passenger and crew compartments be self-extinguishing when tested vertically, meet a more severe burn length requirement, and have an average flame time after removal of the flame source not to exceed 15 seconds. A companion change would be made to Appendix F of Part 25 to establish an acceptable test procedure for these new requirements. Among other things, the new procedure

would require a minimum flame temperature of 1,550 F. in all tests and would contain a new 45° test for cargo compartment liners.

In response to the petition from NEMA, the notice proposes to add a new requirement in § 25.1359 setting forth improved flammability standards for wire and cable insulation. In addition, new test procedures for electrical wire and cable substantially as recommended by the NEMA are set forth in the proposed change to Appendix F. The NEMA recommendations concerning smoke emission from electrical wire and cable have not been incorporated in this notice since the smoke emission issue, in broad aspect, is the subject of a separate rule-making action. (Notice 69-30, Docket No. 9611.)

The requirements for cargo and baggage compartments in § 25.855 would be changed to now require that the liners and the thermal and acoustic insulation used in such compartments must meet the fire protection requirements of § 25.853. In addition, it would require that all liners be separate from the airplane structure even though it permits the liner to be attached to the structure.

As has been the case in the previous crashworthiness and passenger evacuation rule-making actions, it is proposed to make certain of the new requirements applicable to airplanes for which type certificates are issued after the effective date of these proposed amendments. However, unlike the previous rule-making actions, it is not proposed to make these new requirements applicable to all applicants for supplemental type certificates or amendments to type certificates; only to those applicants for STCs or amendments related to the type certificates issued after the effective date of these proposed amendments. To this end a new § 25.3 is proposed containing the special retroactive requirements of this notice.

Part 37. In addition to the foregoing, appropriate changes are proposed to the Technical Standard Order (TSOs) covering Safety Belts, Aircraft Seats and Berths, and Individual Flotation Devices, consistent with the improved fire protection requirements for compartment interiors.

Part 121. With the exception of the requirement for ash trays in compartments where smoking is to be allowed, all the other fire protection requirements currently contained in § 121.215 concerning cabin interiors are now covered under other provisions in Part 121. It is, therefore, proposed to amend § 121.215 to cover only the requirement for ash trays and to require placarding when smoking is not allowed.

It is proposed to amend § 121.285 to strike out the term flame resistant as it relates to materials in cargo bins in passenger compartments and to require that such materials at least meet the existing requirements of § 25.853(b). It is not proposed to require that materials in cargo bins in passenger compartments meet the changes to the requirements of § 25.853 (b) proposed in this notice.

Section 121.310(a)(2) now requires that after September 30, 1969, the assist means for a floor level emergency exit on passenger-carrying landplanes must meet the requirements of § 25.809(f)(1). Section 25.809(f)(2) is being amended in this rule-making action to require that each passenger entrance and service door must be provided with a means to prevent deployment of the assisting means when it is opened under non-emergency conditions. This new requirement would present a prohibitive installation problem for aircraft already certificated and the FAA considers that for those airplanes the current requirement is adequate. It is therefore proposed to amend § 121.310(a)(2) to require that only airplanes type certificated after September 30, 1969, need meet this new requirement.

Paragraph (b) of § 121.310 now requires that each passenger emergency exit marking and each locating sign must, among other things, be manufactured to meet the requirement of § 25.812(b). Section 25.812(b) is being amended in this rule-making action and the FAA does not consider it necessary to require existing airplanes to comply with this new requirement. It is therefore proposed to amend § 121.310(b) to require that only airplanes type certificated after the effective date of the amended § 25.812(b) proposed herein need meet the new requirement.

Consistent with the change proposed for Part 25, it is proposed to amend paragraph (c) of § 121.310 to provide that sources of general cabin illumination need not be independent of the main lighting system if the emergency power supply for general cabin illumination is independent of the power supply for the main lighting system.

It is proposed to add a new subparagraph (3) to paragraph (d) of § 121.310 to require that a flight crew warning light be installed that illuminates whenever electric power is on in the airplane and the emergency system is not armed or turned on. This is consistent with the change proposed in § 25.812(e)(2).

It is further proposed to amend paragraph (e) of § 121.310 to make it clear that on airplanes type certificated after the effective date of this amendment, the location of each passenger emergency exit operating handle and the instructions for opening the exit must continue to be provided in accordance with the applicable requirements of Part 25 proposed in this notice.

Paragraphs (f) and (h) of § 121.310, and § 121.312 contain references to requirements of Part 25 that are being changed in this proposal. It is therefore proposed to amend §§ 121.310 and 121.312 to make it clear that the older airplanes need not comply with the amendments to the Part 25 requirements proposed in this notice. No other changes to these regulations are proposed.

It is proposed to amend § 121.311 to require that occupants of seats equipped with a shoulder harness must fasten that shoulder harness during takeoff and landing. An exception would be made

for crewmembers who cannot perform their duties with the harness fastened.

Paragraph (a) of § 121.317 would be amended consistent with the new proposal in Part 25 to require that passenger information signs regarding smoking and seat belts must be legible to all persons seated in the passenger cabin under all conditions of cabin illumination.

