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**Federal Aviation Administration**

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**Airworthiness Review Program;  
Amendment No. 8A: Aircraft, Engine, and  
Propeller Airworthiness, and Procedural  
Amendments**

**DEPARTMENT OF TRANSPORTATION****Federal Aviation Administration**

14 CFR Parts 11, 21, 23, 25, 27, 29, 31, 33, 35, 43, 45, and 91 *See correction*

[Docket Nos. 14779 and 14324; Amendments Nos. 11-20; 21-51; 23-26; 25-54; 27-18; 29-20; 31-4; 33-9; 35-5; 43-20; 45-12; and 91-167]

**Airworthiness Review Program; Amendment No. 8A: Aircraft, Engine, and Propeller Airworthiness, and Procedural Amendments**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** These amendments to the Federal Aviation Regulations update and improve the airworthiness standards applicable to the type certification of aircraft, engines, propellers, related operating rules, and procedural requirements. These amendments are part of the Airworthiness Review Program.

**EFFECTIVE DATE:** October 14, 1980.

**FOR FURTHER INFORMATION CONTACT:** Marvin J. Walker, Regulatory Review Branch, AVS-22, Safety Regulations Staff, Associate Administrator for Aviation Standards, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591; Telephone: (202) 755-8714.

**SUPPLEMENTARY INFORMATION:** These amendments are the ninth and last in a series of amendments issued as part of the Airworthiness Review Program.

The following amendments have previously been issued as part of this program:

**Title and Federal Register (FR) Citation**

Amendment No. 1: Form Number and Clarifying Revisions (40 FR 2576; Jan. 14, 1975)

Amendment No. 2: Rotorcraft Anticollision Light Standards (41 FR 5290; Feb. 5, 1976)

Amendment No. 3: Miscellaneous Amendments (41 FR 55454; Dec. 20, 1976)

Amendment No. 4: Powerplant Amendments (42 FR 15034; March 17, 1977)

Amendment No. 5: Equipment and Systems Amendments (42 FR 36960; July 18, 1977)

Amendment No. 6: Flight Amendments (43 FR 2302; Jan. 16, 1978)

Amendment No. 7: Airframe Amendments (43 FR 50578; Oct. 30, 1978)

Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; Feb. 4, 1980)

These amendments are for the most part based on Notice 75-31 which was published in the **Federal Register** on July 11, 1975 (40 FR 29410), as well as a number of proposals contained in the following notices of proposed rule making: Notice 75-10 (40 FR 10802; March 7, 1975); Notice 75-19 (40 FR 21866; May 19, 1975); and Notice 75-26 (40 FR 24802; June 10, 1975). Amendments based on the latter three notices have already been issued as a part of the Airworthiness Review Program, specifically those titled Miscellaneous Amendments, Powerplant Amendments, and Airframe Amendments, respectively. Final action on certain of the proposals was deferred, however, at the time the amendments were issued as further consideration and review of these proposals was considered necessary. In other cases, final action was deferred so that they could be considered together with related proposals contained in other notices.

Certain proposals identified as Group 2 in Appendix I to Notice 75-31 were deferred to be dealt with in a later notice as a part of the Airworthiness Review Program. These proposals all addressed the concept of periodically updating the certification basis of airplane models in long-term production. Such recertification every five or ten years would be intended to ensure that the level of safety of all airplanes in service keep pace with the current level of safety expectations. The FAA has now determined that these proposals more appropriately should be examined as a separate issue in a future regulatory action. Accordingly, the proposals identified as Group 2 in Appendix 1 to Notice 75-31 are being dropped from the Airworthiness Review Program.

Proposals relating to cabin safety and flight attendants, which are identified in this amendment, were extracted from Notice 75-31 (40 FR 29410; July 11, 1975) and handled on an expedited basis. Those rules were published in the Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

Interested persons have been given an opportunity to participate in the making of these amendments and due consideration has been given to all matters presented. The proposals and comments are discussed below. Substantive changes and changes of an editorial and clarifying nature have been made to the proposed rules based upon relevant comments received and further

review within the FAA. Except for minor editorial and clarifying changes and the substantive changes discussed below, these amendments and the reasons for them are the same as those contained in Notices 75-10, 75-19, 75-26, and 75-31.

**Discussion of Comments**

The following discussions are keyed to the like-numbered proposals contained in Notices 75-10, 75-19, 75-26, and 75-31, and are presented in the same order as the corresponding amendments found in the rules portion of this document.

**Proposal 8-1.** The proposal to amend § 1.1 in order to transfer the definitions for rated power and thrust to a new § 33.6 is withdrawn. It is considered that such a change may introduce confusion in the administration of aircraft certification rules. See also Proposal 8-94.

**Proposal 8-2.** Several commenters object to proposed § 21.16(a) which would delete reference to a "novel and unusual design feature" as a necessary condition for the Administrator to issue special conditions. Special conditions become a part of the designated applicable regulations for type certification of a particular product (aircraft, aircraft engine, or propeller).

One commenter indicates that the proposed revision is unjustified and would lead to indiscriminate rule making, and that instead of simplifying the administration of the requirements it would introduce complexity. Another commenter claims that adoption of proposed § 21.16(a) would introduce uncertainty into design requirements.

One commenter suggests that in lieu of revising § 21.16, the FAA should perform a study of § 21.21(b)(2). (Section 21.21(b)(2) provides for denial of a type certificate if an unsafe feature or characteristic exists in the design under consideration. Before adoption of § 21.16, FAA used § 21.21(b)(2) to issue special conditions in letter form.) This commenter suggests that if § 21.21(b)(2) were to continue to be used to issue special conditions to cover an unsafe design feature or characteristic that is not "novel or unusual," it must be equally applicable to a condition that exists on more than one (earlier certificated) product, further stating that the other product or products must then have been type certificated using existing rules which did not adequately cover the unsafe design feature or characteristic. On this premise, the same commenter asks several relevant questions. When § 21.21(b)(2) is applied, does the FAA make it retroactive to the other involved models? Are Airworthiness Directives (Part 39)

issued? Why wasn't a special condition issued against the first applicant when the condition was, in fact, novel or unusual? Why was this not followed by a notice of proposed rule making for future application?

These comments and questions caused the FAA to completely reevaluate its practices in designating the applicable regulations for type certification under § 21.17(a), commonly referred to as defining a "type certification basis."

After further consideration of the comments received as well as FAA practice in designating the applicable regulations, and the objectives of proposed § 21.16, the FAA agrees that this proposal should be withdrawn because of the potential for possible abuse of general rulemaking procedures, of the requirements of the Administrative Procedure Act, and the intent of Executive Order 12044. As explained below, the objectives of proposed § 21.16 will be satisfied by the application of a new FAA policy affecting the designation of applicable regulations for the type certification of new aircraft, aircraft engines, and propeller designs. These future practices are consistent with the FAA General Rule-Making Procedures of Part 11, the Administrative Procedure Act, and Executive Order 12044.

Section 21.16 is one paragraph of a number of paragraphs used to define the type certification basis of a new product. Companion paragraphs of importance to this discussion include §§ 21.17 and 21.21. Section 21.17(a) provides that the applicable airworthiness standards are (1) those requirements of this subchapter that are effective on the date of application for a type certificate, unless otherwise specified by the Administrator or unless compliance with later effective amendments is elected by the applicant or required by special retroactive regulations (e.g., § 25.2), and (2) any special conditions prescribed by the Administrator in accordance with § 21.16. Section 21.16 provides for the issuance of special conditions when the Administrator finds that the existing airworthiness standards do not contain adequate or appropriate safety standards *because of novel or unusual design features* of the product to be type certificated. Section 21.21(b)(1) permits noncompliance with specific provisions of the airworthiness standards when there are compensating factors that provide an equivalent level of safety. Such determinations are commonly referred to as "equivalent safety findings." Section 21.21(b)(2) provides

for the denial of a type certificate, notwithstanding a showing of compliance with the applicable airworthiness standards designated in accordance with § 21.17, if the Administrator finds an unsafe feature or characteristic of the product for the category in which certification is requested.

Sections 21.16, 21.17, and 21.21, taken together with FAA policy in designating the applicable regulations must recognize and balance four important considerations: (1) The FAA has an obligation under Section 601 of the Federal Aviation Act of 1958 to keep the airworthiness standards of this subchapter (i.e., FARs 23, 25, 27, 29, 31, 33, and 35) as current as practicable; (2) the type certificate applicant has a right and a need to know, in very specific terms, what the applicable airworthiness standards will be in order to finalize the detail design of its product and to enable the applicant to make reasonable performance guarantees to its potential customers; (3) in the interests of safety, rapid technological advances presently being made by the civil aircraft industry require that the FAA be able to issue special conditions to address truly novel or unusual design features that it has, as yet, not had an adequate opportunity to envisage in the airworthiness standards through the general rulemaking process; and (4) because the airworthiness standards of this subchapter are intentionally objective in nature to allow flexibility in design, the FAA must retain the prerogatives both to make equivalent safety findings and to deny a type certificate whenever an unsafe design feature or characteristic is found during the type certification process.

The phrase "novel or unusual" as used in § 21.16 is a very relative term. As used hereafter in applying § 21.16 to justify the issuance of special conditions, "novel or unusual" will be taken with respect to the state of technology envisaged by the applicable airworthiness standards of this subchapter. It must be recognized that in some areas which will vary from time to time the state of the regulations may somewhat lag the state of the art in new design because of the rapidity in which the state of the art is advancing in civil aeronautical design and because of the time required to develop the experience base needed by the FAA to proceed with general rule making. Applicants for type certification of a new design have the opportunity to mitigate the impact of not knowing the precise airworthiness standards to be applied for "novel or unusual design features" by consulting

with the FAA early in their certification planning when such features are suspected or known by the applicant to exist. It should also be recognized that, because of the intentional objective nature of the airworthiness standards of this subchapter, many new design features which might be thought of as "novel or unusual design features" may already be adequately covered by existing regulations, thus obviating the need to issue special conditions.

