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TRANSPORT CATEGORY AIRPLANES

Crashworthiness and Passenger Evacuation Standards

Title 14—AERONAUTICS AND SPACE

Chapter I—Federal Aviation Administration, Department of Transportation

[Docket No. 9605, Amdt. Nos. 25-32; 37-32; 121-84]

CRASHWORTHINESS AND PASSENGER EVACUATION STANDARDS; TRANSPORT CATEGORY AIRPLANES

The purpose of these amendments is to improve the crashworthiness and the emergency evacuation equipment requirements and operating procedures for transport category airplanes.

These amendments are based on a notice of proposed rule making (34 F.R. 13036, August 12, 1969) circulated as Notice 69-33, dated August 6, 1969.

Interested persons have been afforded an opportunity to participate in the making of these amendments, and due consideration has been given to all matters presented in the numerous comments received in response to Notice 69-33. Based upon those comments and upon further review within the FAA, a number of substantive and editorial changes have been made to the proposed rules. However, in view of the number of comments received only the most pertinent ones are discussed hereinafter. Except as modified by the following discussion, the reasons for the amendments are those contained in the notice.

In Notice 69-33 it was proposed to make certain of the requirements applicable to airplanes for which applications for type certificates have been filed, but the type certificates would not be issued until after the effective date of the proposed amendments. Several comments were received objecting to this proposal because the requirements need to be considered in the initial design stages of an airplane, which is several years prior to the issuance of the type certificate, and to impose them on airplanes nearing type certification might require a substantial redesign of the airplane and would necessitate production-line type design changes thereby dislocating production. Commentators point out that any safety benefit that might result from complying with the proposed requirement would not be commensurate with the unreasonably heavy penalty at this late stage in the certification process. In addition, several comments contended that a number of the proposed requirements are inappropriate and others are unnecessarily severe for airplanes that have a low passenger seating capacity. The FAA's purpose in proposing to make the requirements retroactive was to assure that the new generation of large jumbo jets for which applications for type certificates had been filed, would meet crashworthiness and passenger evacuation requirements that were consistent with the state-of-the-art. However, the type certification basis of those airplanes have now been established and the proposed requirements were considered in determining the airworthiness standards applicable to those airplanes. Therefore, it is no longer necessary to make the proposed requirements retroactive for these airplanes. Furthermore, the proposed retroactive requirements were not developed with the smaller transport category airplanes in mind. The crashworthiness and passenger evacuation problems increase as the size and passenger capacity of the airplane increases. Most of the proposed requirements are related to the design requirements of the larger transport category airplanes and the need to provide rapid egress for a large number of passengers in an emergency with minimum confusion. Any attainable safety benefit that might result by applying the proposed requirements retroactively to the smaller transport category airplanes that have low seating capacities, smaller cabin areas, and less complex designs would not be commensurate with the heavy burden that such a retroactive requirement would impose. Accordingly, proposed § 25.3 and the proposed amendment to § 21.17 have been withdrawn, and the proposed retroactive requirements of §§ 121.310 and 121.312 have been deleted. In addition, the "September 30, 1969" dates specified in present § 121.310 (a) and (h) have been editorially revised for consistency with the dates specified in this amendment. No substantive change has been made in the present requirement by this date change since the Part 25 requirements referenced in these sections have remained unchanged from September 30, 1969, to the date of this amendment.

In addition, the FAA has determined that certain of the requirements in proposed §§ 25.562, 25.721, 25.787, 25.807, and 25.812 are inappropriate and unnecessary, or are unnecessarily severe, for transport category airplanes that have maximum passenger seating configurations, excluding pilots seats, of nine seats or less. In those instances, the proposed requirements have been revised to provide exceptions and to include requirements for such airplanes that provide a level of safety for such airplanes equivalent to that for airplanes with larger passenger seating configurations. Insofar as the requirements are stated in terms of airplane passenger seating "configuration" whereas the present rules refer to passenger "capacity" no substantive change has been made by these revisions and none is intended. It should be noted that the foregoing classification is consistent with Amendment 23-10, adopted subsequent to the issuance of Notice 69-33, which limited the applicability of Part 23 to small airplanes that have a passenger seating configuration, excluding pilots seats, of nine seats or less.

Several comments objected to the proposed amendment of § 25.561 increasing the ultimate inertia forces in the upward and sideward direction and adding an aft load requirement. The commentators contended that the proposed changes to the present requirement are unnecessary, that the proposed side load and upward load factors are not realistic, that the aft load criterion is not appropriate, and that the costs associated with the increase in airplane weight that would result from compliance with the proposed amendment imposes an unreasonable burden. In view of the comments received, the FAA believes that further study of this proposal is necessary. Therefore, the proposal and the related change in proposed § 121.310(f) (6) have been withdrawn for further study and consideration in subsequent rulemaking.

In notice 69-33 it was proposed to add a new § 25.562 containing various requirements dealing with fuel containment. There were a number of comments indicating that the proposal was too severe and too detailed. It was also pointed out that the proposal implies a structural design requirement for a condition well beyond initial structural failure and for which technical analysis would not be reliable. There was also an indication that the reference to injury to occupants is inappropriate in connection with a proposal dealing with design requirements for fuel containment. Finally, it was pointed out that there is no practical way to ensure, with absolute certainty, that an airplane would comply with this proposal in a wheels-up landing. The FAA agrees with these comments and the proposed new § 25.562 has been withdrawn. Instead, the substance of paragraph (a) of proposed § 25.562 has been added as paragraph (b) of § 25.721 taking into account the comments noted above.

Subsequent to the issuance of Notice 69-33, § 25.721 was substantially amended and proposed paragraph (d) is now paragraph (a). Moreover, in response to a comment, the parenthetical expression in the proposed amendment has been changed to make it clear that the regulation is based on the assumption that the overloads act in the upward and aft directions.

Concerning the proposed amendment to § 25.787, several commentators recommended that the proposal be changed to require restraints for each stowage compartment in the passenger cabin rather than requiring that such compartments be completely enclosed. The FAA does not agree. The intent of the proposal is to provide more protection than that provided by restraint devices, such as tie-down straps or webbing. The conventional webbing, nets, or tie-down straps are effective provided that someone makes the necessary connections and adjustments.

Several comments stated that the term "item of mass" in proposed § 25.789 should be defined. One commentator indicated that § 25.789 should be made applicable only to galley equipment, service carts, and crew baggage. The FAA does not agree. A complete enumeration of all the possible items of mass that could be in a passenger or crew compartment would not be practicable. Part 25 contains the type certification requirements for transport category airplanes and § 25.789 is applicable only to items of mass that are included in the type design of the airplane. Section 25.789 is intended to provide protection from each

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such "item of mass" located in the passenger or crew compartments, such as galley equipment, fire extinguishers and other safety equipment, and the proposal has been revised to clearly state the requirement.

In response to comments received, § 25.791 has been revised to make it clear that only one sign notifying when smoking is prohibited and one sign notifying when safety belts should be fastened must, when illuminated, be legible to each person seated in the passenger cabin under all probable conditions of cabin illumination. In addition, consistent with past practice, the proposal has been revised to make it clear that signs may use either letters or symbols, and that the standards apply only when passenger information signs are installed to comply with applicable operating rules.

The FAA received several recommendations with respect to § 25.803. In this connection, it was recommended that only "initial" reflectance and "initial" contrast should be specified for the escape route as they are the only ones under the manufacturer's control. The FAA does not agree. Reflectance and contrast do not inherently deteriorate, as do radioactive signs, and if the markings are chipped or scuffed, they can be restored to their original level by ordinary maintenance. The FAA does not agree with one commentator that the requirement for a minimum width for the escape route in § 25.803(e) should be deleted. Without a minimum requirement, the escape route could be defined by a strip so narrow that it would not provide proper identification of the escape route and would tend to slow down the flow of passengers evacuating the airplane. However, the proposed requirement has been revised to specify an escape route width of 42 inches at Type A exits since this is the minimum width permitted for those exits. In addition, the proposal has been revised in response to several comments to specify an escape route width, a reflectance, and a surface-to-marking contrast requirement for those escape routes only that do not have a means, such as side rails or guards, for channeling the flow of evacuees. Such channel devices must be designed to accommodate the needs of the particular exit and escape route and provide a rapid and effective means for passenger evacuation.