Paragraph (c) of § 121.391 presently contains a reference to paragraph (b) that is no longer necessary or appropriate. In addition to making this correction, it is proposed to make it clear that the number of flight attendants approved under either paragraph (a) or (b) of § 121.391 are set forth in the certificate holder's operations specifications.

It is proposed to amend § 121.571 to require that each certificate holder make an announcement, when the seat belt sign is first turned off after takeoff, that all passengers should, for their safety, keep their seat belts loosely or comfortably fastened while seated. This requirement recognizes the possibility that turbulence may be encountered unexpectedly. The seat belt sign would be turned on when turbulence is expected or when landing is imminent and would notify the passengers that the fastening of seat belts is mandatory. The passenger information requirement of § 121.317(a) would be amended to implement this proposal.

A new § 121.576 is proposed to require that a means be provided to prevent galley equipment, serving carts and crew baggage from becoming a hazard by shifting under specified load conditions. Operators would be given 2 years in which to meet this requirement.

Section 121.589 would be amended to require that the certificate holder ensure that all carry-on baggage has been stowed before each takeoff and each landing. In addition, it would require each passenger to comply with instructions given by any crewmember concerning the stowage of carry-on baggage.

The FAA believes that it is essential for the safety of passengers in a crash situation to require that no food, beverage, tableware, or trays be in position in front of passengers during takeoff or landing. Impact with trays, dishes, cups, glasses, and silverware can cause serious head and face injuries. Furthermore, in the event of an emergency evacuation, the trays, food, and tableware could obstruct and slow movement to the exits and the slippery food litter could cause needless injury. It should also be noted that the cabin attendants, who prepare and serve food and beverages, are responsible for many duties connected with passenger safety which must be performed before takeoff and landing. The preparation and serving of food and beverages before takeoff can interfere with the crewmember's performance of these duties. It is, therefore, proposed to add a new § 121.577 prohibiting a certificate holder from taking off or landing an airplane (1) when any food, beverage, or tableware furnished by the certificate holder is located at any pas-

senger seat, and (2) unless each passenger's food and beverage tray and each serving cart is in the stowed position. Each passenger would be required to comply with instructions given by a crewmember concerning the foregoing requirements.

In consideration of the foregoing, it is proposed to amend Parts 21, 25, 37, and 121 as follows:

#### PART 21

##### § 21.17 [Amended]

1. By amending § 21.17(a) by striking out the reference to "§ 25.2" and inserting the reference to "§§ 25.2 and 25.3" in place thereof.

#### PART 25

1. By adding a new § 25.3 to read as follows:

##### § 25.3 Additional special retroactive requirements.

(a) Notwithstanding §§ 21.17 and 21.101 of this chapter and § 25.2, and irrespective of the date of application—

(1) Each applicant for a type certificate must show after (the effective date of this amendment), that the airplane concerned meets the requirements listed in paragraph (b) of this section in effect on (the date of this amendment); and

(2) Each applicant for a Supplemental Type Certificate (or an amendment to the type certificate) for an airplane type certificated on or after (the effective date of this amendment) must show that the airplane concerned meets the requirements listed in paragraph (b) of this section in effect on (the effective date of this amendment).

(b) Sections 25.561(b), 25.562(a), 25.721(d), 25.785(c), 25.787(a), 25.789, 25.803(e), 25.807(a), (c), and (d), 25.809(b), (f), (g), (h), and (i), 25.811(d), (e), and (g), 25.812(a), (b), (c), (d), (e), (f), (g), and (k), 25.813(c), 25.853, 25.855, 25.1359(d), 25.1557(a), and Appendix F of this part.

2. By amending § 25.561 by striking out paragraph (c) and by amending subparagraph (3) of paragraph (b) to read as follows:

##### § 25.561 General.

(b) . . .  
(3) The occupant experiences the following ultimate inertia forces relative to the surrounding structure:

- (i) Upward—4.5 g.
- (ii) Forward—9.0 g.
- (iii) Sideward—3.0 g.
- (iv) Downward—4.5 g. or any lesser force that will not be exceeded when the airplane absorbs the landing loads resulting from impact with an ultimate descent velocity of 5 f.p.s. at design landing weight.
- (v) Aft—1.5 g.
- (c) [Deleted]

3. By adding a new § 25.562 to read as follows:

##### § 25.562 Fuel containment.

(a) The airplane must be designed so that it can be landed on a paved runway,

with any one or more landing gear legs not extended, without sustaining a structural component failure that would result in the spillage of enough fuel to constitute a fire hazard, or that would result in serious injury to any occupant, under the following conditions:

(1) Airplane weight=design landing weight;

(2) Touchdown velocity=1.05  $V_{LO}$ ;

(3) Rate of sink=3 f.p.s.; and

(4) Coefficient of friction ( $\mu$ )=0.4

(b) The airplane must be designed so that it can be landed on a paved runway, with the airplane in the normal landing configuration, without sustaining a structural component failure that would result in the spillage of enough fuel to constitute a fire hazard, or that would result in serious injury to any occupant, under the following conditions:

(1) Airplane weight=design landing weight;

(2) Rate of sink=24 f.p.s.; and

(3) Airplane pitch attitude=7° above, and below, the pitch attitude for a normal landing.

4. By amending paragraph (d) of § 25.721 to read as follows:

§ 25.721 General.