Henceforth, the special condition will not be issued for general upgrading of the applicable airworthiness standards when novel or unusual design features are not involved. Whenever the FAA determines that an upgrading of the airworthiness standards of this subchapter is warranted, the upgrading will be promulgated as an amendment to this subchapter consistent with the general rulemaking procedures of FAR Part 11, the Administrative Procedure Act, and Executive Order 12044. Should the FAA conclude that there is a compelling safety need to apply a proposed amendment retroactively to designs already type certificated or to designs for which a type certificate application is in progress, the retroactive aspects of the proposed amendment, if supportable by a regulatory analysis completed in accordance with Executive Order 12044, will be announced in the notice of proposed rule making for that amendment. Public comments on the proposed retroactive aspects will be considered in determining the applicability of the adopted rule.

A number of products for which special conditions have not as yet been issued are undergoing type certification at the time of this amendment. Should the FAA conclude that recent or future amendments to this subchapter should be applied to these products that would not otherwise be applicable under § 21.17 (a) (1) then an amendment to require retroactive application will be proposed and acted upon through the general rulemaking process explained above, in lieu of issuing special conditions under § 21.16.

Also, the provisions of § 21.21(b)(2) will no longer be used to justify the issuance of special conditions. However, just as an Airworthiness Directive may be issued under Part 39 to require the correction of an unsafe condition that is likely to exist or develop in a product of the same type design, notwithstanding a showing of compliance with the applicable airworthiness standards, § 21.21(b)(2) may continue to be used to deny issuance of a type certificate if a similar unsafe feature or characteristic

is found during the type certification process, notwithstanding a showing of compliance with requirements designated by § 21.17. The unsafe features and characteristics envisaged by § 21.21 (b) (2) are those related to specific design configuration or product characteristics of a particular design, that one would not normally expect the applicable airworthiness standards to specifically preclude because of their intentionally objective nature.

It is the practice of the FAA to develop and publish a Type Certificate Data Sheet as an integral part of each type certificate. The type certification basis is recorded on the Type Certificate Data Sheet for public information. In the future the type certification basis statement will identify not only the applicable regulation, including special conditions, but also will identify all exemptions issued pursuant to Part 11, together with "equivalent safety findings" made in accordance with § 21.21 (b) (1).

For the above reasons, Proposal 8-2 is withdrawn.

In considering its disposition of the proposal to amend § 21.16 (a), the FAA realizes that a "novel or unusual design feature" today may become a common design feature of the future. The issuance of a like special condition for several product designs will most likely compel general rule making on that subject and the history of that special condition could have a very strong influence on thinking when general rule making is initiated. Also, although special conditions are regulations on particular product applicability, they are issued only in the interest of public safety. For these reasons, Part 11, and § 21.16 of Part 21 are amended to require special conditions to be issued in accordance with the existing general rule-making procedures. As is now the case, a docket will continue to be maintained for each set of special conditions, and all material in the docket will continue to be available for public review.

*Proposal 8-3.* This proposal is one of a group of proposals dealing with the establishment of Instructions for Continued Airworthiness and the responsibilities of maintenance personnel and aircraft operators with respect to those instructions. The group is made up of the following proposals: 8-3, 8-5, 8-21, 8-25, 8-58, 8-62, 8-64, 8-67, 8-77, 8-80, 8-89, 8-91, 8-92, 8-93, 8-97, 8-98, 8-99, 8-104, 8-106, 8-107, 8-110, and 8-111.

A commenter representing a number of scheduled air carriers objects to the requirement in § 21.31(c) that the type design include the Airworthiness

Limitations section of the Instructions for Continued Airworthiness because of the information to be included in that section. Although this commenter does not object to including mandatory replacement times for life-limited parts in the Airworthiness Limitations section, the commenter strongly objects to including inspection intervals and related procedures. Under proposed §§ 43.16 and 91.163(c), the commenter points out, air carriers would be required to comply with these maintenance-related airworthiness limitations. The FAA does not agree that inspection intervals and related procedures can be omitted from the Airworthiness Limitations section of the Instructions for Continued Airworthiness. For example, the proposed Airworthiness Limitations section on a transport category airplane must contain mandatory inspection intervals and related procedures because the damage-tolerance concept described in § 25.571 is predicated upon the use of such inspections to detect initial cracks in principal structural elements before crack growth under repeated loads could progress to a degree which would cause catastrophic failure of the airplane. However, the FAA does agree that §§ 43.16 and 91.163(c) should permit modification of these intervals and procedures by other FAA approved methods. Accordingly, inspection programs approved under §§ 121.25(b), 121.45, 121.367, 123.21(b), 127.13(b), 127.133, 135.5, 135.17, 135.419, 135.421, and 135.425, as defined by approved operations specifications, or an inspection program approved under § 91.217(e) constitute acceptable alternatives. The appendices to Parts 23, 25, 29, 31, 33, and 35 as adopted in this amendment require the applicant to specify (in the Airworthiness Limitations section) mandatory replacement times, inspection intervals, and related procedures. Sections 43.16 and 91.163(c) have been revised to show that only the inspection times and procedures may be adjusted under approved alternative programs.

A commenter objects to § 21.31(c), which in general is applicable to manufacturers, since continued airworthiness, which is covered in the paragraph, is the responsibility of the operator. Because this comment pertains more directly to § 21.50, it is dealt with in conjunction with Proposal 8-5.

In addition to comments relating to the Instructions for Continued Airworthiness, a commenter objects to § 21.31(a) because the proposal to include a list of drawings and specifications in the type design was not

mentioned at the Airworthiness Review Conference. In fact, this proposal did appear as an FAA comment on Proposal No. 565 in the Committee I Workbook (titled "Procedures and Special Subjects") made available to all participants at the conference, and may be found in the docket.

Several commenters object to § 21.31(d) because including analyses in the type design—(1) would be redundant, since it is already required as part of the substantiating data; (2) is unnecessary, since the drawings and specifications required under current § 21.31(a) provide the general information needed by the FAA; and (3) introduces the possibility that the FAA would require the manufacturer to provide any and all data used to prepare the drawings and specifications, thereby delaying type certification. The FAA agrees that proposed § 21.31(d) would serve no useful purpose and it is withdrawn.

*Proposal 8-4.* A commenter objects that § 21.35(b)(2) eliminates flight testing for reliability, contending that analysis and ground test are not dependable as a basis for certification. In the light of this comment, and after further consideration and experience, the FAA has determined that flight testing for reliability does provide safety information not necessarily obtainable from analysis and ground test. Accordingly, the proposal to delete the reference to reliability in § 21.35(b)(2) is withdrawn.

No adverse comment was received on the proposal to replace the word "airplanes" in § 21.35(b)(2) with the word "aircraft" and this amendment to § 21.35(b)(2) is adopted without change.

*Proposal 8-5.* A commenter objects to the continued airworthiness provisions of § 21.50(b) (and also proposed § 21.31(c)) contending that—(1) continued airworthiness is the responsibility of the operator/owner; (2) current regulations in Parts 23 and 25 already require manufacturers to make available recommended maintenance procedures for the product at the time of its delivery; (3) current operating rules require the operator/owner to establish and comply with a maintenance program; and (4) with respect to transport airplanes, the present FAA Maintenance Review Board (MRB) system is an entirely satisfactory way of establishing the means for maintaining airworthiness. Current FAA practice allows operators of new transport category airplanes to utilize FAA MRB recommendations (reference FAA Advisory Circular No. AC 121-22) for starting their maintenance programs, and then vary them with FAA approval

as experience and operating conditions dictate. The commenter points out that, contrary to that practice, the amendment will require the manufacturer to obtain FAA approval of its recommended maintenance procedures before the airplane is type certificated, and to obtain FAA approval of revisions to those procedures (necessitated by any improvement change in the airplane) before approval of the change itself. This, the commenter states, will impose a severe and unnecessary hardship on the manufacturer.

On the first and second points, although the operator/owner does have responsibility for continued airworthiness, the FAA has found that the recommended maintenance procedures made available under current regulations are frequently inadequate in scope and content, and often do not provide a sound basis for the operator/owner to maintain the airworthiness of the aircraft. The FAA has concluded that the lack of such recommended maintenance procedures can best be remedied by requiring that they be made available to owners and operators by the type certificate or supplemental type certificate holder. On the third point, while it is true that not all operators/owners are required to establish and comply with a continuous airworthiness program, those that voluntarily wish to set up such a program are often handicapped by the lack of comprehensive instructions, which would be remedied by § 21.50(b). On the other hand, those required to establish a program will benefit from the more detailed and comprehensive instructions made available to them under § 21.50(b). On the fourth point, which is directed toward aircraft that will be maintained in accordance with an FAA approved operations specification and maintenance program under Parts 121, 123, 127, 135, or an approved inspection program under § 91.217(e), the FAA recognizes that these procedures for maintaining airworthiness of the products have functioned satisfactorily. In this regard, the FAA expects that operating segments of the air transportation industry would continue to work with type certification applicants in defining adequate maintenance instructions prior to type certification. The FAA MRB document, which is a product of contributions made by both the operators and manufacturer, could be picked up by the type design holder and included as a part of the required Instructions for Continued Airworthiness, thus continuing the

usefulness of the existing MRB practices for the original entry into service of new product designs. Likewise, the additional maintenance instructions that would be required and which are not typical to MRB documents, but are presently required in air carrier operators' FAA approved maintenance programs, could also be picked up by the type design holder. Therefore, the screening process that would be utilized by the FAA in reviewing such maintenance documents would not unnecessarily delay type certification or approval of design changes after certification. See also the discussion under Proposal 8-3.