Several comments were received concerning the proposed change to the requirements for a Type III exit stating that it would be difficult for the average person to exit thorugh a 20 x 36 exit (when this exit is not over the wing) with a step up of 20 inches from the cabin floor and enter an inflatable slide. It was recommended that the present definition of a Type III exit be retained. The FAA does not believe that the Type III exit need be restricted to overwing locations. A Type III exit with a 20-inch step up to a slide should not present any more difficulty to the average person than a Type III exit located over the wing having a 20-inch step up inside the airplane and a 27-inch step down outside the airplane to the wing. It should be noted that one of the considerations in permitting Type III exits to be used in other than over-the-wing locations is the fact that over-the-wing exits may not be the most desirable exits in a ditching situation. Damage assessment of airplanes in ditchings shows that the wing flaps may be severely damaged and both the leading and trailing edge of the wings may have torn-metal projections. These may damage life rafts launched and loaded from the wing. In such circumstances, it would be preferable to launch and load rafts from nonoverwing locations.

Several comments recommended that the Type IV exit be retained for the smaller transport category airplanes, particularly those having a low passenger seating capacity, on the ground that the installation of Type III exits instead of Type IV exits would significantly increase the structural weight of the airplane, and that this weight penalty is an unreasonable burden inasmuch as any benefit that might be afforded by a Type III exit would have little effect on airplane evacuation. The FAA agrees with the comments to the extent that they apply to small transport category airplanes that have a passenger seating configuration, excluding pilot seats, of nine seats or less. Accordingly, the present definition of a Type IV exit has been retained in § 25.807(a), and proposed § 25.807(c)(1) has been revised to permit the use of Type IV exits (one on each side of the fuselage) on such airplanes. In addition, the provisions of present § 25.807(c)(7) and (d) and § 25.813 that pertain to Type IV exits have been retained.

Several comments were received recommending that other provisions of current § 25.807(c) also be changed. One comment recommended the deletion of the requirement that where more than one floor level exit per side is prescribed, at least one such exit must be located near each end of the cabin. In another instance, it was recommended that applicants should be able to select the values in either the table in paragraph (c)(1) or (2). The FAA does not agree with either of these suggestions. The change to § 25.807(c) proposed in Notice 69-33 concerned only the deletion of the reference to, and the values for, Type IV exits. Both of the foregoing recommendations are outside the scope of the notice. Finally, a request was made to change the values for a Type A exit from 100 passenger seats to 115 passenger seats. The FAA does not agree. There has not been sufficient service experience with the Type A exit to date to justify the requested change. While the request may have merit, it will require further study by the FAA.

Several comments noted that the requirements of present § 25.809(b) do not include consideration of fuselage deformation, which is covered in other rules, and that it should be made clear that the proposed addition to the present rule does not include consideration of such deformation. The FAA agrees and the proposed amendment to § 25.809(b) has been revised to clearly state the intent of the requirement. In addition, proposed subparagraph (b)(1) has been revised to make it clear that the requirement applies to the airplane when it is in the normal ground attitude as well as in the attitudes corresponding to the collapse of one or more legs of the landing gear.

A comment was also received recommending that proposed § 25.809 (b)(2) and (f)(1)(ii) be changed to require the total time from exit actuation to full slide deployment to be not more than 10 seconds. This suggestion is beyond the scope of the notice and requires further study. The FAA intends to consider it in connection with future rulemaking. However, § 25.809(f)(1)(i) has been revised to clearly state that deployment must begin during the exit opening cycle.

In response to a comment, proposed paragraph (g) of § 25.809 has been revised to allow the showing required by that paragraph to be made by tests alone or by a combination of analysis and tests.

One comment recommended that the requirement in § 25.809(h) be revised to prescribe that means must be provided to assist evacuees to reach the ground from overwing exits if the place on the airplane structure at which the escape route terminates is more than 6 feet above the ground with the airplane on the ground and the critical landing gear collapsed. Under the current requirement the 6 feet is measured with the airplane on the ground and all landing gear extended. The FAA intends to consider this recommendation, which is beyond the scope of the notice, in subsequent rulemaking.

Comments received concerning proposed § 25.809(i) indicated that the objective of this proposal had been misunderstood. The intent of the proposal is to prevent the installation of a powered exit system, the failure of which would render more than one exit totally inoperative. If a single power-boost or single power-operated exit-opening system is the primary system for operating more than one exit in an emergency, each exit must be capable of meeting the requirements of § 25.809(b)(1) in the event of failure of the primary system. The proposed requirement has been revised to make this clear.

A comment was received recommending that the exit locator signs required in § 25.811(d) not be required in airplanes having a seating capacity of 21 or less if the exit marking sign is plainly visible from any point in the cabin. The comment stated that this should be done because under the proposal the overhead locator signs would be within a few feet of the exit marking signs. The purpose of the exit locator sign is to aid in locating emergency exits and it is anticipated that regardless of the size of an airplane or its seating capacity, the exit locator signs will be near the emergency exit. This is the intent of the regulation. Another comment recommended that the proposal should require that the exit locator sign indicating the location of the nearest exit must be visible to each seated passenger. The FAA has found

that these signs provide for effective evacuation performance. The primary need to see exit locating signs occurs when the passenger reaches the aisle during emergency evacuation. As a practical matter, in existing airplanes, the exit locating signs are generally visible to passengers in their seats.

In response to a comment, the proposed requirement in § 25.812(f) that emergency lighting must be provided at each overwing exit for, among other things, a minimum width of 4 feet for a Type A exit has been changed to specify a minimum width of 42 inches. The minimum width of a Type A exit is 42 inches and the illuminated area need not be more than 42 inches wide.

One comment stated that the state-of-the-art permits each light to have its own independent power supply. The comment indicates that there is no reason to permit any light to be inoperative except those directly damaged by the fuselage separation and suggested that § 25.812(k) be changed accordingly. The FAA does not agree. This matter was considered in Amendment 25–15, adopted September 15, 1967. At that time, the FAA stated that it is not necessary to require that all lights except those directly damaged by the fuselage breakup remain operative after any single vertical separation of the fuselage during crash landing. The FAA considers that the present requirement which permits up to 25 percent of certain of the emergency lights, in addition to those directly damaged by the fuselage breakup, to be rendered inoperative is all that is required in the interest of safety. However, it should be noted that under current requirements certain important interior and exterior lights must still remain operative.

A recommendation was made to change the lead-in statement in § 25.853 to refer to "typical" decorative surfaces and to define such surfaces as "paint finishes and decorative textured laminates applied to the materials." The FAA does not believe that this change is necessary. Under this proposal repetitive testing would not be required for finishes and decorative surfaces that are found to be "typical", with respect to their burn characteristics, of finishes and decorative surfaces already tested.

In response to comments received, § 25.853(a) has been revised to make it clear that the requirement does not apply to compartments for the stowage of small items, such as maps and magazines. However, the FAA does not agree with the recommendation that synthetic materials should be tested by a method other than a vertical test. While it is recognized that the test procedures referenced in § 25.853 could be made more stringent in various ways, the FAA has no reason to believe that materials (whether synthetic or other) meeting the prescribed tests do not have adequate burn characteristics.

One commentator stated that proposed § 28.812(b) should be revised to require a supplementary self-illuminated sign that would remain lighted at all times to make passengers aware of the exit location. The FAA does not consider that such a requirement is necessary. The purpose of the proposal is to make passengers aware of the location of the exits during the confusion attending an emergency. The FAA does not consider the passenger locating signs need be illuminated during normal operation; the general cabin lighting system normally provides sufficient illumination for the unlighted locator signs.

In response to a comment, the proposed requirements of § 25.812(b)(1) have been revised to provide some tolerance in the letter height to stroke-width ratio for emergency exit locator signs. The final rule allows a letter height to stroke-width ratio of not more than 7:1 nor less than 6:1.

One comment objected to the requirement in § 25.812(d) that the floor of the passageway leading to each floor-level passenger emergency exit must be provided with illumination that is not less than 0.02 foot-candle. The commentator stated that 0.01 foot-candle is all that is necessary in evacuation systems, and that, because eye adaption is more difficult at higher illumination levels, 0.02 foot-candles might be detrimental. The FAA considers the illumination of the passageway leading to an emergency exit to be very important and critical to safety. Evacuees must have assurance of adequate illumination for rapid and uninterrupted movement to the exit as well as for movement through the exit. While the FAA is aware of the lighting preadoption problem, it nevertheless considers that 0.02 foot-candle illumination is essential for passageway lighting.

Subsequent to the issuance of Notice 69–33, the lead-in sentences of § 25.812 (e) and (g)(2) were amended by Amendment 25–28, and the proposed changes to these paragraphs have been revised to include the later amendments, as revised for consistency with the requirements being adopted by this amendment.