(d) The main landing gear system must be designed so that if it fails due to overloads during takeoff and landing (assuming the overloads are in the vertical plane parallel to the longitudinal axis of the airplane), the failure mode is not likely to cause the spillage of enough fuel from any part of the fuel system to constitute a fire hazard. This may be shown by analysis or test, or both.

5. By amending § 25.785(c) by amending the second sentence of the lead-in paragraph and subparagraphs (1), (2), and (3) as follows:

§ 25.785 Seats, berths, safety belts, and harnesses.

(c) . . . 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.

6. By amending § 25.787 by striking out paragraph (c) and by changing the title of the section and amending paragraph (a) as follows:

§ 25.787 Stowage compartments.

(a) Each compartment for the stowage of cargo, baggage, carry-on articles, and equipment (such as life rafts), and any other stowage compartment must be designed for its placarded maximum weight of contents and for the critical

load distributions at the appropriate maximum load factors corresponding to the specified flight and ground load conditions, and to the emergency landing conditions of § 25.561(b), except that the forces specified in the emergency landing conditions need not be applied to compartments located below, or forward, of all occupants in the airplane. Each stowage compartment in the passenger cabin except for underseat and overhead compartments for passenger convenience must be completely enclosed.

(c) (Deleted)

7. By adding new § 25.789 to read as follows:

§ 25.789 Retention of items of mass in passenger and crew compartments.

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

8. By adding a new § 25.791 to read as follows:

§ 25.791 Passenger information signs.

When installed, passenger information signs must be legible to all persons seated in the passenger cabin under all conditions of cabin illumination. Signs which notify when seat belts should be fastened and when smoking is prohibited must be so constructed that the crew can turn them on and off.

9. By amending paragraph (e) of § 25.803 to read as follows:

§ 25.803 Emergency evacuation.

(e) An escape route must be established from each overwing emergency exit, and (except for flap surfaces suitable as slides) covered with a slip resistant surface. The escape route surface must have a reflectance of at least 80 percent, must be defined by markings with a surface-to-marking contrast ratio of at least 5:1, must be at least 4 feet wide at Type A passenger emergency exits, and must be at least 2 feet wide at all other passenger emergency exits.

§ 25.807 [Amended]

10. By amending § 25.807 *Passenger emergency exits* as follows:

A. By amending paragraph (a) (3) to read as follows:

(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 must not exceed 27 inches.

B. By striking out paragraph (a) (4).

C. By amending paragraphs (c) and (d) to read as follows:

(c) *Passenger emergency exits.* The prescribed exits need not be diametri-

cally 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 tall 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 (5) 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
1 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 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:

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

(3) For passenger capacities in excess of 299, each emergency exit in the side of the fuselage must be either a Type A or 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.

(4) If a passenger ventral or tall 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 passenger seating capacity 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 passengers.

(ii) For a tall 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 § 25.809(f) (1), 25 additional passengers.

(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.

(5) Each emergency exit in the passenger compartment in excess of the minimum number of required emergency exits must meet the applicable requirements of §§ 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 subparagraph (1) of this paragraph, exits must be added to meet them:

(1) 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 passengers, 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/exit ratio may be increased.

(2) 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.

#### § 25.809 [Amended]

11. By amending § 25.809 as follows:

A. By amending paragraph (b) by adding the following at the end thereof:

(b) \* \* \* Each exit must be capable of being opened—

(1) With the airplane in each of the attitude corresponding to collapse of one or more legs of the landing gear; and

(2) Within 10 seconds measured from the time when the opening means is actuated to the time when the exit is fully opened.

B. By amending paragraph (f) (1) to read as follows:

(1) The assisting means for each passenger emergency exit must be a self-supporting slide or equivalent, and must be designed to meet the following requirements:

(i) It must be automatically deployed concurrent with the opening of the exit from the inside of the airplane. However, each passenger emergency exit which is also a passenger entrance door or a service door must be provided with means to prevent deployment of the assisting means when it is opened from either the inside or the outside under nonemergency conditions for normal use.

(ii) It must be automatically erected within 10 seconds after deployment is begun.

(iii) It must be of such length that the lower end is self supporting on the ground after collapse of one or more legs of the landing gear.

C. By amending paragraph (g) to read as follows:

(g) Each emergency exit must be shown by tests to meet the requirements of paragraphs (b) and (c) of this section.

D. By striking out present paragraph (h) and by adding new paragraphs (h) and (i) to read as follows:

(h) If the place on the airplane structure at which the escape route required in § 25.803(e) terminates is more than 6 feet from the ground with the airplane on the ground and the landing gear extended, means must be provided to assist evacuees (who have used the overwing exits) to reach the ground. If the escape route is over a flap, the height of the terminal edge must be measured with the flap in the takeoff or landing position, whichever is higher from the ground. The assisting means must be of such length that the lower end is self-supporting on the ground after collapse of any one or more landing gear legs.

(i) If a power-boost or power-operated system is the primary system for operating the exit, the exit must be capable of meeting paragraph (b) (1) 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. If a secondary power-boost or power-operated system is provided to operate the exit in the event of failure of the primary system, it must be independent of the airplane's main systems and main energy sources.