A commenter questions the need for the provision in § 21.50(b) requiring that the Airworthiness Limitations section of the Instructions for Continued Airworthiness be furnished with each aircraft, engine, or propeller. The FAA agrees that this provision is unnecessary, as the type certificate holder must make the manual available, and the operator/owner must comply. To require a manual to be furnished with each equipment would be redundant, and in some instances, would be unnecessary. Accordingly, the requirement that the Airworthiness Limitations section be furnished with each airplane or product is revised to require that the section be furnished to each owner of the type.

A commenter objects to § 21.50(b) insofar as it applies to rotorcraft type certificated under Parts 27 and 29, contending that the manufacturer is already required under those parts to furnish a maintenance manual, which has allegedly been proven adequate. The FAA does not agree. The proposed Instructions for Continued Airworthiness, which are broader in scope and more detailed than the maintenance manual currently required under Parts 27 and 29, would provide the operator/owner with the minimum amount of information needed to maintain the airworthiness of increasingly complex rotorcraft currently being designed.

A commenter suggests that § 21.50(b) be revised to make it clear that an aircraft manufacturer need not supply Instructions for Continued Airworthiness pertaining to engines and propellers until the complete aircraft is delivered to the first retail purchaser. The continued airworthiness instructions for propellers and engines should be provided to the aircraft manufacturer to facilitate transmittal to purchasers of the aircraft.

A commenter notes that § 21.50(b) would require an aircraft manufacturer to make the Instructions for Continued

Airworthiness available to the owner upon delivery of the aircraft and to any other person required to comply with any of the terms of those instructions upon request. Since such a request could be made before the first aircraft delivery, it could impose an unnecessary burden on the aircraft manufacturer. The commenter suggests that § 21.50(b) be revised so that such a request need not be filled until after delivery of an aircraft to the first owner. The FAA agrees that an early request for the Instructions for Continued Airworthiness could impose an unnecessary burden on the manufacturer. Additionally, the FAA notes that airplanes can be delivered to an operator, prior to full type certification, with a provisional airworthiness certificate to allow activities such as crew training, and therefore prior to the approval of the Airworthiness Limitations section. Accordingly, the phrase "upon request" has been deleted from § 21.50(b) and the language has been revised to require that at least one set of the complete Instructions for Continued Airworthiness be furnished upon delivery to the customer, or subsequent to issuance of the first standard certificate of airworthiness, whichever occurs later.

*Proposal 8-6.* Commenters object to the proposal to make § 21.97(b) applicable to all products rather than to engines only because—(1) the volume of paperwork would increase out of proportion to any benefits that might be gained; (2) the applications for supplemental type certificates would be significantly more complex, since there are frequently many configuration variations within an aircraft model and a fleet operator would have to list all of the configurations or make separate application for each; and (3) the term "specific configuration" must be defined if the proposal is to be properly administered. In light of these comments and after further consideration, the FAA concludes that this proposal requires additional study and it is withdrawn.

*Proposal 8-7.* No unfavorable comment was received on the proposal to amend § 21.123 to require a manufacturer to submit a manual describing its production inspection system and means for controlling materials and parts. Accordingly, the proposal is adopted without substantive change.

*Proposal 8-8.* A commenter objects to § 21.143(a)(2) contending that substitution of the word "supplier" for "subsidiary" introduces a major change to the requirements, involving increased

paperwork and costs. The FAA does not agree. The FAA has consistently administered § 21.143(a)(2) as applying to all raw materials, purchased items, parts, and assemblies supplied to the prime manufacturer. The change does not involve increased paperwork or costs because it is a semantic change which clarifies the definition of persons or entities subject to the quality control data requirements of § 21.143, without expanding any of those requirements. The use of the term "subsidiary" is unclear because it implies that there must be a corporate connection between the prime manufacturer and his supplier. Accordingly, the language has been revised to reflect the FAA's intent that the quality control data requirements of § 21.143(a)(2) apply to all "suppliers" of each prime manufacturer. For similar reasons and for internal consistency, § 21.143(b) is revised to replace the term "subsidiary manufacturers" with the term "suppliers".

*Proposal 8-9.* No unfavorable comment was received on the proposal to amend § 21.182 to ensure that the proposed new § 45.11(c) is cross referenced. Accordingly, the proposal is adopted without substantive change.

*Proposal 8-10.* A commenter raises the question whether a special flight permit issued under § 21.197(a)(3) would serve as a certificate of airworthiness for international flights. The FAA notes that international flights cannot be conducted under special flight permits issued under § 21.197 unless specifically authorized by the foreign authorities concerned.

Another commenter objects to § 21.197(a)(3)(ii) because as worded, the individual aircraft would have to be flown for at least 50 hours, thereby defeating the purpose of the original proposal (as submitted for the Airworthiness Review) which aimed at eliminating unnecessary delays in obtaining FAA approval of customer demonstration flights. The commenter suggests that this provision be changed to stipulate that the aircraft type must have been flown for at least 50 hours. The FAA agrees that since the proposal concerns aircraft manufactured under a production certificate, and since the aircraft type would have been flown for at least 50 hours during the type certification program, the 50 hours of flight provision is not necessary. However, the FAA does not agree with the commenter's suggested revision. It is necessary to require that production flight tests for the individual aircraft involved be satisfactorily completed before the aircraft is flown on customer demonstration flights. Accordingly,

§ 21.197(a)(5) is added to prescribe this condition in place of the 50 hours of flight provision.

The same commenter also suggests that § 21.197(a)(3)(ii) should be made applicable to aircraft produced under a type certificate only, since such aircraft received close production surveillance by the FAA. The FAA agrees that a production certificate should not be the limiting factor in obtaining FAA approval of customer demonstration flights. If the aircraft has been demonstrated to otherwise meet all the safety requirements for a standard airworthiness certificate, then customer demonstration flights could be permitted. This proposal is adopted by the addition of § 21.197(a)(5).

In addition, the commenter suggests that proposed § 21.197(a)(3)(ii) be amended with a reference to the maintenance and inspection programs called for under § 21.195 for Experimental and Subpart C Provisional Type Certificates. Such procedures would unnecessarily complicate the issuance of permits for customer demonstration flights and would in effect nullify the original proposal. The portion of the proposal calling for maintenance and inspection programs in these instances is therefore withdrawn.

*Proposal 8-11.* No unfavorable comments were received on the proposal to amend § 23.253(b)(3) to ensure that high speed buffeting does not become severe enough to prevent the pilot from reading the instruments or controlling the airplane. Accordingly, the proposal is adopted without substantive change. Also see Proposal 8-28.

*Proposal 8-12.* No unfavorable comments were received on the proposal to amend § 23.361 to redefine the limit engine torque load conditions to be considered for turbine engine installations and to make other clarifying changes. Accordingly, the proposal is adopted without substantive change.

*Proposal 8-13.* The FAA does not agree with a commenter who suggests that the lead-in of § 23.371 be revised to make the gyroscopic load requirements applicable to piston as well as turbine engines. The FAA has no information to indicate a need for coverage of piston engines in this regulation, nor was any submitted by the commenter.

Another commenter concurs with § 23.371, assuming that a rational analysis of loads under § 23.371(a) is an alternate to the loads specified in § 23.371(b). This assumption is correct. No change to § 23.371 was proposed in this regard. Section 23.371 is adopted without substantive change.

*Proposal 8-14.* A commenter suggests that the word "operated" in § 23.729(c) be replaced by the word "lowered". The commenter states that the intent of the rule is to ensure that the gear can be lowered in an emergency. The FAA concurs, but the word "extended" is used to preserve the internal consistency of the section. Section 23.729(c) is revised accordingly.

This commenter also questions whether § 23.729(e) would require an "up lock". The commenter is evidently referring to a "lock" in the sense of a positive means other than hydraulic pressure, as required to keep the gear extended by § 23.729(b). Section 23.729(e) contains no such requirement.

Another commenter suggests that the second sentence of § 23.729(e) be revised to add the words "and secured" after the words "fully extended" and "fully retracted" in order to clarify what functions the lights would indicate to the pilot. The first sentence of the paragraph clearly states that the indicators should inform the pilot that the gear is secured in the extended or retracted position.

A commenter states that the proposal is redundant since the requirement is already in effect. The FAA does not agree. This is one of several new provisions being incorporated into the current regulations to assure the reliability of small land-plane landing gear systems.

After further review, the FAA has determined that the words "and warning device" should be removed from the heading of § 23.729(e) to preclude confusion between the requirements of this paragraph and those of § 23.729(f). Section 23.729 is adopted with editorial changes and the revisions discussed.

*Proposal 8-15.* A commenter objects to § 23.903(f) on the grounds that it imposes new and unjustified criteria for restart capability of reciprocating engine powered airplanes. The FAA believes the requirement to be fully justified. Accidents have occurred with multiengine reciprocating powered, as well as turbine powered airplanes because pilots have not been adequately apprised of the engine restart envelope for their airplane. Therefore, the requirement must apply to both types of engine installations.

This commenter further states that § 23.903(g) is acceptable provided that the "restart requirement is understood to be within the restart envelope for the aircraft (if one is approved for the aircraft)." Present § 23.903(e)(3), as applicable to turbine engine powered small airplanes, states that it must be possible to restart an engine in flight, and § 23.903(f) requires that an approved restart envelope be established.

Therefore, development of a restart envelope would be required for the approval of each turbine engine powered small airplane. As adopted, §23.903(g) requires that, following in-flight shutdown of all engines, electrical power for ignition exists throughout the approved restart envelope.

Another commenter states that it seems inconsistent to require that electrical power be provided for ignition but not for rotational capability sufficient for an engine start. The FAA does not agree. As adopted, the rule provides for those circumstances where engine windmilling speed is sufficient for restarting but insufficient to provide electrical power for ignition.

The proposal is adopted without substantive change. However §23.903(f) is revised to make it clear that the specified in-flight engine restart capability is required throughout the required altitude and airspeed envelope.

*Proposal 8-16.* No unfavorable comment was received on adding a new §23.905(d) referencing propeller blade pitch control system durability requirements. Accordingly, §23.905(d) is adopted without substantive change. For discussion of a related proposal to add a new §35.42, see the discussion under Proposal 8-103.