One comment concerning the proposed requirement for a crew warning light in § 25.812(e)(2) indicated that a light burning continuously would result in power depletion. The flight crew warning light provides positive indication when the emergency lighting control device is neither armed nor turned on. The current drain is very small when related to the total electrical system demand and is outweighed by the gain in safety.

A comment recommended that instead of requiring the operating handle for Type III exists to be self-illuminated, the rule should permit lighting from the emergency lighting system as an acceptable alternative. The FAA does not agree. Adequate illumination of Type III emergency exit operating handles in an emergency situation can only be provided through self-illumination. Persons crowding the exit are likely to block off light from any source other than from the handle itself. It was also recommended that the operating instructions for opening emergency exits should be readable from the aisle rather than a distance of 30 inches. The FAA disagrees. The instructions need only be readable by the persons at or near the exit who are in a position to open the exit. The 30-inch requirement has been in the regulation for many years and there is no evidence that it is not adequate. However, since paragraph (e) of § 25.811 applies only to operation of an exit from the inside, it has been revised to make this clear. It was also recommended that self-illuminated handles be required on all passenger emergency exits instead of limiting them to Type III exits. All Type A and Type I exits and all Type II exits not located overwing, are floor level exits and the rules now require general illumination for passageways leading to such exits. This general illumination provides adequate illumination for operating handles and instructions. However, the comment may have merit with respect to Type II and Type IV overwing exits and the FAA plans to consider it in subsequent rule-making action with respect to such exits.

It was also recomemnded that each sign use the words "emergency exit" to eliminate the possibility that passengers might attempt to open emergency exits in other than emergency conditions. The FAA does not consider that such a change is necessary. All exits are "emergency" exits and the FAA considers that the word "exit" is more appropriate.

In response to comments received, proposed paragraph (a) of § 25.812 has been revised for the purpose of clarifying the requirement. No substantive change has been made by this revision.

One commentator stated that test evidence suggests that a reduction in the flame resistant standards of sidewall materials up to the top of the window line can be made with no loss of overall safety compared with the standard above this height, having regard to the lesser tendency for flame to spread at the lower level. The FAA does not agree. While the FAA is aware of higher potential temperature and flame spread at the upper sidewalls and ceiling, it is also aware that wall panels and partitions normally are continuous to floor level. Furthermore, there is no certainty that the cabin ceiling and upper sidewalls will remain uppermost after a crash landing.

One comment concerning § 25.853 suggested that "covering of upholstery" be deleted from the requirements of paragraph (b). The FAA agrees. The term "upholstery" includes the material used to stuff and to permanently cover furniture. It was also suggested that cargo compartment liners, insulation blankets, and cargo covers be deleted from § 25.853 and that all cargo compartment requirements be placed in § 25.855. The FAA does not agree that this is necessary. However, the provisions have been revised to clearly set forth the distinction between the fire protection requirement of §§ 25.853 and 25.855. In this case, the final rule makes it clear that § 25.853 covers, in addition to other materials, materials used in convertible passenger/crew cargo compartments. On the other hand, § 25.855 covers cargo and baggage compartments not occupied by passenger or crew.

A number of comments suggested that certain of the items listed in proposed § 25.853(b) could be constructed with

elastomeric materials and that the rule should not require this material to be listed to the standards of paragraph (b). The FAA agrees and the proposal has been revised to allow those items, if constructed of elastomeric materials, to be tested under the requirements of paragraph (b-2).

With respect to proposed § 25.853(c), there was a comment recommending that the words "instrument assemblies" be changed to read "instrument panels." The FAA does not agree. Under the current rules, "edge light instrument panels" made of specified materials were exempt from the requirements of paragraph (a) of § 25.853 applicable to all wall and ceiling panels. Notice 69–33 proposed to remove that exemption since there are materials that can be used in edge light instrument panels that are available and that meet the self-extinguishing requirements of paragraph (a). The proposed requirement concerning "edge lighted instrument assemblies" is not related to edge lighted instrument panels. The edge lighted instrument assembly requirement applies to one or more instruments situated in a common housing. Such assemblies may be installed in edge lighted instrument panels.

A comment was also received requesting that proposed § 25.853(d) be changed so that "small parts" need not be tested. The commentator contends that it is impractical to test each small part and that the chemistry of materials is sufficiently well known to prevent the use of rapid burning materials. The FAA does not agree that all small parts need not be tested. However, the requirement has been revised to provide that small parts which the Administrator finds would not contribute significantly to the propogation of a fire, need not be tested. Another comment stated that the 4 in./min. burn rate is unnecessarily lenient for all small parts and recommended a 2.5 in./min. burn rate. The FAA does not agree. The availability of materials that would meet the 2.5 in./min. burn rate is limited. Moreover, the quantities of materials involved in this recommendation is not sufficient to warrant the more stringent burn capability.

Various comments also requested clarification regarding the applicability of proposed § 25.853(d) to motion picture film. The motion picture film that is used aboard aircraft now is safety film. In response to these comments and after further consideration, the FAA has determined that motion picture film need not meet the proposed requirements, but must meet the specifications for safety film set forth in Standard Specifications for Safety Photographic Film PHI.25. The proposal has been revised accordingly. Moreover, the ducts through which the motion picture film travels during operation in flight must meet the requirements of § 25.853(b) which apply to other ducts on the airplane.

The purpose of the proposed amendment to §§ 25.855 and 25.857 was to delete the requirement for a liner in cargo compartments from § 25.857 and put it in § 25.855. However, it appears that the proposed change to § 25.855, while establishing certain characteristics for liners, does not expressly require a liner. Therefore, proposed § 25.855(a) has been revised to require a liner in Class B through E cargo and baggage compartments. Moreover, it has been brought to the FAA's attention that the proposed amendment could be interpreted as prohibiting "a pinhole or translucent resin area through which light can be seen but flame does not penetrate." This was not intended and the appropriate change has been made to clarify the proposal.

In a comment on § 25.1359(d), it was recommended that this requirement should apply to electrical wire and cable insulation in a "pressurized zone" rather than in the entire fuselage. The FAA does not agree. With respect to wire and cable insulation, the FAA is equally concerned about all areas of the fuselage. Burning wire insulation could cause the spread of a fire from a nonpressurized zone to a pressurized zone. Another comment recommended that wire insulation must be self-extinguishing when tested at an angle of 60°, that a burn length requirement not to exceed 3 inches should be added, and that the dripping requirement should be changed to an average of 3 seconds. It was also recommended that the proposal should refer to "coaxial cable" rather than "cable" and should specify a burn rate of 2.5 in./min. for that cable. The test procedure specified in Appendix F for wire and cable is a 60° test. Therefore, it is appropriate to refer to the 60° test in § 25.1359(d). Moreover, through oversight, the proposal did not contain a burn length requirement which is essential in determining that any material is self-extinguishing. Therefore, the proposal has been changed to specify a 3-inch burn length. However, the FAA does not agree that the proposal should be changed to refer to coaxial cables and to specify a 2.5 in./min. burn rate. The FAA considers that all electrical cable insulation must meet the proposed fire protection requirement, including coaxial. Since the regulation now contains a burn length requirement as the criterion for self-extinguishing properties, there is no need for a burn rate requirement.

A comment recommended that the proposal be revised to require a single wire vertical test with a 2-second extinguishing time and a 10-wire bundle test with a 5-second extinguishing time. The FAA does not believe that these tests are necessary to insure that electrical wire and cable insulations have adequate self-extinguishing characteristics. The proposed requirement covers both burn length and extinguishing time and also permits persons to use any approved equivalent method for determining that the insulation is self-extinguishing. The test methods recommended could be used if they are equivalent to the method stated in the appendix.

In response to a comment, paragraph (a) of Appendix F has been changed to add a limitation of 24 hours as an alternative to reaching moisture equilibrium. The FAA believes that this revision would not significantly affect the outcome of the tests. In addition, the proposed paragraph (b) has been revised to permit testing material of the actual size used in the airplane if it is smaller than the specified 2 inches wide and 12 inches long.

In response to comments, the Federal Standard referenced in paragraph (c) of Appendix F has been revised to reflect the correct designation and paragraph (f) has been revised to specify that the flame must contact the center of the material.

In response to comment, the proposal covering burn length has been revised to make it clear that the burn length excludes areas where material has melted away from the heat source. Finally, in response to comments a number of clarifying changes have been made to the proposal for the 60 degree test applicable to wire and cable. In this connection, the rule now requires the testing of a minimum of three specimens in place of the statistical determination. It also allows the upper end of the specimens to be passed over a rod or pulley and the use of a Tirrill burner as well as a Bunsen burner. The requirement for a ¼-inch inlet and the centigrade reference for the burner have been deleted for consistency with other test requirements.