#### § 25.811 [Amended]

12. By amending § 25.811 as follows:

A. By amending paragraph (d) to read as follows:

(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.

B. By amending subparagraph (1) of paragraph (e) to read as follows:

(e) The location of the operating handle and instructions for opening the exit must be shown as follows:

(1) For each passenger emergency exit, by a marking on or near the exit that is readable from a distance of 30 inches. In addition, the operating handle for each Type III passenger emergency exit must be self-illuminated with an initial brightness of at least 160 microlamberts. If the operating handle is covered, self-illuminated cover removal instructions having an initial brightness of at least 160 microlamberts must also be provided.

C. By amending subparagraph (2) of paragraph (e) by inserting the words "Type A" between the word "each" and the word "Type I."

D. By amending paragraph (g) to read as follows:

(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."

#### § 25.812 [Amended]

13. By amending § 25.812 *Emergency lighting* as follows:

A. By amending the lead-in statement of paragraph (a) to read as follows:

(a) An emergency lighting system, independent of the main lighting system, must be installed except that sources of general cabin illumination need not be independent of the main lighting system if the emergency power supply for general cabin illumination is independent of the power supply for the main lighting system. The emergency lighting system must include:

B. By amending paragraphs (b), (c), (d), (e), (f), and (g) to read as follows:

(b) Emergency exit signs must meet the following requirements:

(1) Each passenger emergency exit locator sign required by § 25.811(d) (1) and each passenger emergency exit marking sign required by § 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 stroke height-to-width ratio must be 7:1. 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.

(2) Each passenger emergency exit sign required by § 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 self-illuminated sign if this will make the sign more conspicuous.

(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 aft.

(d) The floor of the passageway leading to each floor-level passenger emergency exit, between the main aisles and the exit openings, must be provided with illumination that is not less than 0.02 foot-candle measured along a line that is within 6 inches of and parallel to the floor and is centered on the passenger evacuation path.

(e) The emergency lighting system must be designed as follows:

(1) The lights must be operable manually from the flight crew station and (if required by the operating rules of this chapter) 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 or turned on.

(3) When armed or turned on, the lights must remain lighted or become 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 means to safeguard against inadvertent operation of the control device from the "armed" or "on" position.

(f) 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 2-square-foot area where an evacuee is likely to make his first step outside the cabin;

(ii) Not less than 0.05 foot-candle (measured normal to the direction of the incident light) for a minimum width of 4 feet for a Type A overwing emergency exit and 2 feet for all other overwing emergency exits along the 30 percent of the ship-resistant portion of the escape route required in § 25.803(e) that is farthest from the exit; and

(iii) Not less than 0.03 foot-candle on the ground surface with the landing gear extended (measure 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 recovery emergency exit not required by § 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.

(g) The means required in § 25.809 (f) (1) and (h) to assist the occupants in descending to the ground must be illuminated so that the deployed 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 deployed 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 assist means is self-illuminated, 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 deployed 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.

C. By amending paragraph (k) by inserting the word "transverse" between the words "single" and "vertical" in the lead-in statement and by striking out the word "exit" in subparagraph (3).

14. By amending § 25.813(c) to read as follows:

§ 25.813 Emergency exit access.

(c) There must be access from each aisle to each Type III exit. For airplanes having a maximum seating capacity of 20 or more, the projected opening of the exit provided must not be obstructed 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 in the airplane.

15. By amending § 25.853 by redesignating present paragraphs (c) through (f) as paragraphs (e) through (h), respectively, and by amending the lead-in statement and paragraphs (a) and (b) and by adding new paragraphs (c) and (d) to read as follows:

§ 25.853 Compartment interiors.

Materials, including finishes or decorative surfaces applied to the materials, used in each compartment occupied by the crew or passengers must meet the following test criteria, as applicable:

(a) Interior ceiling panels, interior wall panels, partitions, galley structure, large cabinet walls, structural flooring, and materials used in the construction of stowage compartments (other than underseat) must be self-extinguishing when tested vertically in accordance with the applicable portions of Appendix F of this part, or other approved equivalent methods. The average burn length may

not exceed 6 inches and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the test specimen may not continue to flame for more than 3 seconds after falling.

(b) Floor covering, textiles (including draperies, upholstery, and the covering of upholstery), seat cushions, padding, decorative and nondecorative coated fabrics, leather, trays and galley furnishings, transparencies not covered in paragraph (c) of this section, electrical conduit, molded and thermoformed parts, thermal and acoustical insulation and insulation covering, air ducting, joint and edge covering, trim strips (decorative and chafing), cargo compartment liners, insulation blankets, and cargo covers, must be self-extinguishing when tested vertically in accordance with the applicable portions of Appendix F of this part, or other approved equivalent methods. The average burn length may not exceed 8 inches and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the test specimen may not continue to flame for more than 5 seconds after falling.

(c) Acrylic windows, edge lighted instrument assemblies, seat belts, shoulder harnesses, and cargo and baggage tie-down equipment including containers, bins, pallets, etc. used in passenger or crew compartments, may not have a burn rate greater than 2.5 inches per minute when tested horizontally in accordance with the applicable portions of Appendix F of this part, or other approved equivalent methods.