*Proposal 8-17.* A commenter suggests that since the requirement for fuel tanks to retain fuel during a landing with landing gear retracted or collapsed may be subject to individual interpretation, advisory material on compliance methods should be reviewed with industry prior to implementation of the rule. The FAA does not agree. The revision merely clarifies an existing requirement. Section 23.967 is adopted without substantive change.

*Proposal 8-18.* A commenter recommends that the Proposal to add a new §23.991(d) which requires that operation of any fuel pump does not adversely affect continuous engine operation, be withdrawn or its adoption delayed while the compatibility of engine and airplane fuel systems is studied. The compatibility between these systems must be established in the design process, and the relevant design considerations are well known. Delaying the requirement in favor of additional study is not warranted.

Another commenter contends that the requirement is beyond the needs of safety. The FAA agrees that the proposal requirement is too restrictive and §23.991(d) is revised to provide that the operation of any fuel pump may not affect engine operation so as to create a hazard.

Two commenters disagree with adding a new §23.991(d), contending

that it eliminates present fuel system designs. The FAA has no information to suggest that compliance with the revised section, as discussed above, would be impossible using present fuel system designs, nor was any presented by the commenter.

The proposal is adopted with the revision discussed above.

*Proposal 8-19.* No unfavorable comments were received on the proposal to amend §23.1305(n) to permit movement of the propeller blade up to 8° below the flight low pitch position before an indication of the movement is required for the flight crew. Accordingly, the proposal is adopted without substantive change.

*Proposal 8-20.* For comments related to withdrawal of the proposal to revise §23.1521(a), see Proposal 8-94.

*Proposal 8-21.* Since the proposal for §23.1529 is substantively identical to those for §§25.1529 (Proposal 8-58), 27.1529 (Proposal 8-64), and 29.1529 (Proposal 8-77), all comments on these proposals are considered here.

A commenter notes that although the explanation for §23.1529 makes it clear that the Instructions for Continued Airworthiness need not be finalized until delivery of the first airplane, the proposal itself seems to require that they be finalized before type certification. The commenter suggests that this point be clarified. The FAA agrees, and §§23.1529, 25.1529, 27.1529, 29.1529, 31.82, 33.4, and 35.4, are revised accordingly.

In response to a commenter representing a group of scheduled air carriers, the FAA notes that, except for the Airworthiness Limitations section, there is no requirement that any operator/owner use the Instructions for Continued Airworthiness referred to in §§23.1529, 25.1529, 27.1529 and 29.1529. Moreover, the new §§43.13(a), 43.16, and 91.163(c) allow the use of other methods. In particular, the use of maintenance manuals and continuous airworthiness maintenance programs developed under current Parts 121, 123, 127, and 135, or an inspection program approved under current §91.217(e), would be acceptable alternatives to the Airworthiness Limitations section. This commenter suggests that language be added to §25.1529 to make it clear that alternatives to the Instructions for Continued Airworthiness (except the Airworthiness Limitations section) may be used. This suggestion was not adopted because §§43.16 and 91.163(c) make this provision sufficiently clear.

*Proposals 8-22, 8-23, and 8-24.* Final action on Proposals 8-22, 8-23, and 8-24 was taken in Airworthiness Review Program, Amendment No. 7: Airframe

Amendments (43 FR 50578; Oct. 30, 1978).

*Proposal 8-25.* The proposals to add an appendix to Parts 23, 25, 27, and 29 (Proposals 8-62, 8-67, and 8-80) setting forth Instructions for Continued Airworthiness are substantively identical and are discussed below. Unless otherwise stated, the discussion refers to the designated sections in each of the appendices mentioned above.

§XX.1(a). A commenter objects to the concept of specifying requirements (as opposed to providing guidance) for the preparation of Instructions for Continued Airworthiness, contending that such requirements would lead to time-consuming negotiations between the manufacturer and the FAA, and that some flexibility in providing the instructions is necessary. The appendix sets forth, in broad objective terms, the kinds of information the Instructions for Continued Airworthiness must contain. Within this framework, the manufacturer would be free to develop detailed instructions appropriate to its aircraft. The FAA is confident that the appendix provides a reasonable measure of flexibility, and anticipates no difficulties or delays in determining the acceptability of the Instructions developed by the manufacturer.

§XX.1(b). A commenter objects to the requirement that Instructions for Continued Airworthiness be provided for appliances, contending that—(1) this information is often not available from the appliance manufacturer; (2) even when available, the information sometimes has to be revised for the particular application in a manner not approved or intended by the appliance manufacturer; and (3) the information necessary for customized equipment installations would be unreasonably costly to develop. The FAA does not agree. Such information, which is essential to the continued airworthiness of the aircraft, should be provided for each required product. Accordingly, the language of §XX.1(b) is revised to make it clear that if the aircraft manufacturer does not supply continued airworthiness instructions for the product, the Instructions for Continued Airworthiness for the aircraft must include this information. See also the discussion under §XX.3(a)(5)(i).

A commenter objects to the proposal to include information on engines and all appliances in the Instructions for Continued Airworthiness, contending that—(1) such information should be furnished by the engine or appliance manufacturer; and (2) with respect to appliances, only those for which standards have been established by FAA should be covered. On the first

point, manufacturers of new engine designs are required to supply the information for their products under new § 33.4. Manufacturers of new aircraft using currently certificated engines are required by § XX.1(b) to provide the information for the engine in their Instructions for Continued Airworthiness for the aircraft. In practice, the FAA expects this information to be developed and supplied by the engine manufacturer. A similar requirement for appliances would be administratively impracticable because of the large number involved. On the second point, it should be noted that specific performance and safety standards have not been established for all essential appliances. However, upon further review, the FAA concludes that it would be unreasonable to require the aircraft manufacturer to cover appliances other than those required in applicable regulations. Accordingly, § XX.1(b), as adopted, refers only to appliances "required by this chapter."

§ XX.2. A commenter suggests a revision of this section to make clear that the Instructions for Continued Airworthiness may consist of a series of volumes, or may be supplied in other than book form, such as on microfilm or microfiche. The language in § XX.2 is sufficiently broad to cover these acceptable alternatives. Reference to the Air Transportation Association of America Specification No. 100 (where it appeared) is deleted from § XX.2(b) because it is nonregulatory.

§ XX.3, *lead-in-paragraph*. A commenter objects to the requirement that the contents of the manual "be prepared to be understood by the person who will be responsible for maintaining" the aircraft or product, contending that—(1) it would impose a subjective standard that would be impossible to meet; and (2) it could be interpreted to mean that, in some circumstances, manuals for aircraft to be exported must be prepared in the language of the country of export. In light of these comments, the first sentence of the lead-in paragraph of § XX.3, is revised to read as follows: "The contents of the manual or manuals must be prepared in the English language." This conveys the intent of the original proposal. A commenter points out that there may be different levels of maintenance instructions, directed at different classes of operators. For example, the maintenance instructions provided to a fleet operator or commuter airline may be more comprehensive than those provided to a fixed base operator. Any level of maintenance instructions considered appropriate by the

manufacturer may be submitted, provided that those instructions comply with the minimum standards in the appendix.

§ XX.3(a)(2). A commenter recommends that the requirement for complete descriptions be limited in scope to the "standard" aircraft and "quantity-installed" optional equipment, contending that it would be virtually impossible to devise "custom" maintenance manuals for each product because of the many combinations of equipment that may be ordered by the purchaser. In addition, the commenter states that a manual containing all of these combinations would be difficult to use. The FAA does not agree. To achieve its purpose, the Instructions for Continued Airworthiness must contain information on each item of equipment required by regulation to be installed on the aircraft. The FAA notes that supplemental type certificates (STC's) are required for installation of equipment not a part of the type certificate, and that this maintenance manual requirement is equally applicable to the STC applicant.

§ XX.3(a)(3). A commenter recommends that since maintenance personnel have no need for the kind of operating information provided in a Pilot's Operating Handbook, the paragraph be revised to require only *basic* principles of equipment control and operation. The FAA agrees, and § XX.3(a)(3) now refers to "basic control and operation information."

§ XX.3(a)(5)(i). A commenter recommends that applicants be allowed to refer to a component manufacturer as a source of information instead of including the information in the Instructions for Continued Airworthiness. The commenter argues that many component manufacturers prefer to maintain control of their maintenance information to ensure that it is up to date. In other cases, maintenance at the factory may be required because of the complexity of the equipment. The FAA recognizes that some accessories, instruments, and equipment have an exceptionally high degree of complexity, requiring specialized maintenance techniques, test equipment, or expertise. In such cases, it would be in the interest of safety to allow the applicant to refer to the appropriate manufacturer in the maintenance instructions. The FAA does not agree, however, that such reference should be allowed in other circumstances. Section XX.3(a)(5)(i) (redesignated § XX.3(b)(1)) is revised accordingly.

A commenter recommends that the last sentence of § XX.3(a)(5)(i), be

revised to allow reference to a separate inspection program, rather than include it in the maintenance instructions, so that the inspection program could be better kept current and also tailored to an individual operator's needs. The FAA does not agree. The inspection program must be set forth in the Instructions for Continued Airworthiness to ensure its availability to those who will benefit from it.

The FAA, after further study of § XX.3(a)(5)(i), has decided that the provision should specifically require a description of applicable maintenance or wear tolerances. Section XX.3(a)(5)(i) (redesignated § XX.3(b)(1)) is clarified in this regard.

§ XX.3(a)(5)(ii). A commenter objects to the words "could occur" in this paragraph because it encompasses everything within the realm of possibility, thereby unnecessarily increasing the volume of the maintenance instructions. The phrase "probable malfunctions" replaces the phrase "typical malfunctions that could occur" in § XX.3(a)(5)(ii) (redesignated § XX.3(b)(2)).

§ XX.3(a)(5)(iii). A commenter suggests that this paragraph would be clearer if the first three words and the last five words are deleted. Section XX.3(a)(5)(iii) (redesignated § XX.3(b)(3)) is revised accordingly.