The proposed changes to §§ 37.132, 37.136, and 37.178 have been incorporated into the appropriate provisions under those TSO's to make it clear that the new requirements apply only to new models of equipment manufactured on or after the effective date of the new requirements.

In Notice 69–33, it was proposed to amend § 121.215 to cover only the requirement for ash trays and to require placarding when smoking is not allowed. This amendment was proposed on the grounds that all the other fire protection requirements currently contained in § 121.215 concerning cabin interiors are now covered under other provisions in Part 121. While this statement is appropriate insofar as the later aircraft are concerned, it is not appropriate with respect to all of the older aircraft covered under Subpart J. Thus, until such time as there is a major overhaul of a cabin or a refurbishing of a cabin interior on those aircraft as provided in § 121.312, the fire protection requirements of § 121.215 are still necessary. The current provisions of § 121.215 have been retained with an appropriate reference to § 121.312.

It was also proposed to amend § 121.285 to require that cargo bins in passenger compartments meet the current requirements of § 25.853(b) upon adoption of these amendments. However, as indicated in one of the comments, such a proposed change would be inconsistent with current § 121.312 which only requires compliance with current § 25.853 for such cargo bins upon refurbishing or major overhaul of cabin compartment. The proposed change to § 121.285 has therefore been withdrawn.

While there was no change to § 121.291 proposed in Notice 69–33, the FAA is

aware that some confusion exists concerning the application of § 121.291 to an airplane that is the same, from an emergency evacuation point of view, as another airplane in which the certificate holder has successfully demonstrated emergency evacuation. The FAA does not believe that in such a situation a repeat of the demonstration is necessary. Therefore, § 121.291 has been revised to make this clear.

While not covered in Notice 69–33 in any detail, the FAA considers it appropriate at this time to make certain editorial revisions to § 121.310. The many substantive changes being made to § 121.310 make these editorial changes desirable. In this connection all of the expired compliance dates in the section have been deleted and the various paragraphs have been appropriately rearranged to accommodate these deletions. No substantive changes have been made by these editorial revisions and none is intended. These editorial revisions affect paragraphs (a), (g), (h), (i), and (j).

A clarifying change has been made to § 121.310(a) to make it consistent with the corresponding requirement in § 25.812(a).

The proposed amendment to § 121.310 (b)(2) has been revised to remove the inconsistency between the lead-in paragraph and the referenced provisions of § 25.812(b). The lead-in paragraph, as proposed in Notice 69–33, inadvertently retained the requirement that interior emergency exit marking and locator signs must have white letters 1 inch high on a red background 2 inches high. While this is appropriate for airplanes that are type certificated prior to the effective date of this amendment, it is inconsistent with the interior emergency exit marking requirements for airplanes that are type certificated after that date. In addition, the requirements set forth in subdivision (iii) of this proposal have been incorporated into subdivision (i) since they are not related to the new requirements set forth in subdivision (ii).

In answer to one commentator, a "transverse vertical separation" in § 121.310(d) is a vertical separation of the airplane that is approximately 90° to the longitudinal axis. The addition of the word "transverse" makes § 121.310(d) consistent with § 25.812(e)(3).

It was proposed to amend § 121.310(d) further by adding a new subparagraph (3) requiring a flight crew warning light. In response to a comment, and after further consideration, the FAA believes that it would be unreasonably burdensome to apply this requirement to airplanes already in service. However, airplanes newly certificated under § 25.812(e)(2) of this amendment will be equipped with a flight crew warning light, thereby providing an orderly transition to an improved level of safety.

The proposed amendment requiring that each exit emergency light provide the required level of illumination for at least 10 minutes at the critical ambient conditions after emergency landing has been removed from subdivision (iii) of subparagraph (2) of § 121.310(d) and placed in a new subparagraph (3). It has been determined by the FAA that the operators will need additional time in order to make the modifications necessary to meet this requirement. Therefore, this new requirement has been placed in subparagraph (3) with a compliance date 2 years after the effective date of this amendment.

Several comments were received concerning proposed § 121.312. All of these comments cited difficulties with the requirement that cabin interior material must be replaced upon the first "major overhaul" or upon "refurbishing" of the cabin interior. The comments noted that cabin interiors are being maintained on an "on condition" basis and suggested that the rule should be so clarified. The incorporation of an "on condition" requirement in proposed § 121.312 would require a complete revision to that section and would be outside the scope of the notice. However, it appears that a clarification of that regulation may be necessary and the FAA is currently studying this proposal with a view to initiating appropriate rulemaking.

Concerning the proposed change to § 121.317, it has come to the attention of the FAA that on some airplanes, the seat belt and no smoking signs are not visible to some seated passengers. In these instances, an announcement is made over the public address system that the signs have been turned on. In the final rule, operators of such airplanes have been given 2 years to procure and install the additional signs required to comply with the new rule. In the meantime, the operators must continue to meet the current requirements.

Section 121.391(d) has been revised to make it clear that: (1) This paragraph applies only to flight attendants required by § 121.391; and (2) the flight attendants need only be located at the required floor level exits. It was not intended that flight attendants be seated at the additional floor level exits because such exits do not, in general, meet all of the standards applicable to required emergency exits. The FAA believes that in the interest of safety, flight attendants must be located at the most effective floor level exits.

Several comments indicated that the requirement in § 121.571, that passengers be briefed to keep their safety belts "loosely and comfortably fastened while seated", would not be appropriate. After such a briefing, passengers might not have the belt fastened tight enough to provide the necessary restraint in the event of unexpected turbulence. The FAA agrees and the rule requires only that passengers be told that they should keep their seat belts fastened while seated.

In addition, one commentator noted that a pretakeoff briefing is not the appropriate place for the announcement that when the seat belt sign is off passengers should keep their seat belts fastened. The commentator believes that this briefing should be made after takeoff when turning the seat belt sign off. The FAA agrees, and the proposal has been changed accordingly.

Several comments were received concerning proposed § 121.577. These comments recommended that the proposal permit certain beverages and foods to be located at a passenger seat during takeoff or landing of an airplane. One commentator indicated that beverages in small paper or plastic cups or a breakfast roll would not constitute a danger to passengers in the event of an accident. As the FAA stated in Notice 69–33, in an emergency situation requiring evacuation, the litter from food service of any kind (including coffee or rolls) can be hazardous. Therefore, the proposal has not been changed as recommended. However, proposed § 121.577(b) has been revised to make it clear that during takeoff and landing passenger food and beverage trays and serving carts must be secured in their stowed positions, i.e., correctly positioned in their storage compartment and their restraint means, if any, fastened.

Numerous comments were received on the proposal concerning carry-on baggage (§ 121.589). Several comments pointed out that the restraint requirement should not be made mandatory for all seats. The FAA agrees that it is only when baggage is permitted to be stowed under a seat that the seat need be fitted with a means to prevent articles of baggage stowed under it from sliding forward. The proposal has been revised accordingly. Two comments objected to any requirement that carry-on baggage be stowed under a seat. The inconvenience of having to check baggage with no corresponding gain in safety was cited as reason for their objection. The FAA does not agree. Carry-on baggage must be secured to prevent injury to passengers, and to prevent interference with passenger evacuation, in a crash situation. The increase in safety realized from such a requirement far outweighs the inconvenience of checking the baggage. Another comment recommended that the rule permit stowage of carry-on baggage in front of passengers seated facing a bulkhead provided the bulkhead meets the crash impact requirements of paragraph (c) of § 121.589. Section 121.285 already provides for the carriage of cargo, including carry-on baggage, forward of the foremost seated passenger. However, insofar as the recommendation would required the imposition of crash impact loads on bulkheads, it would constitute a substantive change in the existing requirements. Such a change is outside the scope of Notice 69–33. On the other hand, the recommendation appears to have merit and may be the subject of a future rule-making action.

There was also a comment recommending that the carry-on baggage should be restrained in the sideward direction as well as in the forward direction. Such a requirement was not proposed in Notice 69–33 and the FAA believes that most seats provide side restraint. However, since there may be seats that do not, the FAA is looking

into the matter and will initiate rule making as needed.

In consideration of the foregoing, Parts 25, 37, and 121 of the Federal Aviation Regulations are amended, effective May 1, 1972, as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. Section 25.721 is amended to read as follows:

§ 25.721 General.