(d) Except for electrical wire and cable insulation, materials in items not specified in paragraph (a), (b), or (c) of this section may not have a burn rate greater than 4 inches per minute when tested horizontally in accordance with the applicable portions of Appendix F of this part or other approved equivalent methods.

16. By amending § 25.855 by amending paragraph (a), by redesignating present paragraphs (b) through (e) as paragraphs (c) through (f) and by adding new paragraph (b) to read as follows:

§ 25.855 Cargo and baggage compartments.

(a) Liners and thermal and acoustic insulation used in each cargo and baggage compartment, including convertible passenger-cargo compartments, must be constructed of materials that at least meet the requirements set forth in § 25.853(b). In addition, the liners must be separate from (but may be attached to) the airplane structure and must be tested at a 45° angle in accordance with the applicable portions of Appendix F of this part or other approved equivalent methods. The flame may not cause a hole to appear in the material during application of the flame or subsequent to its removal. The average flame time after removal of the flame source may not exceed 15 seconds and the average glow time may not exceed 10 seconds.

0.025  
0.025  
12 sec flame before removal  
Horizontal

Cargo Comp. Matt. Flame Test

- 6 - 60 second flame before removal

(b) Insulation blankets and covering used to protect cargo must be constructed of materials that at least meet the requirements of § 25.853(b) and tiedown equipment must be constructed of materials that at least meet the requirements set forth in § 25.853(c).

§ 25.857 [Amended]

17. By amending § 25.857 by striking out subparagraph (4) of paragraph (b), and subparagraph (5) of paragraph (c), subparagraph (4) of paragraph (d), and subparagraph (1) of paragraph (e).

18. By amending § 25.1359 by adding a new paragraph (d) to read as follows:

§ 25.1359 Electrical system fire and smoke protection.

(d) Electrical wire and cable insulation installed in any area of the fuselage must be self-extinguishing when tested in accordance with the applicable portions of Appendix F of this part, or other approved equivalent methods. The average flame time after removal of the flame source may not exceed 30 seconds. Drippings from the test specimen may not continue to flame for more than 3 seconds after falling.

§ 25.1411 [Amended]

19. By amending § 25.1411(c) by striking out the reference to "§ 25.807(c) (4)" and inserting reference to "§ 25.809(f)" in place thereof.

20. By amending paragraph (a) of § 25.1557 to read as follows:

§ 25.1557 Miscellaneous markings and placards.

(a) *Storage compartments and ballast location* Each storage compartment and each ballast location must have a placard stating any limitations on contents, including weight, that are necessary under the loading requirements.

21. By amending Appendix F to read as follows:

Appendix F

AN ACCEPTABLE TEST PROCEDURE FOR SHOWING COMPLIANCE WITH §§ 25.853, 25.855, AND 25.1359

(a) *Conditioning* Specimens must be conditioned at 70° F. plus or minus 5° and at 50 percent plus or minus 5 percent relative humidity until moisture equilibrium is reached. Only one specimen at a time may be removed from the conditional environment immediately before subjecting it to the flame.

(b) *Specimen configuration*. Except as provided for materials used in electrical wire and cable insulation and in small items, materials must be tested either as a section cut from a fabricated part as installed in the airplane or as a specimen simulating a cut section, such as a specimen cut from a flat sheet of the material or a model of the fabricated part. The specimen may be cut from any location in a fabricated part; however, fabricated units, such as sandwich panels, may not be separated for test. The specimen thickness must be no thicker than the minimum thickness to be qualified for use in the airplane, except that: (1) Thick

foam parts, such as seat cushions, must be tested in 1/4-inch thickness; (2) when showing compliance with § 25.853(d) for materials used in small items the materials must be tested in no more than 1/4-inch thickness; (3) when showing compliance with § 25.1359 (d) for materials used in electrical wire and cable insulation the wire and cable specimens must be the same size as used in the airplane. In the case of fabrics, both the warp and fill direction of the weave must be tested to determine the most critical flammability conditions. When performing the tests prescribed in paragraphs (d) through (e) of this appendix, the specimen must be mounted in a metal frame so that (1) in the vertical tests of paragraphs (d) and (e) the two long edges are held securely, (2) in the horizontal test of paragraph (f) the two long edges and one end are held securely, (3) the exposed area of the specimen is at least 2 inches wide and 12 inches long and (4) the edge to which the burner flame is applied must not consist of the finished or protected edge of the specimen but must be representative of the actual cross-section of the material or part installed in the airplane. When performing the test prescribed in paragraph (f) of this appendix, the specimen must be mounted in a metal frame so that all four edges are held securely and the exposed area of the specimen is at least 8 inches by 8 inches.

(c) *Apparatus* Except as provided in paragraph (h) of this appendix, tests must be conducted in a draft-free cabinet in accordance with Federal Specification CCC-T-191b Method 5903T (revised Method 5902) for the vertical test, or Method 5906 for the horizontal test (available from the General Services Administration, Business Service Center, Region 3, Seventh and D Streets SW., Washington, D.C. 20407) or other approved equivalent methods. Specimens which are too large for the cabinet must be tested in similar draft-free conditions.