§ XX.3(a)(5)(iv). A commenter suggests revision of this paragraph to make it clear that the overweight landing check refers to the condition in which a certificated landing weight is lower than certificated takeoff weight, since the aircraft manufacturer cannot speculate what damage might be done to an aircraft that takes off and must immediately land at a weight near the certificated takeoff weight. This comment may have merit for certain aircraft. Moreover, since an overweight landing is but one of several occurrences which would necessitate a check to determine aircraft damage, to single out one occurrence would imply that the others need not be covered in the maintenance instructions. Accordingly, the words "checks after an overweight landing" are deleted from § XX.3(a)(5)(iv) (redesignated § XX.3(b)(4)).

§ XX.3(b). A commenter recommends deletion of the requirement for an overhaul manual or section, contending that—(1) there are many products that, for safety reasons, should not be overhauled; and (2) the manufacturer must make the technical assessment as to whether a product can be safely overhauled. In the light of these comments, and after further consideration, the FAA finds that those

portions of § XX.3(b) that provide for overhaul information only (except for engines), should not be required in the Instructions for Continued Airworthiness. Accordingly, §§ XX.3(b)(1)(i), XX.3(b)(1)(ii), XX.3(b)(1)(iv), XX.3(b)(1)(viii), and XX.3(b)(3), are withdrawn. The other provisions of § XX.3(b) specify information that is needed for purposes other than overhaul.

§ XX.3(b)(1)(iii). No adverse comment was received on this proposal to require structural access plate information. Accordingly, it is adopted as proposed, but redesignated § XX.3(c).

§ XX.3(b)(1)(v). No adverse comment was received on this proposal to require instructions on special inspection techniques. Accordingly, it is adopted as proposed, but redesignated § XX.3(d).

§ XX.3(b)(1)(vi). A commenter points out that no part can be restored to its original condition by protective coatings or treatments. The FAA agrees, and § XX.3(b)(1)(vi) (redesignated § XX.3(e)) is revised to make this clear and to require only the information necessary to apply protective treatments to the structure after inspection.

§ XX.3(b)(1)(vii). No adverse comment was received on this proposal to require data on structural fasteners. Accordingly, it is adopted as proposed, but redesignated § XX.3(f).

§ XX.3(b)(1)(ix). No adverse comment was received on the proposal to require a list of special tools. Accordingly, it is adopted as proposed, but redesignated § XX.3(g).

§ XX.3(c). Three commenters object to the concept of supplying generalized repair data. One contended that—(1) the nature of the damage may not be known in a particular case, though it may appear to fall under a general repair "fix"; (2) the safety of the product may be seriously impaired by repairs made in such instances; and (3) the manufacturer can provide alternate means for a mechanic to obtain repair data. In the light of these comments, the FAA agrees that it is not necessary to include the repair information in the Instructions for Continued Airworthiness as proposed. Accordingly, proposed § XX.3(c) is withdrawn.

§ XX.4. A commenter suggests that the manufacturer should be allowed to list items in the Airworthiness Limitations section that it deems necessary to maintain structural integrity, where such items are not called out in the applicable airworthiness standards. Another commenter, representing the scheduled airlines, objects to the inclusion, in the Airworthiness Limitations section, of mandatory replacement times for parts

other than life-limited parts and of mandatory inspection intervals. The resolution of these comments is discussed under Proposal 8-3. The language proposed for the Airworthiness Limitations sections of the appendices to Parts 23, 25, 27, and 29 is being retained, except that the mandatory replacement times, mandatory inspection intervals, and related procedures are specified as those associated with structural integrity—including those approved under current § XX.571. It also is made clear that FAA approved alternative programs may be used. To avoid unnecessary restriction being placed on operation, only these items are listed in the pertinent Airworthiness Limitations section. Other items can of course be listed in other sections of the Instructions for Continued Airworthiness.

Proposal 8-26. The addition of new §§ 25.101(i) and (j) would set forth requirements for automatic systems that affect performance, including automatic takeoff thrust control systems (ATTCS). In view of the evolving technology of automatic systems, the special features and functions of each design, and the complex interrelationships with other systems, the FAA has concluded that specific regulations are premature and that safety considerations can be more advantageously addressed in special conditions for specific systems. Accordingly, Proposal 8-26 and related Proposals 8-34, 8-48, and the § 25.1305(c)(9) portion of 8-50 are withdrawn.

Proposal 8-27. The revision of § 25.111(c)(4) will permit changes in power or thrust by an automatic takeoff thrust system but prohibit any change requiring action by the pilot when determining the takeoff path. Although specific proposals relating to criteria for automatic takeoff thrust systems have been withdrawn, the FAA believes that this proposal should be retained as it standardizes the procedure for determining the takeoff path, and is consistent with current practice.

One commenter implies that this rule change will add the task of monitoring conditions and instruments and thereby increase the pilot workload. Other commenters suggest that a limited provision for manual throttle setting be included, or are opposed to the proposal completely on the grounds that safety will be compromised in service. Since the rule will apply in the context of a determination of performance rather than an operating requirement, the proposal is adopted without change.

Proposal 8-28. A commenter suggests that the term "impair" in § 25.253(a)(2)(iii) be changed to

"significantly impair". The FAA does not agree. In present high altitude, high Mach number jet airplanes, any recovery from upset or speed anomaly must be done essentially by reference to flight instruments. Therefore, any buffet or vibration condition which would in any way impair the pilot's ability to accurately interpret instrument information cannot be tolerated. The same commenter stated that some interpretative material on vibrational frequencies and levels of acceleration would be useful. Use of interpretative material would divert attention from the primary consideration, impairment of pilot ability, which is qualitative. Proposed § 25.253(a)(2)(iii) is adopted without substantive change.

Proposal 7-17. Although no unfavorable comment was received on the proposal to amend § 25.305(d), two commenters state that their agreement was with the understanding that both the discrete gust and the continuous turbulence analyses are required. Present § 25.341(a) requires that limit load factors be established by reference to a discrete gust encounter. Present § 25.305(d) specifies that the dynamic response of the airplane to vertical and lateral continuous turbulence must be taken into account. Both analyses are required.

Two commenters recommend that present § 25.341 be amended to require dynamic loads analysis by reference to discrete gusts having varying gust gradient distances. The FAA does not agree. The combination of discrete gust analysis under § 25.341 and continuous turbulence analysis under § 25.305 is less complex than the method described by these commenters and provides sufficient substantiation of strength. The proposal is adopted without substantive changes.

Proposal 8-29. Many negative comments were received on the proposal to revise § 25.307(a) to require ultimate load tests for each normal and failsafe critical load condition. Three commenters indicate that the proposed regulation would add to the cost and time required for certification although present airplane safety records do not support the need for a change. One commenter points out that the design philosophy used for commercial transports, due to the dominant influence of the economic requirement for long life without structural fatigue problems, often produces reserve margins of safety. Another commenter proposes that ultimate load tests be limited to structures such as composites, which substantially differ from conventional structure. The FAA agrees

that to conduct ultimate load tests for all critical load conditions would greatly increase the amount of testing required, which is not warranted by the safety record since there have been no service features which indicate that present methods of substantiation are inadequate. In many cases failures in service result from conditions such as fatigue or corrosion which are not covered by ultimate load tests. The proposal to require ultimate testing of all structural components therefore is deleted. In some cases, however, analysis must be supplemented by limit and/or ultimate load tests. The amendment, as adopted, is revised accordingly.

*Proposal 8-30.* Several negative comments were received on §§ 25.365 (e) and (f), requiring airplane designers to consider pressure vessel decompression resulting from the loss of any nonplug door, detonation of a bomb within the cabin at all probable locations, and engine disintegration. Several commenters oppose designing for the loss of a nonplug door, stating that there is no reason why nonplug doors cannot be designed to be as safe as plug doors. These commenters suggest that the door design criteria be upgraded to improve door integrity. The FAA agrees that door integrity should be improved to the extent that design for their loss is not justified. Therefore § 25.783 is revised in response to Proposal 8-35 to require this improved level and § 25.365(e)(1) is withdrawn.

Many commenters object to designing for all possible bomb detonations and probable bomb locations. A commenter points out that airworthiness requirements in the past have attempted to safeguard aircraft against structural and mechanical failure, human error, natural hazards, etc. They note that no one has attempted to incorporate into airworthiness requirements the consequences of homicidal or suicidal tendencies. Another commenter states that the aircraft industry has to accept responsibility for compensating the public for loss or injuries resulting from defects in its products, and the inclusion of a bomb damage requirement in Part 25 could significantly extend the grounds of possible product liability actions, particularly with the imprecise requirements of § 25.365(e). Many commenters state that the wording of § 25.365(e)(3) is so vague as to make its implementation impossible. The FAA notes that, ultimately, minimizing the loss of airplanes as a result of bomb explosions is a ground security problem.

A commenter suggests an alternative to § 25.365(e)(3) which would establish a

relationship between the design maximum opening and the cross-sectional area of the pressurized shell. The FAA agrees that the proposed relationship provides an acceptable method for determining hole size. The FAA has determined that the maximum hole size required should be 20 square feet, a value contained in Airworthiness Directive 75-15-05 (August 11, 1975) pertaining to openings in wide-body transports. Section 25.365(e)(3) is revised to allow the maximum opening to vary as a function of the cross-sectional area of the pressurized shell to account for the differences in size between narrow and wide-body transports and is redesignated and adopted as § 25.365(e)(2).

The FAA finds that the maximum opening specified in adopted § 25.365(e)(2) will exceed the opening that would result from causes other than bomb explosions or engine disintegration, and that a probability safety analysis to determine hole size in passenger or cargo areas resulting from other causes is not needed. Thus, proposed § 25.365(f) is withdrawn.