(a) The main landing gear system must be designed so that if it fails due to overloads during takeoff and landing (assuming the overloads to act in the upward and aft directions), the failure mode is not likely to cause—

(1) For airplanes that have a passenger seating configuration, excluding pilots seats, of nine seats or less, the spillage of enough fuel from any fuel system in the fuselage to constitute a fire hazard; and

(2) For airplanes that have a passenger seating configuration, excluding pilots seats, of 10 seats or more, the spillage of enough fuel from any part of the fuel system to constitute a fire hazard.

(b) Each airplane that has a passenger seating configuration excluding pilots seats, of 10 seats or more must be designed so that with the airplane under control 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 is like to cause the spillage of enough fuel to constitute a fire hazard.

(c) Compliance with the provisions of this section may be shown by analysis or tests, or both.

2. Section 25.785(c) is amended by amending the second sentence of the lead-in paragraph and subparagraphs (1), (2), and (3) to read 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.

* * * * *

3. Section 25.787 is amended by striking out paragraph (c) and by changing the title of the section and amending paragraph (a) to read 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 distribution 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. If the airplane has a passenger seating configuration, excluding pilots seats, of 10 seats or more, each stowage compartment in the passenger cabin, except for underseat and overhead compartments for passenger convenience, must be completely enclosed.

* * * * *

(c) [Deleted]

4. A new § 25.789 is added 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 (that is part of the airplane type design) 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).

5. A new § 25.791 is added to read as follows:

§ 25.791 Passenger information signs.

When passenger information signs are installed to comply with the operating rules of this chapter, at least one sign (using either letters or symbols) notifying when smoking is prohibited and one sign (using either letters or symbols) notifying when safety belts should be fastened must, when illuminated, be legible to each person seated in the passenger cabin under all probable conditions of cabin illumination. Signs which notify when safety belts should be fastened and when smoking is prohibited must be so constructed that the crew can turn them on and off.

6. Paragraph (e) of § 25.803 is amended 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. Except where a means for channeling the flow of evacuees is provided—

(1) The escape route must be at least 42 inches wide at Type A passenger emergency exits and must be at least 2 feet wide at all other passenger emergency exits, and

(2) The escape route surface must have a reflectance of at least 80 percent, and must be defined by markings with a surface-to-marking contrast ratio of at least 5.1.

7. Section 25.807 *Passenger emergency exits,* is amended as follows:

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

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

§ 25.807 Passenger emergency exits.

(a) * * *

(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.

* * * * *

(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:

Additional emergency exits (each side of fuselage)	*Increase in passenger seating configuration allowed*
Type A	100
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 100 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 § 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 §§ 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.

8. Section 25.809 *Emergency exit arrangement,* is amended as follows:

A. By amending paragraph (b) to read as set forth below.

B. By amending paragraph (f)(1) to read as set forth below.

C. By amending paragraph (g) to read as set forth below.

D. By amending paragraph (h) and by adding a new paragraph (i) to read as set forth below.

§ 25.809 **Emergency exit arrangement.**

* * * * *

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

* * * * *

(f) * * * (1) The assisting means for each passanger 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 and deployment must begin during the interval between the time the exit opening means is actuated from inside the airplane and the time the exit is fully opened. However, each passenger emergency exit which is also a passenger entrance door or a service door must be provided with means to prevent deployment of the assisting means when it is opened from either the inside or the outside under non-emergency conditions for normal use.

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

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

(g) 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.

(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 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.

9. Section 25.811 *Emergency exit marking,* is amended as follows:

A. By amending paragraph (d) to read as set forth below.

B. By amending the lead-in sentence and subparagraph (1) of paragraph (e) to read as set forth below.

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

D. By amending paragraph (g) to read as set forth below.

§ 25.811 **Emergency exit marking.**

* * * * *

(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 the exit from the inside 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.

* * * * *

(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".

10. Section 25.812 *Emergency lighting*, is amended as follows:

A. By amending the lead-in statement of paragraph (a) to read as set forth below.

B. By amending paragraphs (b), (c), (d), (e), (f), and (g) to read as set forth below.

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).

§ 25.812 Emergency lighting.

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

* * * * *

(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 § 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 § 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 § 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 les 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) Except for subsystems provided in accordance with paragraph (g) 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 (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 emergency lighting control device is neither armed nor 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 42 inches for a Type A overwing emergency exit and of 2 feet for all other overwing emergency exits along the 30 percent of the slip-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 (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 § 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 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 and 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.

* * * * *

11. Section 25.813(c) is amended to read as follows:

§ 25.813 Emergency exit access.

* * * * *

(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 seats, 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 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.

* * * * *

12. Section 25.853 is amended by amending the lead-in statement and paragraphs (a) and (b) and by adding new paragraphs (b-1), (b-2), and (b-3) 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 stowage compartments and compartments for stowing small items such as magazines and maps) 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 an average of 3 seconds after falling.

(b) Floor covering, textiles (including draperies and upholstery), seat cushions, padding, decorative and nondecorative coated fabrics, leather, trays and gallery furnishings, electrical conduit, thermal and acoustical insulation and insulation covering, air ducting, joint and edge covering, cargo compartment liners, insulation blankets, cargo covers, and transparencies, molded and thermoformed parts, air ducting joints, and trim strips (decorative and chafing), that are constructed of materials not covered in paragraph (b–2) of this section, 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 an average of 5 seconds after falling.

(b–1) Motion picture film must be safety film meeting the Standard Specifications for Safety Photographic Film *PH 1.25* (available from the United States of America Standards Institute, 10 East 40th Street, New York, NY 10018), or an FAA-approved equivalent. If the film travels through ducts, the ducts must meet the requirements of paragraph (b) of this section.

(b–2) Acrylic windows and signs, parts constructed in whole or in part of elastomeric materials, edge lighted instrument assemblies consisting of two or more instruments in a common housing, seat belts, shoulder harnesses, and cargo and baggage tiedown equipment, including containers, bins, pallets, etc., used in passenger or crew compartments, may not have an average 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.

(b–3) Except for electrical wire and cable insulation, and for small parts (such as knobs, handles, rollers, fasteners, clips, grommets, rub strips, pulleys, and small electrical parts) that the Administrator finds would not contribute significantly to the propagation of a fire, materials in items not specified in paragraphs (a), (b), (b–1), or (b–2) 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.

* * * * *

13. Section 25.855 is amended by amending paragraph (a) and by adding new paragraphs (a–1) and (a–2) to read as follows:

§ 25.855 Cargo and baggage compartments.

(a) Thermal and acoustic insulation (including coverings) and liners, used in each cargo and baggage compartment not occupied by passengers or crew, must be constructed of materials that at least meet the requirements set forth in § 25.853(b).

(a–1) Class B through Class E cargo or baggage compartments as defined in § 25.857, must have a liner and the liner must be constructed of materials that at least meet the requirements set forth in § 25.853(b), 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. In the course of the 45° angle test, the flame may not penetrate (pass through) 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.

(a–2) Insulation blankets and cargo covers used to protect cargo in compartments not occupied by passengers or crew must be constructed of materials that at least meet the requirements of § 25.853(b), and tiedown equipment (including containers, bins, and pallets) used in each cargo and baggage compartment not occupied by passengers or crew must be constructed of materials that at least meet the requirements set forth in § 25.853(b–3).

* * * * *

§ 25.857 [Amended]

14. Section 25.857 is amended by striking out subparagraph (4) of paragraph (b), subparagraph (5) of paragraph (c), subparagraph (4) of paragraph (d), and subparagraph (1) of paragraph (e) and by designating them "reserved".

15. Section 25.1359 is amended by adding a new paragraph (d) to read as follows:

§ 25.1359 Electrical system fire and smoke protection.

* * * * *

(d) Insulation on electrical wire and electrical cable installed in any area of the fuselage must be self-extinguishing when tested at an angle of 60° in accordance with the applicable portions of Appendix F of this part, or other approved equivalent methods. The average burn length may not exceed 3 inches and 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 an average of 3 seconds after falling.

§ 25.141 [Amended]

16. Section 25.1411(c) is amended by striking out the reference to "§ 25.807 (c)(4)" and inserting reference to "§ 25.809(f)" in place thereof.

17. Paragraph (a) of § 25.1557 is amended to read as follows:

§ 25.1557 Miscellaneous markings and placards.

(a) *Baggage and cargo compartments and ballast location.* Each baggage and cargo compartment, and each ballast location must have a placard stating any limitations on contents, including weight, that are necessary under the loading requirements. However, underseat compartments designed for the storage of carry-on articles weighing not more than 20 pounds need not have a loading limitation placard.