(d) *Vertical test, in compliance with § 25.853 (a) and (b)* A minimum of three specimens must be tested and the results averaged. For fabrics, the direction of weave corresponding to the most critical flammability conditions must be parallel to the longest dimension. Each specimen must be supported vertically. The specimen must be exposed to a Bunsen or Tirrill burner with a nominal 3/8-inch I.D. tube adjusted to give a flame of 1 1/2 inches in height. The minimum flame temperature measured by a calibrated thermocouple pyrometer in the center of the flame must be 1,550° F. The lower edge of the specimen must be three-fourths inch above the top edge of the burner. The flame must be applied to the centerline of the lower edge of the specimen. For materials covered by § 25.853(a), the flame must be applied for 60 seconds and then removed. For materials covered by § 25.853(b), the flame must be applied for 12 seconds and then removed. Flame time, burn length, and flaming time of drippings, if any, must be recorded. The burn length determined in accordance with paragraph (g) of this appendix must be measured to the nearest one-tenth inch.

(e) *Horizontal test in compliance with § 25.853 (c) and (d)*. A minimum of three specimens must be tested and the results averaged. Each specimen must be supported horizontally. The exposed surface when installed in the aircraft must be face down for the test. The specimen must be exposed to a Bunsen burner or Tirrill burner with a nominal 3/8-inch I.D. tube adjusted to give a flame of 1 1/2 inches in height. The minimum flame temperature measured by a calibrated thermocouple pyrometer in the center of the flame must be 1,550° F. The speci-

men must be positioned so that the edge being tested is three-fourths of an inch above the top of, and on the center line of the burner. The flame must be applied for 15 seconds and then removed. A minimum of 10 inches of the specimen must be used for timing purposes, approximately 1 1/2 inches must burn before the burning front reaches the timing zone, and the average burn rate must be recorded.

(f) *Forty-five degree test, in compliance with § 25.855(a)*. A minimum of three specimens must be tested and the results averaged. The specimens must be supported at an angle of 45° to a horizontal surface. The exposed surface when installed in the aircraft must be face down for the test. The specimens must be exposed to a Bunsen or Tirrill burner with a nominal 3/8-inch I.D. tube adjusted to give a flame of 1 1/2 inches in height. The minimum flame temperature measured by a calibrated thermocouple pyrometer in the center of the flame must be 1,550° F. Suitable precautions must be taken to avoid drafts. One-third of the flame must be applied for 30 seconds and then removed. Flame time, glow time, and whether a hole appears through the specimen must be recorded.

(g) *Burn length*. Burn length is the distance from the original edge to the farthest evidence of damage to the test specimen due to flame impingement, including areas of partial or complete consumption, charring, or embrittlement, but not including areas sooted, stained, warped, or discolored, nor areas where material has shrunk away from the heat source.

(h) *Sixty degree test in compliance with § 25.1359*. The specimen of wire or cable (including insulation) must be placed at an angle of 60° with the horizontal within a chamber approximately 2 feet high x 1 foot x 1 foot, open at the top and at one vertical side (front), and which allows sufficient flow of air for complete combustion, but which is free from drafts. The specimen must be parallel to and approximately 8 inches from the front of the chamber. The lower end of the specimen must be held rigidly clamped. The upper end of the specimen must pass over a pulley and must have an appropriate weight attached to it so that the specimen is held tautly throughout the flammability test. The test specimen span between lower clamp and upper pulley must be 24 inches and must be marked 8 inches from the lower end to indicate the central point for flame application. A flame from a Bunsen burner must be applied for 30 seconds at the test mark. The Bunsen burner must be mounted underneath the test mark on the specimen, and at an angle of 30° to the vertical plane of the specimen. The Bunsen burner must have a 1/4-inch inlet, a nominal bore of three-eighths inch, and a length of approximately 4 inches from top to primary inlets. The burner must be adjusted to produce a 3-inch high flame with an inner cone approximately one-third of the flame height. The temperature of the hottest portion of the flame, as measured with a calibrated thermocouple pyrometer, may not be less than 954° C. (1,750° F). The burner must be positioned so that the hottest portion of the flame is applied to the test mark on the wire. The distance of flame travel upward along the wire from the test mark and the time of burning after removal of the flame must be recorded. The time of burning of any dripping particles must be recorded. Breaking of the wire specimens is not considered a failure. The results of this compliance testing must indicate that, based on a statistical determination, not less than 60 percent of the wire of each specification installed in the airplane must equal or exceed the requirements of § 25.1359(d).

Cargo Compartment Materials

PART 37

§§ 37.132, 37.136 [Amended]

22. By amending § 37.132 *Safety belts, TSO-C22e* to require that new models of such equipment must meet the test criteria set forth in proposed § 25.853(c) and by amending § 37.136 *Aircraft seats and berths, TSO-C39*, to require that new models of such equipment must meet the test criteria set forth in proposed § 25.853(b).

§ 37.178 [Amended]

23. By amending § 37.178 *Individual flotation devices, TSO-C72a*, by amending paragraphs 4.0.4 and 7.0.3 of the FAA Standard to read as follows:

4.0.4 *Fire protection.* If the device is not used as part of a seat or berth, materials used in the device, including any covering, must meet paragraph 6.0.2 of this standard. If the device is to be used as part of a seat or berth, all materials used in the device must meet paragraph 7.0.3 of this standard.