In light of the comments received on proposed § 25.365(e)(4), and after further consideration, the FAA concludes that openings caused by airplane or equipment failures can occur in any compartment, and that partitions, bulkheads, and floors should be designed for openings from these causes. Thus, proposed § 25.365(e)(4) is revised accordingly, redesignated, and adopted as § 25.365(e)(3).

No adverse comments were received on proposed § 25.365(e)(2) to require design to withstand penetration of the cabin by a portion of an engine following engine disintegration and the proposal is redesignated § 25.365(e)(1) and adopted without substantive change.

*Amendment to § 25.571(a)(3).* Because of the change to § 25.1529 adopted in this amendment, the reference to the "maintenance manual" in § 25.571(a)(3) is no longer appropriate. For consistency, § 25.571(a)(3) references the Airworthiness Limitations section of the Instructions for Continued Airworthiness.

*Proposal 8-31.* Numerous unfavorable comments were received on the proposal to add a new § 25.633 requiring that essential systems be designed to minimize damage caused by detonation of a bomb in the airplane. Most commenters contend that there is no means to protect essential systems from all possible bomb detonations and that bomb size and location cannot be rationally defined. Several commenters indicate that the separation of essential

systems on modern airplanes presently provides a measure of protection and that the proposed requirements of § 25.633 are beyond the state of the art.

The FAA agrees that rational means of determining and defining all possible bomb size/location combinations which would damage essential systems does not exist. Therefore, the proposal is withdrawn.

*Proposal 8-32.* Several commenters object to the proposed horizontal stabilizer "trim-in-motion" aural warning requirement of § 25.677(e) on the grounds that the aural environment in today's cockpits is already cluttered and that finding new and distinctive aural warnings is becoming difficult. They further suggest that small increments of trim change should not cause aural warning, and that warnings should be given only when a safety-of-flight hazard exists. One commenter suggests that there is no need for separate aural warning on aircraft having direct trim control wheels in the cockpit.

The FAA agrees with the comments and upon further review concludes that the proposal is premature and unworkable. Accordingly, it is withdrawn for further study.

*Proposal 8-33.* Several adverse and supporting comments were received on the proposal to add a new § 25.685(e) requiring arrangement of control systems to provide an airplane with the capability of continued safe flight and landing in the event of an inflight localized structural failure. Several commenters agree with the intent of the proposal and propose minor changes. One commenter agrees with the intent of the proposal, but believes that only failures which have not been shown to be extremely improbable need be considered. Commenters state that the intent of the proposed rule change is already encompassed by § 25.365(e) which would require that floor failure resulting from rapid decompression be shown to be extremely improbable.

A commenter further states that present § 25.671(c) requires control systems to be designed to be tolerant of failures, and that control system damage is more likely from other sources. The commenter claims that service experience and rational analysis show that the floor structure provides the best available protection for the control system from damage from these other sources.

After further study the FAA agrees with the commenters that the primary objectives of this proposal are adequately covered by several existing sections of FAR 25. For example: § 25.365(e) requires that the floor be

designed for pressure vessel opening which is a function of the cross-sectional area of the fuselage; § 25.571 requires all structure to be damage tolerant where practical; § 25.671 requires that control systems be tolerant of failures, including exterior damage; § 25.629 requires freedom from flutter under failure conditions; § 25.631 requires protection of controls in the empennage structure from bird strikes; and § 25.901(d) requires design precautions be taken to minimize the hazards to the airplane, including control systems, in the event of an engine rotor failure. The proposal therefore is withdrawn.

*Proposal 8-34.* For an explanation of the withdrawal of the proposals concerning automatic systems that affect airplane performance, one of which is the proposal to add a new § 25.705, see Proposal 8-26.

*Proposals 8-35 and 2-59.* Several commenters object to the requirement in § 25.783(e) that provisions for the inspection of door locking mechanisms must be discernable under all possible lighting conditions. The commenters state that allowance should be made for use of supplemental lighting such as a flashlight to aid in the inspection. The FAA agrees and the section is revised accordingly.

A commenter states that direct visual inspection is only needed for external doors for which the initial opening movement is not inward and which are pressurized or for which an inadvertent opening could prevent continued safe flight and landing. Although these comments have merit, they go beyond the scope of Proposal 8-35 and interested parties have not had an opportunity to comment on these changes. No change to the section is being made based on these comments. Several commenters object to the redundancy of a dual warning system requirement and state that in lieu of redundancy, a reliability level should be specified. Further comments state that all external doors do not require this level of reliability. The FAA agrees that this reliability level could be specified and should apply only to external doors for which initial movement is not inward, and the section is changed accordingly. The present language defining where door warning systems are required is retained, as no change in present practice is intended.

A commenter suggests that § 25.783(e) should specify several good design practices. These design practices are desirable but are not essential, since the necessary level of safety can be obtained by alternate means under § 25.783.

Several commenters object to new § 25.783(f), suggesting that it apply only to nonplug type doors and doors whose loss would present a probable hazard. The FAA agrees that provisions to prevent unsafe pressurization can be limited to doors whose loss would present a portable hazard. However, the FAA does not agree that it should be limited to nonplug type doors because a plug door is defined as one whose initial opening is inward and this feature does not necessarily provide complete assurance that an unsafe pressurization will not occur with subsequent opening of the door in flight. The clarifying phrase "to an unsafe level" has been added to § 25.783(f). The intent is to prevent pressurization to a level which would be hazardous if an unlocked external door inadvertently opened.

Several commenters object to proposed new § 25.783(g) (Proposal 8-25), stating that it would unnecessarily preclude the use of nonplug type doors above 45,000 ft. The FAA agrees that nonplug type doors can safely be used at altitudes above 45,000 ft., since adequate warning systems and door integrity are provided by § 25.783(e). Proposed new § 25.783(g) is withdrawn.

A commenter proposes that for the door whose opening would be a hazard, the door and immediate surrounding fuselage, door mechanisms, and warning system be design for any combination of failures (including improper operation) not shown to be extremely improbable. The FAA agrees. In place of the proposals in 8-30, with regard to §§ 25.365(e) (1), (3), and (4), a rule is included to require determination by safety analysis that inadvertent opening of doors which could prevent continued safe flight and landing is extremely improbable.

Two commenters state that the criteria for passenger egress in the revision to the second sentence of § 25.783(g) (Proposal 2-59 of Notice 75-10) should be evacuation time, and not the rate of passenger egress through a given exit. The FAA agrees. Revision of the second sentence of § 25.783(g) is redesignated as § 25.783(i) and the reference to § 25.561(a)(3) in the proposal is corrected to reference § 25.561(b)(3).

Numerous negative comments concern proposed new § 25.783(j), which requires that lavatory doors open into the cabin to preclude anyone from being trapped in the lavatory. The commenters state that this requirement is overly restrictive on design and that an outward opening door could have an adverse effect on aisle width and emergency evacuation capabilities if such a door jammed open. The FAA

agrees that inward opening doors can be designed to prevent anyone being trapped in a lavatory in cases of incapacitation or for other reasons. Thus, new § 25.783(j) is revised to delete the requirement that lavatory doors open into the cabin.

*Proposals 8-36, 2-60, and 8-37.* Final action on Proposals 8-36, 2-60, and 8-37 was taken in Airworthiness Review Program, Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

*Proposal 8-38.* One commenter objects to adding a new § 25.792 to require a sign indicating whether lavatories are occupied, asserting that it would be inappropriate for general aviation aircraft certificated under Part 25. Two commenters doubt that the proposed rule would achieve the objective of preventing aisle congestion near lavatories. They point out that many existing aircraft have similar signs which have not prevented people from "standing in line" for lavatories. Also, passengers can cause congestion in aisles for other reasons. One of the commenters states that lighted signs in a darkened cabin; i.e., during movies or rest periods, would annoy passengers, and that the rule might foster a proliferation of signs throughout the cabin. Finally, one commenter is concerned that any increase in the number of lighted signs might distract the passengers' attention from more essential notices.

Based on the comments and upon further review, the FAA finds that the proposed requirement would not achieve the objective sought. Accordingly, the proposal is withdrawn.

*Proposal 8-39.* Final action on Proposal 8-39 was taken in Airworthiness Review Program Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

*Proposal 8-40.* Final action on Proposal 8-40 was taken in Operations Review Program Amendment No. 8 (45 FR 41586; June 19, 1980).

*Proposal 8-41.* A commenter suggests that new § 25.851(a)(5), which replaces current § 25.853(f), be expanded to prescribe four fire extinguishers for a passenger capacity of 100 or more, and to require at least one CO<sub>2</sub>, dry chemical, or all-purpose fire extinguisher near lavatory and galley areas. These suggested changes are beyond the scope of the notice. However, changes in these requirements are appropriate and the FAA is conducting a research program to establish comprehensive standards and guidance information pertaining to the

selection of portable fire extinguishers, taking into consideration types and quantities of extinguisher agents, extinguisher performance, and other factors. Regulatory changes based on the findings of this research program will be proposed in the next airworthiness standards review.

Sections 25.851 (a)(5) and (a)(6), which consolidate hand fire extinguisher requirements, are adopted without substantive change.

*Proposals 8-42, 2-18, 2-65, 2-114, and 2-160.* Final action on Proposals 8-42, 2-18, 2-65, 2-114, and 2-160 was taken in Airworthiness Review Program, Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

*Proposal 8-43.* Final action on Proposal 8-43 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

*Proposal 8-44.* For a discussion of proposed § 25.905(c), see the discussion under Proposal 8-103. The proposal to add a new § 25.905(c) is adopted without substantive change.

*Proposals 8-45 and 8-96.* The proposed amendments to §§ 25.939 and 33.65 are being deferred for consideration in a forthcoming notice of proposed rule making of the Aircraft Engine Regulatory Review Program.

*Proposals 8-46, 3-35, and 8-47.* Final action on Proposals 8-46, 3-35, and 8-47 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; Oct. 30, 1978).