* * * * *

18. Appendix F is amended 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 to 70° F, plus or minus 5° and at 50 percent plus or minus 5 percent relative humidity until moisture equilibrium is reached or for 24 hours. Only one specimen at a time may be removed from the conditioning 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 parts, 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 ½-inch thickness; (2) when showing compliance with § 25.853(b–3) for materials used in small parts that must be tested, the materials must be tested in no more than ⅛-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 paragraph (d), the two long edges and the upper edge are held securely; (2) in the horizontal test of paragraph (e), the two long edges and the edge away from the flame are held securely; (3) the exposed area of the specimen is at least 2 inches wide and 12 inches long, unless the actual size used in the airplane is smaller; 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 Test method Standard 191 Method 5903 (revised Method 5902) for the vertical test, or Method 5906 for horizontal test (available from the General Services Administration, Business Service Center, Region 3, Seventh and D Streets SW., Washington, DC 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 1½ inches in height. The minimum flame 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 center line 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 (b–2) and (b–3).* 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 1½ 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 specimen 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 1½ 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–1).* 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 1½ 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 contact the material at the center of the specimen and must be applied for 30 seconds and then removed. Flame time, glow time, and whether the flame penetrates (passes through) the specimen must be recorded.

(g) *Sixty-degree test in compliance with § 25.1359(d).* A minimum of three specimens of each wire specification (make and size) must be tested. The specimen of wire or cable (including insulation) must be placed at an angle of 60° with the horizontal in the cabinet specified in paragraph (c) of this appendix with the cabinet door open during the test or must be placed 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 6 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 or rod 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 or rod 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 or Tirrill burner must be applied for 30 seconds at the test mark. The burner must be mounted underneath the test mark on the specimen, perpendicular to the specimen and at an angle of 30° to the vertical plane of the specimen. The burner must have a nominal bore of three-eighths inch, and must be adjusted to provide a 3-inch-high flame with an inner cone approximately one-third of the flame height. The minimum temperature of the hottest portion of the flame, as measured with a calibrated thermocouple pyrometer, may not be less than 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. 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. Breaking of the wire specimens is not considered a failure.

(h) *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 or melted away from the heat source.

PART 37—TECHNICAL STANDARD ORDER AUTHORIZATIONS

1. Section 37.132 is amended by changing the section heading, by amending paragraph (a)(1), and by adding a new subdivision (vi) to paragraph (a)(2) to read as follows:

§ 37.132 Safety Belts—TSO–C22f.

(a) *Applicability*—(1) *Minimum performance standards.* This technical standard order prescribes the minimum performance standards that safety belts must meet in order to be identified with the applicable TSO marking. New models of safety belts that are to be so identified and that are manufactured on or after May 1, 1972, must meet the standards set forth in National Aircraft Standards (NAS) Specification 802 revised May 15, 1950, with the exceptions covered in subparagraph (2) of this paragraph. NAS 802 is incorporated by reference herein in accordance with 5 U.S.C. 552(a)(1) and § 37.23 and is available as indicated in § 37.23. Additionally, NAS 802 may be examined at any FAA regional office of the Chief, Engineering and Manufacturing Branch (or in the case of the Western Region, the Chief, Aircraft Engineering Division), and may be obtained from the National Standards Association, 1321 14th Street NW., Washington, DC 20005, at a cost of three (3) dollars. Belts approved under prior issuances of this section may continue to be manufactured under the earlier provisions.

(2) *Exceptions.* * * *

(vi) In lieu of compliance with paragraphs 1.1.1, 3.1.4, and 4.3.1.1 of NAS 802, the webbing and all other materials used in the belt assembly must comply with the fire protection provisions of § 25.853 (b–2) of this chapter.

* * * * *

2. Section 37.136 is amended to read as follows:

§ 37.136 Aircraft seats and berths—TSO–C39a.

(a) *Applicability*—(1) *Minimum performance standards.* (i) This technical standard order prescribes the minimum performance standards that aircraft seats and berths of the following types must meet in order to be identified with the applicable TSO marking:

Type I—Transport (9g forward load).
Type II—Normal and utility.
Type III—Acrobatic.
Type IV—Rotorcraft.

(ii) New models of seats and berths that are to be so identified, and that are manufactured on or after May 1, 1972, must meet the standards set forth in National Aircraft Standard (NAS) Specification 809, dated January 1, 1956, with the exceptions covered in subparagraph (2) of this paragraph. NAS 809 is incorporated by reference herein in accordance with 5 U.S.C. 552(a)(1) and § 37.23 and is available as indicated in § 37.23. Additionally, NAS 809 may be examined at any FAA regional office of the Chief, Engineering and Manufacturing Branch (or in the case of the Western Region, the Chief, Aircraft Engineering Division), and may be obtained from the National Standards Association, 1321 14th Street NW., Washington, DC 20005, at a cost of three (3) dollars.

(2) *Exceptions.* (i) The sideward loads as specified in 4.1.2. Table I need not exceed the requirements of the applicable Federal Aviation Regulations.

(ii) In lieu of compliance with paragraphs 2.1, 3.12, and 4.32 of NAS 809, materials in Type I seats and berths must comply with the fire protection provisions of § 25.853(b) of this chapter.

(b) *Marking.* The weight required in § 37.7 need not be included.

(c) *Previous approval.* Seats and berths approved prior to May 1, 1972, may continue to be manufactured under the provisions of their original approval.

3. Section 37.178 is amended as follows:

A. The section heading is changed and paragraph (a) is amended to read as set forth below.

B. Paragraphs 4.0.4 and 7.0.3 of Federal Aviation Administration Standard, Individual Flotation Devices, are amended to read as set forth below.

§ 37.178 Individual flotation devices—TSO–C72b.

(a) *Applicability.* This technical standard order (TSO) prescribes the minimum performance standards that individual flotation devices must meet in order to be identified with the applicable TSO marking. New models of the devices that are to be so identified, and that are manufactured on or after May 1, 1972, must meet the requirements of the "Federal Aviation Administration Standard, Individual Flotation Devices", amended effective May 1, 1972, set forth at the end of this section.

* * * * *

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—CERTIFICATION AND OPERATIONS: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

1. Paragraph (a) of § 121.215 is amended to read as follows:

§ 121.215 Cabin interiors.

(a) Except as provided in § 121.312, each compartment used by the crew or passengers must meet the requirements of this section.

* * * * *

2. Paragraph (a) of § 121.291 is amended to read as follows:

§ 121.291 Demonstration of emergency evacuation procedures.

(a) Each certificate holder must show, by actual demonstration conducted in accordance with paragraph (a) of Appendix D to this part, that the emergency evacuation procedures for each type and model of airplane with a seating capacity of more than 44 passengers, that is used in its passenger-carrying operations, allow the evacuation of the full seating capacity, including crewmembers, in 90 seconds or less, in each of the following circumstances:

(1) A demonstration must be conducted upon the initial introduction of a type and model of airplane into passenger-carrying operations. However, the demonstration need not be repeated for any airplane type or model that has the same number and type of exits, the same cabin configuration, and the same emergency equipment, as any other airplane used by the certificate holder in successfully demonstrating emergency evacuation in compliance with this paragraph.

(2) A demonstration must be conducted—

(i) Upon increasing by more than 5 percent the passenger seating capacity for which successful demonstration has been conducted; or

(ii) Upon a major change in the passenger cabin interior configuration that will affect the emergency evacuation of passengers.

* * * * *

3. Section 121.310 is amended as follows:

A. Paragraphs (a), (b)(2), and (c) are amended to read as set forth below.

B. Paragraph (d) of § 121.310 is amended by amending the flush paragraph at the end by inserting the word "transverse" between the word "a" and the word "vertical", and by adding a new subparagraph (3) to read as set forth below.

C. Paragraph (e) of § 121.310 is amended by amending the last sentence

D. Paragraph (f) of § 121.310 is amended by amending the last sentence of subparagraph (3) to read as set forth below.

E. Paragraphs (g), (h), (i), and (j) are amended to read as set forth below.

As amended, § 121.310 will read as follows:

§ 121.310 Additional emergency equipment.

(a) *Means for emergency evacuation.* Each passenger-carrying landplane emergency exit (other than over-the-wing) that is more than 6 feet from the ground with the airplane on the ground and the landing gear extended, must have an approved means to assist the occupants in descending to the ground. The assisting means for a floor-level emergency exit must meet the requirements of § 25.809(f)(1) of this chapter in effect on April 30, 1972, except that, for any airplane for which the application for the type certificate was filed after that date, it must meet the requirements under which the airplane was type certificated. An assisting means that deploys automatically must be armed during taxiing, takeoffs, and landings. However, if the Administrator finds that the design of the exit makes compliance impractical, he may grant a deviation from the requirement of automatic deployment if the assisting means automatically erects upon deployment and, with respect to required emergency exits, if an emergency evacuation demonstration is conducted in accordance with § 121.291(a). This paragraph does not apply to the rear window emergency exit of DC–3 airplanes operated with less than 36 occupants, including crewmembers and less than five exits authorized for passenger use.