7.0.3 *Test for fire protection of materials.* Materials used in flotation devices that are to be used as part of an aircraft seat or berth must comply with the self-extinguishing fire protection provisions of § 25.853(b) of Part 25 of this chapter. In all other applications, the materials in the flotation devices must be tested in accordance with paragraph 6.0.2 of this standard to substantiate adequate flame resistant properties.

PART 121

24. By amending § 121.215 to read as follows:

§ 121.215 Compartments where smoking is allowed.

Each compartment used by the crew or passenger where smoking is allowed must be equipped with self-contained ash trays that are completely removable. Other compartments used by the crew or passengers must be placarded against smoking.

25. By amending § 121.285 by amending paragraph (b) (6) to read as follows:

§ 121.285 Carriage of cargo in passenger compartments.

(b) . . .

(6) The bin must be fully enclosed and made of materials that at least meet § 25.853(b) of this chapter in effect on (the day prior to the effective date of this amendment).

§ 121.310 [Amended]

26. By amending paragraph (a) of § 121.310 by amending the first sentence of subparagraph (2) to read as follows:

(2) After September 30, 1969, it must meet the requirements of § 25.809(f) (1) of this chapter in effect on that date, except that, on any airplane type certificated after September 30, 1969, it must meet the assist means requirements under which the airplane was type certificated. . . .

27. By amending paragraph (b) (2) of § 121.310 to read as follows:

(2) Each passenger emergency exit marking and each locating sign must

have white letters 1 inch high on a red background 2 inches high, be self or electrically illuminated, and must meet the following:

(i) For airplanes type certificated prior to (the effective date of this amendment) each passenger emergency exit marking and each locating sign must be manufactured to meet the requirements of § 25.812(b) of this chapter in effect on (the day prior to the effective date of this amendment). On these airplanes, no sign may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts.

(ii) For airplanes type certificated after (the effective date of this amendment) each passenger emergency exit marking and each locating sign must be manufactured to meet the interior emergency exit marking requirements under which the airplane was type certificated. On these airplanes, no sign may continue to be used if its luminescence (brightness) decreases to below 250 microlamberts.

(iii) The colors may be reversed if it increases the emergency illumination of the passenger compartment. However, the Administrator may authorize deviation from the 2-inch background requirements if he finds that special circumstances exist that make compliance impractical and that the proposed deviation provides an equivalent level of safety.

28. By amending paragraph (c) of § 121.310 to read as follows:

(c) *Lighting for interior emergency exit markings.* Each passenger-carrying airplane must have an emergency lighting system, independent of the main lighting system, except that sources of general cabin illumination need not be independent of the main lighting system if the emergency power supply for general cabin illumination is independent of the power supply for the main lighting system. The emergency lighting system must—

(1) Illuminate each passenger exit marking and location sign; and

(2) Provide enough general lighting in the passenger cabin so that the average illumination, when measured at 49-inch intervals at seat armrest height, on the centerline of the main passenger aisle, is at least 0.05 foot-candles.

29. By amending paragraph (d) of § 121.310 by amending the flush paragraph at the end by inserting the word "transverse" between the word "a" and the word "vertical," by amending subparagraph (2) (iii) and by adding a new subparagraph (3) to read as follows:

(d) *Emergency light operation.* . . .

(2) . . .

(ii) When armed or turned on at either station, remain lighted or become lighted upon interruption of the airplane's normal electric power and provide the required level of illumination for at least 10 minutes at the critical ambient conditions after emergency landing.

(3) After (2 years after the effective date of this amendment) a flight crew warning light must be provided which

illuminates when electric power is on in the airplane and the flight crew manual control device used to meet subparagraph (2) of this paragraph is not armed or turned on.

30. By amending paragraph (e) of § 121.310 to read as follows:

(e) *Emergency exit operating handles.*

(1) For passenger-carrying airplanes type certificated prior to (the effective date of this amendment), the location of each passenger emergency exit operating handle, and instructions for opening the exit, must be shown by a marking on or near the exit that is readable from a distance of 30 inches. In addition, for each Type I and Type II emergency exit with a locking mechanism released by rotary motion of the handle, the instructions for opening must be shown by—

(i) A red arrow with a shaft at least 3/4-inch wide and a head twice the width of the shaft, extending along at least 70° of arc at a radius approximately equal to three-fourths of the handle length; and

(ii) The word "open" in red letters 1 inch high, placed horizontally near the head of the arrow.

(2) For passenger-carrying airplanes type certificated on or after (the effective date of this amendment), the location of each passenger emergency exit operating handle and instructions for opening the exit must be shown in accordance with § 25.811(e) of this chapter. On these airplanes, no operating handle or operating-handle cover may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts.

31. By amending paragraph (f) of § 121.310 by amending the last sentence of subparagraphs (3) and (6) to read as follows:

(f) *Emergency exit access.* . . .

(3) . . . In addition—

(i) For airplanes type certificated prior to (the effective date of this amendment), the access must meet the requirements of § 25.813(c) of this chapter in effect on (the day prior to the effective date of this amendment); and

(ii) For airplanes type certificated after (the effective date of this amendment), the access must meet the emergency exit access requirements under which the airplane was type certificated.