*Proposal 8-48.* For an explanation of the withdrawal of the proposals concerning automatic takeoff thrust control systems, one of which is the proposal to add a new § 25.1143(f), see Proposal 8-26.

*Proposals 8-49 and 3-41.* Final action on Proposals 8-49 and 3-41 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; Oct. 30, 1978).

*Proposal 8-50.* For an explanation of withdrawal of the proposals concerning automatic takeoff thrust control systems, one of which is the addition of a new § 25.1305(c)(9), see Proposal 8-26.

One commenter objects to revising § 25.1305(d)(1), stating that significant aerodynamic forces acting on the powerplant nacelle make the direct measurement of thrust impractical. The FAA agrees that such forces may be significant. This commenter further objects to the revision, stating that it is beyond the state of the art to prohibit a parameter from being used if the

accuracy of the indication will be adversely affected by any engine malfunction or damage. The FAA agrees that precise values of thrust provided by a malfunctioning, damaged, or deteriorated engine are unnecessary, provided that any changes in thrust due to engine malfunction, damage, or deterioration are indicated to the pilot. The paragraph is revised to require that the indication must be based on the direct measurement of thrust or of parameters that are directly related to thrust.

Although concurring with § 25.1305(d)(1), one commenter states that he would prefer to retain the existing requirements and delete the words ", or to indicate a gas stream pressure that can be related to thrust." The FAA does not agree. The change suggested by this commenter would eliminate the requirement for thrust information and would retain the requirement for change-of-thrust information only. It also would provide a lower level of safety than the adopted paragraph.

This commenter also states that § 25.1305(d)(1) should be complementary to a similar requirement in Part 33 of this chapter. The FAA does not agree. In current practice, the airframe manufacturer determines how performance should be met. The choice of a means to indicate thrust is negotiated between the airplane manufacturer and the engine manufacturer. The factors which influence the final choice are substantial and may vary among airplane designs. These factors may not be known to the engine manufacturer at the time of engine type certification. Another commenter states that the need for an actual value of thrust is not obvious, whereas indication of a loss of thrust would satisfy the original proposal. The FAA agrees that the actual value of thrust is of little value to the pilot. Section 25.1305(d)(1) is revised to specify that the indicator indicate thrust, or a parameter related to thrust, to the pilot.

*Proposal 8-51.* No unfavorable comments were received on the proposal to change the reference in § 25.1307(h) for fire extinguishers in connection with Proposal 8-41. Accordingly, the proposal is adopted without substantive change.

*Proposal 8-52.* Final action on Proposal 8-52 was taken in Airworthiness Review Program, Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

*Proposal 8-53.* Several commenters point out a number of service

deficiencies with proposed § 25.1421 which defines the requirements for cargo compartment fire detection systems. They contend that the requirement for the detection system to actuate a warning within one minute of the start of a fire is too restrictive. One commenter cites the results of FAA tests which show average fire detection times to be from 1.75 to 5 minutes. The commenters also suggest that the tests necessary to show compliance with the warning requirements are not clearly defined. Finally, one commenter points out that fires in baggage containers and other enclosed containers can burn for a considerable time before detection is likely by fire detectors in the cargo compartment.

The FAA does not concur that the one-minute requirement is too restrictive. A survey of fire detection technology has indicated that the state of the art permits detection of a fire in less than one minute after inception. In addition, current standards do not define the test procedures necessary to show compliance with warning requirements. The new one-minute requirement is intended to improve the standards in this regard.

The proposal is adopted without substantive change.

**Note.**—This proposal has been carried erroneously under § 25.1421 which pertains to megaphones. It will be included in the amendment as a new § 25.858.

*Proposal 8-54.* Comments received from several commenters reflected confusion over the intent of proposed § 25.1439(c). It was noted that much of what was intended by proposed § 25.1439(c) is included in existing § 25.1439(a) as amended by Amendment 25-38 (40 FR 55454; 12/20/76), provided that the portable oxygen equipment requirements of § 25.1447(c)(4) are retained. Amendment 25-38 emanated from Airworthiness Review Program Notice No. 2 (40 FR 10813; 3/7/75), and was adopted (41 FR 55468; 12/20/76) after publication of Airworthiness Review Program Notice No. 8 (40 FR 29420; 7/11/75) which contained proposals 8-54 and 8-55. The FAA agrees that the existing regulations require much of what was intended by proposal 8-54, provided that proposal 8-55 is withdrawn. The FAA further agrees that additional clarifications are needed before further amendments are made to § 25.1439. Therefore the FAA withdraws both proposals 8-54 and 8-55. The subject of protective breathing equipment will be addressed in a forthcoming notice of proposed rule making.

*Proposal 8-55.* The proposal to delete § 25.1447(c)(4) is withdrawn for the

reasons stated for withdrawal of Proposal 8-54.

*Proposal 8-56.* For comments related to the proposal to revise § 25.1521(a), and for the withdrawal of that proposal, see Proposal 8-94.

*Proposal 8-57.* Final action on Proposal 8-57 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

*Proposal 8-58.* For comments related to the proposal to amend § 25.1529, see Proposal 8-21.

*Proposal 8-59.* A commenter objects to the proposed new § 25.1557(e), calling for a placard on each flight attendant seat to indicate that it may be occupied by a flight attendant, asserting that such placarding is redundant and that a proliferation of placards in the aircraft will only serve to confuse the passengers and make all placards less effective. The commenter also states that the proposal would prohibit non-flight attendant airline personnel who are cognizant of emergency procedures from occupying flight attendant seats when the aircraft is full. The FAA concludes that a new aircraft certification rule is unnecessary to achieve this result and the proposal is withdrawn.

*Proposals 8-60 and 8-61.* Final action on Proposals 8-60 and 8-61 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

*Proposal 7-55.* A commenter recommends that discrete gusts with varying gradient distances be added as a supplement to Appendix G to Part 25. The FAA disagrees because past experience with the use of discrete gusts with varying gust gradient distances has indicated that knowledge with regard to how gust intensity varies with gust gradient distance is not currently available to the designer. The research and development work accomplished in the area of dynamic response to continuous turbulence has indicated that the continuous turbulence criteria of Appendix G to Part 25 is the most rational approach currently available which gives consistent strength levels for airplanes of different characteristics and missions.

A commenter recommends that paragraph (a) of Appendix G be revised to delete the requirement for considering combined stresses based on both vertical and lateral components of turbulence. The commenter states that the current practice of combining root-mean-square stresses (shear, moment, and torsion) resulting from gust

calculations involving only purely vertical or lateral components of turbulence is a realistic, practical method for combining stress. The commenter contends that the methods for realistically combining statistical load quantities involving both vertical and lateral components of turbulence have not been satisfactorily developed in the current state of the art. After further review the FAA agrees. Paragraph (a) of Appendix G is revised to delete the requirement for considering the combined stresses resulting from the vertical and lateral components of turbulence.

A commenter recommends that paragraph (b)(3)(i) of Appendix G be revised to require a gust intensity of  $U = 75$  fps gust velocity in the interval 0 to 20,000 ft. altitude with a linear decrease to 30 fps at 80,000 ft. altitude. This recommendation would obviate the need to do mission analysis to justify lower levels of loads than those required to meet the design envelope gust intensity factor of 85 fps for new airplanes whose characteristics are similar to previous designs which have been shown to be adequate for the lower level of gust intensity being proposed. There is no technical need for new aircraft which are similar to existing aircraft with regard to response characteristics and basic mission profiles to make extension mission analysis computations in order to establish their adequacy with regard to loads resulting from encounters with continuous turbulence if they are designed for the gust intensity shown to be adequate for the existing design. Therefore, it is acceptable to use a gust intensity value of 75 fps from 0 to 20,000 ft. altitude, and a linear reduction from 75 fps at 20,000 ft. to 30 fps at 80,000 ft., provided the new design is comparable to a similar design with extensive satisfactory service experience. These criteria, which have been under discussion between FAA and industry for over 10 years, are proposed as new rules rather than acceptable means of complying with existing rules. Paragraph (b)(3)(i) is revised accordingly. The commenter also recommends that paragraph (d)(1) be revised to require a gust intensity of  $U = 60$  fps on the interval 0 to 20,000 ft. altitude and be linearly decreased to 23 fps at 80,000 ft. altitude. The FAA disagrees. The gust intensities in paragraph (d)(1) are based on the distribution of gust intensity with altitude which were developed in the basic research for the development of continuous turbulence criteria and are, therefore, considered reasonable as a lower design envelope limit for mission

analysis. A cost analysis was provided by the commenter to justify the lower gust intensities, but the FAA finds that this cost analysis was based on "design envelope analysis" alone. Paragraph (c), which is an alternative to paragraph (b), provides for a "mission analysis". Actual experience has shown that "mission analysis," which considers airplane operational characteristics, has been used in the past in lieu of the 85 fps intensities to prevent weight and cost penalties. Paragraphs (c) and (d) of Appendix G are adopted without substantive change.

A commenter recommends that paragraph (d) of Appendix G be revised to delete the reference to "fail-safe loads" since such loads are not provided in Appendix G. The FAA agrees. Paragraph (d) of Appendix G is revised accordingly.

A commenter recommends that proposed paragraph (e) of Appendix G be deleted since acceleration levels measured at the pilot station on current conventional aircraft can be established by flight demonstration much more easily and with less cost than by use of an expensive analysis considering response to continuous turbulence. Upon further review, the FAA has determined that it lacks sufficient information to specify the right combination of analysis and flight test to determine the acceleration levels at the pilot's station during continuous turbulence. Accordingly, proposed paragraph (e) of Appendix G is withdrawn. The current requirements related to operation in turbulence are adequate to determine the response at the pilot's station during continuous turbulence.

*Proposal 8-62.* For comments related to the proposal to add a new Appendix G to Part 25, see Proposal 8-25. Appendix G (redesignated Appendix H) to Part 25 is adopted with the changes discussed in Proposal 8-25.