(b) *Interior emergency exit markings.* * * *

(2) Each passenger emergency exit marking and each locating sign must meet the following:

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, 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 April 30, 1972. On these airplanes, no sign may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts. 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.

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, 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.

(c) *Lighting for interior emergency exit markings.* Each passenger-carrying airplane must have an emergency lighting system, independent of the main lighting system. However, 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—

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

(2) Provide enough general lighting in the passenger cabin so that the average illumination, when measured at 40-inch intervals at seat armrest height, on the centerline of the main passenger aisle, is at least 0.05 foot-candles.

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

(3) After May 1, 1974, each light must provide the required level of illumination for at least 10 minutes at the critical ambient conditions after emergency landing.

(e) *Emergency exit operating handles.* (1) For a passenger-carrying airplane for which the application for the type certificate was filed prior to May 1, 1972, 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 three-fourths 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 a passenger-carrying airplane for which the application for the type certificate was filed on or after May 1, 1972, the location of each passenger emergency exit operating handle and instructions for opening the exit must be shown in accordance with the requirements under which the airplane was type certificated. On these airplanes, no operating handle or operating handle cover may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts.

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

(3) * * * In addition—

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, the access must meet the requirements of § 25.813(c) of this chapter in effect on April 30, 1972; and

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the access must meet the emergency exit access requirements under which the airplane was type certificated.

* * * * *

(g) *Exterior exit markings.* Each passenger emergency exit and the means of opening that exit from the outside must be marked on the outside of the airplane. There must be a 2-inch colored band outlining each passenger emergency exit on the side of the fuselage. Each outside marking, including the band, must be readily distinguishable from the surrounding fuselage area by contrast in color. The markings must comply with the following:

(1) If the reflectance of the darker color is 15 percent or less, the reflectance of the lighter color must be at least 45 percent.

(2) If 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) Exits that are not in the side of the fuselage must have the external means of opening and applicable instructions marked conspicuously in red or, if red is inconspicuous against the background color, in bright chrome yellow and, when the opening means for such an exit is located on only one side of the fuselage, a conspicuous marking to that effect must be provided on the other side. "Reflectance" is the ratio of the luminous flux reflected by a body to the luminous flux it receives.

(h) *Exterior emergency lighting and escape route.* (1) Each passenger-carrying airplane must be equipped with exterior lighting that meets the following requirements:

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, the requirements of § 25.812 (f) and (g) of this chapter in effect on April 30, 1972.

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the exterior emergency lighting requirements under which the airplane was type certificated.

(2) Each passenger-carrying airplane must be equipped with a slip-resistant escape route that meets the following requirements:

(i) For an airplane for which the application for the type certificate was filed prior to May 1, 1972, the requirements of § 25.803(e) of this chapter in effect on April 30, 1972.

(ii) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the slip-resistant escape route requirements under which the airplane was type certificated.

(i) *Floor level exits.* Each floor level door or exit in the side of the fuselage (other than those leading into a cargo or baggage compartment that is not accessible from the passenger cabin) that is 44 or more inches high and 20 or more inches wide, but not wider than 46 inches, each passenger ventral exit (except the ventral exits on M–404 and CV–240 airplanes), and each tail cone exit, must meet the requirements of this section for floor level emergency exits. However, the Administrator may grant a deviation from this paragraph if he finds that circumstances make full compliance impractical and that an acceptable level of safety has been achieved.

(j) *Additional emergency exits.* Approved emergency exits in the passenger compartments that are in excess of the minimum number of required emergency exits must meet all of the applicable provisions of this section except paragraph (f) (1), (2), and (3) of this section and must be readily accessible.

4. Section 121.311 is amended 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 should harness need not be fastened if the crewmember cannot perform his required duties with the shoulder harness fastened.

5. Section 121.312 is amended to read as follows:

§ 121.312 Materials for compartment interiors.

Upon the first major overhaul of an airplane 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 an airplane for which the application for the type certificate was filed prior to May 1, 1972, § 25.853 of this chapter in effect on April 30, 1972.

(b) For an airplane for which the application for the type certificate was filed on or after May 1, 1972, the materials requirement under which the airplane was type certificated.

6. Paragraph (a) of § 121.317 is amended to read as follows:

§ 121.317 Passenger information.

(a) Until May 1, 1974, no person may operate an airplane unless it is equipped with signs that are visible to passengers and cabin attendants to notify them when smoking is prohibited and when safety belts should be fastened. After May 1, 1974, no person may operate an airplane unless it is equipped with passenger information signs that meet the requirements of § 25.791 of this chapter. The signs must be constructed so that the crew can turn them on and off. They must be turned on for each takeoff and each landing and when otherwise considered to be necessary by the pilot in command.

* * * * *

7. Section 121.391 is amended by inserting the words "required by this section" between the word "attendants" and the word "shall", and by inserting the word "required" between the word "to" and the word "floor", in paragraph (d) and by amending paragraph (c) 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.

* * * * *

8. Paragraph (a) of § 121.571 is amended to read as follows:

§ 121.571 Briefing passengers before takeoff.

(a) Each certificate holder operating a passenger-carrying airplane shall insure that all passengers are orally briefed by the appropriate crewmember as follows:

(1) Before each takeoff, on each of the following:

(i) Smoking.

(ii) The location of emergency exits.

(iii) The use of seat belts.

(2) After each takeoff, immediately before or immediately after turning the seat belt sign off, an announcement shall be made that passengers should keep their seat belts fastened, while seated, even when the seat belt sign is off.

* * * * *

9. A new § 121.576 is added to read as follows:

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

After May 1, 1974, 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.

10. A new § 121.577 is added to read as follows:

§ 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 and each serving cart is secured in its stowed position.

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

11. Section 121.589 is amended 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) Each passenger seat under which baggage is permitted to be stowed 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.

(Secs. 313(a), 601, 603, 604, Federal Aviation Act of 1958, 49 U.S.C. 1354(a), 1421, 1423, 1424, sec. 6(c), Department of Transportation Act, 49 U.S.C. 1655(c))

Issued in Washington, D.C., on February 15, 1972.

J. H. SHAFFER,
Administrator.

[FR Doc. 72-2675 Filed 2-23-72;8:45 am]

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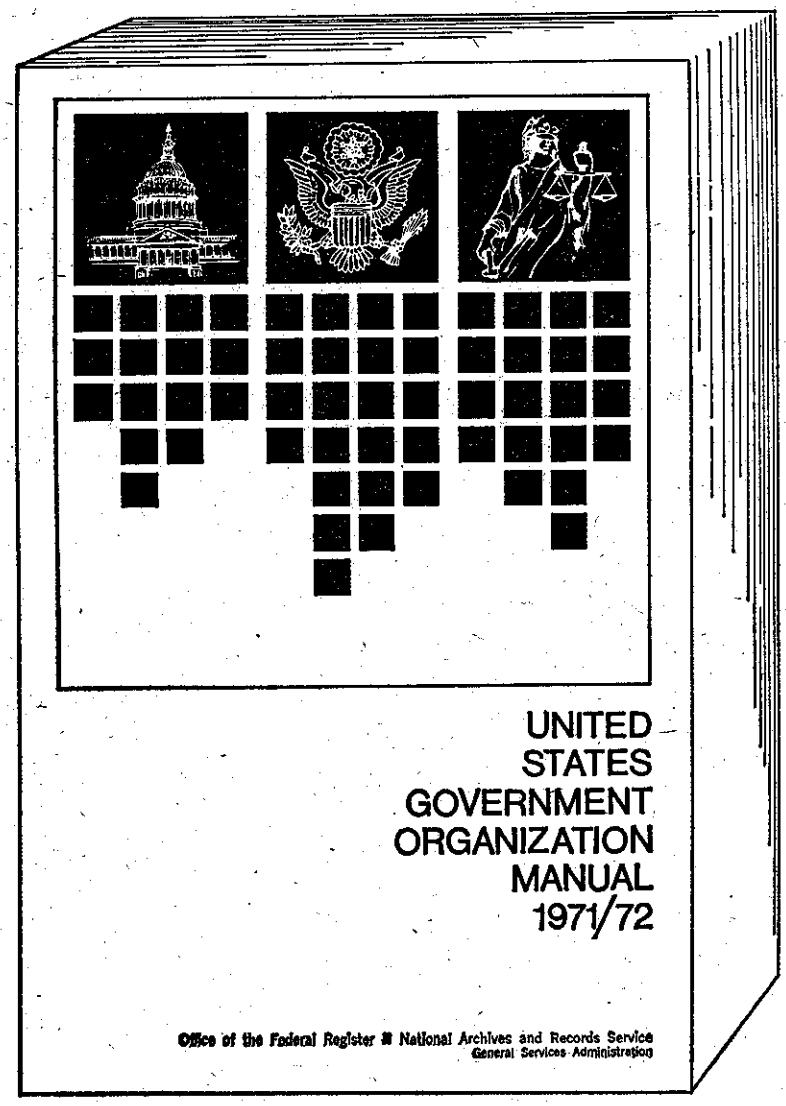