(6) . . . 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—

(i) For airplanes type certificated prior to (the effective date of this amendment), in § 25.561(b) of this chapter in effect on (the day prior to the effective date of this amendment); and

(ii) For airplanes type certificated after (the effective date of this amendment), in the emergency landing conditions regulations under which the airplane was type certificated.

32. By amending paragraph (h) of § 121.310 by amending subparagraph



(1) and the first sentence of subparagraph (2) to read as follows:

(h) *Exterior emergency lighting and escape route.* (1) After June 30, 1971, each passenger-carrying airplane must be equipped with exterior lighting that meets the following requirements:

-- (i) For airplanes type certificated prior to September 30, 1969, the requirements of § 25.812 (f) and (g) of this chapter in effect on that date; and

(ii) For airplanes type certificated on or after September 30, 1969, the exterior emergency lighting requirements under which the airplane was type certificated.

(2) After September 30, 1969, each passenger-carrying airplane type certificated on or before that date must be equipped with a slip-resistant escape route that meets the requirements of § 25.803(e) of this chapter in effect on September 30, 1969, and each passenger-carrying airplane type certificated after September 30, 1969, must have a slip-resistant escape route that meets the requirements under which the airplane was type certificated.

33. By amending § 121.311 by adding a new paragraph (e) to read as follows:  
§ 121.311 *Seat and safety belts.*

(e) Each occupant of a seat equipped with a shoulder harness must fasten the shoulder harness during takeoff and landing, except that, in the case of crewmembers, the shoulder harness need not be fastened if the crewmember cannot perform his required duties with the shoulder harness fastened.

34. By amending § 121.312 to read as follows:

§ 121.312 *Materials for compartment interiors.*

After October 24, 1968, upon the first major overhaul of an aircraft cabin or refurbishing of the cabin interior all materials in each compartment used by the crew or passengers that do not meet the following requirements must be replaced with materials that meet these requirements:

(a) For airplanes type certificated prior to (the effective date of this amendment), § 25.853 of this chapter in effect on (the day prior to the effective date of this amendment); and

(b) For airplanes type certificated after (the effective date of this amendment) § 25.853 of this chapter in effect

on (the effective date of this amendment).

35. By amending the first sentence of § 121.317(a) to read as follows:

§ 121.317 *Passenger information.*

(a) No person may operate an airplane unless it is equipped with signs that are legible under all conditions of cabin illumination to all persons seated in the passenger cabin to notify them when smoking is prohibited and when safety belts must be fastened.

36. By amending paragraph (c) of § 121.391 to read as follows:

§ 121.391 *Flight attendants.*

(c) The number of flight attendants approved under paragraphs (a) and (b) of this section are set forth in the certificate holder's operations specifications.

37. By amending paragraph (a) of § 121.571 to read as follows:

§ 121.571 *Briefing passengers before takeoff.*

(a) Before each takeoff, each certificate holder operating a passenger-carrying airplane shall ensure that all passengers are orally briefed by the appropriate crewmember on each of the following:

- (1) Smoking.
- (2) The location of emergency exits.
- (3) The use of seat belts. This briefing must include an announcement that even when the seat belt sign is off, passengers should keep their seat belts loosely or comfortably fastened while seated.

38. By adding a new § 121.576 to read as follows:

§ 121.576 *Retention of items of mass in passenger and crew compartments.*

After (2 years after the effective date of this amendment), means must be provided to prevent each item of galley equipment and each serving cart, when not in use, and each item of crew baggage, which is carried in a passenger or crew compartment from becoming a hazard by shifting under the appropriate load factors corresponding to the emergency landing conditions under which the airplane was type certificated.

39. By adding the following new § 121.577 preceding § 121.579:

§ 121.577 *Food and beverage service equipment during takeoff and landing.*

(a) No certificate holder may take off or land an airplane when any food, beverage, or tableware, furnished by the certificate holder is located at any passenger seat.

(b) No certificate holder may take off or land an airplane unless each passenger's food and beverage tray is in the stowed position or removed from the passenger's seat and stowed.

(c) Each passenger shall comply with instructions given by a crewmember in compliance with this section.

40. By amending § 121.589 to read as follows:

§ 121.589 *Carry-on baggage.*

(a) No certificate holder may permit an airplane to take off or land unless each article of baggage carried aboard by passengers is stowed—

- (1) In a suitable baggage or cargo stowage compartment;
- (2) As provided in paragraph (c) of § 121.285; or
- (3) Under a passenger seat.

(b) Each passenger shall comply with instructions given by crewmembers regarding compliance with paragraph (a) of this section.

(c) After August 24, 1969, each passenger seat shall be fitted with a means to prevent articles of baggage stowed under it from sliding forward under crash impacts severe enough to induce the ultimate inertia forces specified in § 25.561(b)(3) of this chapter or in the emergency landing condition regulations under which the aircraft was type certificated. A certificate holder may obtain an additional extension of the compliance date, but not beyond October 24, 1969, from the air carrier district office charged with the overall supervision of its operation by showing that good cause exists for the extension.

These amendments are proposed under the authority of sections 313(a), 601, 603, and 604 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, and 1424, and of section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

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