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Chapter I—Federal Aviation Administration, Department of Transportation

[Docket No. 9605, Amdts. Nos. 25-32; 37-32; 121-84]

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

PART 37—TECHNICAL STANDARDS ORDER AUTHORIZATION

PART 121—CERTIFICATION AND OPERATIONS: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

Crashworthiness and Passenger Evacuation Standards; Transport Category Airplanes

Correction

In F.R. Doc. 72-2675 appearing at page 3964 in the issue of Thursday, February 24, 1972, the following changes should be made:

1. In Part 25, the bracket which refers to "§ 25.141" (page 3972) should read "§ 25.1411".

2. In Appendix F, paragraph (d) (page 3973), in the 12th line the word "temperature" should be inserted between the words "flame" and "measured".

3. In Part 121 the second line of amendatory paragraph (C) (page 3974), now reading "amended by amending the last sentence", should read "amended to read as set forth below".

4. The paragraphs in the preamble material on page 3966 are out of order and should read as set forth below:

that these signs provide for effective evacuation performance. The primary need to see exit locating signs occurs when the passenger reaches the aisle during emergency evacuation. As a practical matter, in existing airplanes, the exit locating signs are generally visible to passengers in their seats.

A comment recommended that instead of requiring the operating handle for Type III exits to be self-illuminated, the rule should permit lighting from the emergency lighting system as an acceptable alternative. The FAA does not agree. Adequate illumination of Type III emergency exit operating handles in an emergency situation can only be provided through self-illumination. Persons crowding the exit are likely to block off light from any source other than from the handle itself. It was also recommended that the operating instructions for opening emergency exits should be readable from the aisle rather than a distance of 30 inches. The FAA disagrees. The instructions need only be readable by the persons at or near the exit who are in a position to open the exit. The 30-inch requirement has been in the regulation for many years and there is no evidence that it is not adequate. However, since paragraph (e) of § 25.811 applies only to operation of an exit from the inside, it has been revised to make this clear. It was also recommended that self-illuminated handles be required on all passenger emergency exits instead of limiting them to Type III exits. All Type A and Type I exits and all Type II exits not located overwing, are floor level exits and the rules now require general illumination for passageways leading to such exits. This general illumination provides adequate illumination for operating handles and instructions. However, the comment may have merit with respect to Type II and Type IV overwing exits and the FAA plans to consider it in subsequent rule-making action with respect to such exits.

It was also recommended that each sign use the words "emergency exit" to eliminate the possibility that passengers might attempt to open emergency exits in other than emergency conditions. The FAA does not consider that such a change is necessary. All exits are "emergency" exits and the FAA considers that the word "exit" is more appropriate.

In response to comments received, proposed paragraph (a) of § 25.812 has been revised for the purpose of clarifying the requirement. No substantive change has been made by this revision.

One commentator stated that proposed § 28.812(b) should be revised to require a supplementary self-illuminated sign that would remain lighted at all times to make passengers aware of the exit location. The FAA does not consider that such a requirement is necessary. The purpose of the proposal is to make passengers aware of the location of the exits during the confusion attending an emergency. The FAA does not consider that passenger locating signs need be illuminated during normal operation; the general cabin lighting system normally provides sufficient illumination for the unlighted locator signs.

In response to a comment, the proposed requirements of § 25.812(b)(1) have been revised to provide some tolerance in the letter height to stroke-width ratio for emergency exit locator signs. The final rule allows a letter height to stroke-width ratio of not more than 7:1 nor less than 6:1.

One comment objected to the requirement in § 25.812(d) that the floor of the passageway leading to each floor-level passenger emergency exit must be provided with illumination that is not less than 0.02 foot-candle. The commentator

stated that 0.01 foot-candle is all that is necessary in evacuation systems, and that, because eye adaption is more difficult at higher illumination levels, 0.02 foot-candles might be detrimental. The FAA considers the illumination of the passageway leading to an emergency exit to be very important and critical to safety. Evacuees must have assurance of adequate illumination for rapid and uninterrupted movement to the exit as well as for movement through the exit. While the FAA is aware of the lighting preadoption problem, it nevertheless considers that 0.02 foot-candle illumination is essential for passageway lighting.

Subsequent to the issuance of Notice 69–33, the lead-in sentences of § 25.812 (e) and (g) (2) were amended by Amendment 25–28, and the proposed changes to these paragraphs have been revised to include the later amendments, as revised for consistency with the requirements being adopted by this amendment.

One comment concerning the proposed requirement for a crew warning light in § 25.812(e) (2) indicated that a light burning continuously would result in power depletion. The flight crew warning light provides positive indication when the emergency lighting control device is neither armed nor turned on. The current drain is very small when related to the total electrical system demand and is outweighed by the gain in safety.

In response to a comment, the proposed requirement in § 25.812(f) that emergency lighting must be provided at each overwing exit for, among other things, a minimum width of 4 feet for a Type A exit has been changed to specify a minimum width of 42 inches. The minimum width of a Type A exit is 42 inches and the illuminated area need not be more than 42 inches wide.

One comment stated that the state-of-the-art permits each light to have its own independent power supply. The comment indicates that there is no reason to permit any light to be inoperative except those directly damaged by the fuselage separation and suggested that § 25.812 (k) be changed accordingly. The FAA does not agree. This matter was considered in Amendment 25–15, adopted September 15, 1967. At that time, the FAA stated that it is not necessary to require that all lights except those directly damaged by the fuselage breakup remain operative after any single vertical separation of the fuselage during crash landing. The FAA considers that the present requirement which permits up to 25 percent of certain of the emergency lights, in addition to those directly damaged by the fuselage breakup, to be rendered inoperative is all that is required in the interest of safety. However, it should be noted that under current requirements certain important interior and exterior lights must still remain operative.

A recommendation was made to change the lead-in statement in § 25.853 to refer to "typical" decorative surfaces and to define such surfaces as "paint finishes and decorative textured laminates applied to the materials." The FAA does not believe that this change is necessary. Under this proposal repetitive testing would not be required for finishes and decorative surfaces that are found to be "typical", with respect to their burn characteristics, of finishes and decorative surfaces already tested.

In response to comments received, § 25.853(a) has been revised to make it clear that the requirement does not apply to compartments for the stowage of small items, such as maps and magazines. However, the FAA does not agree with the recommendation that synthetic materials should be tested by a method other than a vertical test. While it is recognized that the test procedures referenced in § 25.853 could be made more stringent in various ways, the FAA has no reason to believe that materials (whether synthetic or other) meeting the prescribed tests do not have adequate burn characteristics.

One commentator stated that test evidence suggests that a reduction in the flame resistant standards of sidewall materials up to the top of the window line can be made with no loss of overall safety compared with the standard above this height, having regard to the lesser tendency for flame to spread at the lower level. The FAA does not agree. While the FAA is aware of higher potential temperature and flame spread at the upper sidewalls and ceiling, it is also aware that wall panels and partitions normally are continuous to floor level. Furthermore, there is no certainly that the cabin ceiling and upper sidewalls will remain uppermost after a crash landing.

One comment concerning § 25.853 suggested that "covering of upholstery" be deleted from the requirements of paragraph (b). The FAA agrees. The term "upholstery" includes the material used to stuff and to permanently cover furniture. It was also suggested that cargo compartment liners, insulation blankets, and cargo covers be deleted from § 25.853 and that all cargo compartment requirements be placed in § 25.855. The FAA does not agree that this is necessary. However, the provisions have been revised to clearly set forth the distinction between the fire protection requirement of §§ 25.853 and 25.855. In this case, the final rule makes it clear that § 25.853 covers, in addition to other materials, materials used in convertible passenger/crew cargo compartments. On the other hand, § 25.855 covers cargo and baggage compartments not occupied by passenger or crew.

A number of comments suggested that certain of the items listed in proposed § 25.853(b) could be constructed with