*Proposal 8-63.* Final action on Proposal 8-63 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

*Amendment to § 27.571.* Because of the change to § 27.1529 adopted in this amendment, the reference to § 27.1529(a)(2) in §§ 27.571 (b), (c), (d)(1), (d)(3), and (e) is no longer appropriate. The reference is changed to "§ A27.4 of Appendix A". This discrepancy was overlooked in Notice 75-31 (40 FR 29410; July 11, 1975). Since this amendment is clarifying in nature and does not impose a burden on the public, notice and public procedure are unnecessary and good cause exists for adopting this amendment.

*Proposal 8-64.* For comments related to the proposal to amend § 27.1529, see Proposal 8-21.

*Proposals 8-65 and 8-66.* Final action on Proposals 8-65 and 8-66 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

*Proposal 8-67.* For comments related to the proposal to add a new Appendix A to Part 27, see Proposal 8-25. Additional comments on this proposal, and on the proposal to add a new Appendix A to Part 29, are discussed here.

A commenter suggests that the wording of Appendix A be adjusted to take into account the differences between airplanes and rotorcraft. The FAA agrees. The appendix, as proposed, is generally equally applicable to airplanes and rotorcraft. However, several minor changes have been made to the appendix to provide for rotorcraft differences, primarily to cover rotors and differing fatigue standards.

A commenter objects to Appendix A, contending that: (1) The standards in current §§ 27.1529 and 29.1529 have been adequate in service, and (2) the proposal is excessive in scope and would create an undue burden. The FAA does not agree, having found that recommended maintenance procedures made available to operators/owners in the past were frequently inadequate in scope and content, providing no sound basis for maintaining the airworthiness of the rotorcraft. Appendix A, with the revisions and deletions discussed above and under Proposal 8-25, would not create an undue burden on the type certificate applicant.

One commenter expresses concern that certain inspection provisions in current § 91.217 might be applied to rotorcraft. The appendix contains no such requirement. Current § 91.217 applies only to certain airplanes.

*Amendment to § 29.571.* Because of the change to § 29.1529 adopted in this amendment, the reference to "§ 29.1529(a)(2)" in § 29.571 (b), (c), (d)(1), (d)(3), and (e) is no longer appropriate. For consistency, the reference is changed to "§ A29.4 of Appendix A required by § 29.1529". This change was overlooked in Notice 75-31 (40 FR 29410; July 11, 1975). Since this amendment is clarifying in nature and does not impose a burden on the public, notice and public procedure are unnecessary and good cause exists for adopting this amendment.

*Proposal 2-154.* For a discussion directly related to proposed new § 29.783(g), see the discussion under Proposal 8-35 for § 25.783(g) (Proposal

2-59 of Notice 75-10). Section 29.783(g) is adopted without substantive change.

*Proposals 8-68 through 8-78 and 2-164.* Final action on Proposals 8-68, 8-69, 8-70, 8-71, 8-72, 8-73, 8-74, 8-75, 8-76, and 2-164 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

*Proposal 8-77.* For comments related to the proposal to amend § 29.1529, see Proposal 8-21.

*Proposals 8-78 and 8-79.* Final action on Proposals 8-78 and 8-79 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

*Proposal 8-80.* For comments related to the proposal to add a new Appendix A to Part 29, see Proposals 8-25 and 8-67.

*Proposal 8-81.* No unfavorable comments were received on adding a new § 31.12 Providing for standardized application of the airworthiness requirements for balloons. Accordingly, § 31.12 is adopted without substantive change.

*Proposal 8-82.* No unfavorable comments were received on adding a new § 31.16 requiring that balloon empty weight be determined. Accordingly, § 31.16 is adopted without substantive change.

*Proposal 8-83.* No unfavorable comments were received on the intent of new § 31.17 which specifies performance in terms of an initial minimum rate of climb. However, a commenter raises the question whether compliance with proposed § 31.17(a) could be shown by testing at several altitudes and ambient temperatures and then extrapolating, by appropriate analysis, to the other values in the range for which approval is sought. The FAA considers that such extrapolation by analysis is an acceptable means of complying with proposed § 31.17(a), because the climb performance of balloons is based on fundamental principles and, therefore, can be predicted with sufficient accuracy from established test points.

The FAA notes that the 300 fpm climb rate requirement in § 31.17(a) was intended as a minimum standard. To make this clear, § 31.17 as adopted is revised by inserting the words "at least" before the number "300" in the first sentence of § 31.17(a).

*Proposal 8-84.* A commenter, referring to new § 31.19(a) governing critical uncontrolled descent, suggests that it would be difficult and time-consuming to determine which tear is the most critical single tear in the balloon envelope between tear stoppers. The

FAA does not agree. An analysis, or a combination of test and analysis, would be an acceptable means of determining the most critical single tear. It would not be necessary to test each kind of tear. No other unfavorable comments were received on the proposal to add a new § 31.19. Accordingly, § 31.19 is adopted without substantive change.

*Proposal 8-85.* No unfavorable comments were received on the proposal to amend § 31.27(c) to be consistent with new § 31.19, Performance: Uncontrolled descent. Accordingly, the proposal is adopted without substantive change.

*Proposal 8-86.* No unfavorable comments were received on the proposal to amend § 31.65 updating the position light standards and expressing them in language consistent with related standards in other airworthiness parts. However, the FAA finds that the use of a cross reference to § 23.1397 as proposed in § 31.65(e) may be inconvenient for those governed by Part 31. Accordingly, § 31.65, as adopted, sets forth the chromaticity coordinates for aviation red and aviation white as currently prescribed in § 23.1397.

*Proposal 8-87.* No unfavorable comments were received on the proposal to amend § 31.71. However, after further consideration, the FAA concludes that proposed § 31.71(a)(2) is unnecessarily restrictive in that it would, in all cases, require marking the equipment as to its identification, function, and operating limitations, Marking of the equipment as to its identification, function, or operating limitations, or any applicable combination of those factors is sufficient. This is also the language used in corresponding sections of other aircraft airworthiness regulations. Section 31.71, as adopted, is revised accordingly.

*Proposal 8-88.* No unfavorable comments were received on the proposal to amend § 31.81 to detail operating limitations and information. The FAA notes, however, that proposed § 31.81(b) is not clear as to which "operating limitations and other information necessary for safe operation" must be furnished. The FAA's intent, as stated in the explanation, is to require that the information established under § 31.81(a) be furnished. Section 31.81(b) is revised accordingly. Section 31.81(a) is adopted without substantive change.

*Proposal 8-89.* A commenter is concerned that proposed § 31.82 might require balloon manufacturers to prepare two overlapping maintenance documents—the maintenance manual currently supplied to operators/owners,

and the proposed Instructions for Continued Airworthiness. The FAA notes that under §§ 31.82 and 21.50(b), balloon manufacturers would be required to prepare and furnish only the Instructions for Continued Airworthiness.

The FAA notes further (as discussed under Proposal 8-21) that the Instructions for Continued Airworthiness need not be finalized until delivery of the first balloon, while § 31.82, as proposed, could be interpreted to require that they be finalized before type certification. This point is clarified in § 31.82, as adopted, consistent with the corresponding requirement in Parts 23, 25, 27, and 29.

*Proposal 8-90.* No unfavorable comments were received on the proposal to amend § 31.85(b)(1). However, a commenter questions whether percentage figures on the required fuel quantity gauge would be acceptable. The FAA has determined that, in the particular case of balloons (for which the fuel quantity information is to an extent less important to safety than for other classes of aircraft), calibration of the fuel quantity gauge in percent of fuel cell capacity is an acceptable means of complying with the last sentence of § 31.85(b)(1). Section 31.85(b)(1), as adopted, is revised to make this clear.

*Proposal 8-91.* No adverse comments were received on the proposal to add a new Appendix A to Part 31. However, comments received on the proposals to add a similar appendix to Parts 23, 25, 27, and 29 (Proposal 8-25), were equally valid with respect to this proposal. Accordingly, Appendix A to Part 31, as adopted, is revised in substance as applicable.

Regarding the proposals to require generalized repair data in the Instructions for Continued Airworthiness, it is more appropriate, as well as necessary and practicable, to include specific instructions for repair of the key elements of a balloon—the balloon envelope and its basket or trapeze. This information is incorporated in paragraph A31.3(i) as revised.

*Proposal 8-92.* A commenter objects to § 33.4 insofar as it would require completion of the Instructions for Continued Airworthiness before the type certificate is issued, contending that a significant portion of the data and other material called for is typically not compiled until 6 months or longer after type certification. The commenter suggests that manufacturers be allowed to prepare and make available the Instructions for Continued Airworthiness before the first aircraft

equipped with the subject engine is put into service, which, it claims, is the earliest such instructions would be needed. Requiring the engine manufacturer to complete the Instructions for Continued Airworthiness before the type certificate is issued would constitute an unnecessary burden. However, the FAA considers that they must be made available, and furnished, upon delivery of the first engine on an aircraft or issuance of a standard certificate of airworthiness for the aircraft, whichever occurs later. This would be consistent with corresponding requirements proposed for other products. See Proposals 8-5 and 8-21. Section 33.4 is revised and adopted accordingly.

*Proposal 8-93.* A commenter observes that § 33.5 requires that the instruction manual for installing and operating the engine be "approved," whereas proposed § 33.4 requires that the Instructions for Continued Airworthiness be "acceptable to the Administrator," and recommends that the latter term be used for consistency. The FAA notes that the term "acceptable to the Administrator" is widely used in Part 43 in connection with maintenance requirements, whereas the term "approved" is more frequently used in FAR Parts containing installation and operating requirements. Considering the FAR as a whole, the FAA does not agree that such consistency is essential. Accordingly, § 33.5 is adopted as proposed.

*Proposal 8-94.* Several commenters object to proposed §§ 33.6 (e) and (f), and to proposed §§ 23.1521(a) and 25.1521(a) (Proposals 8-20 and 8-56, respectively) on the grounds that the use of rated takeoff power or thrust for 10 minutes with one engine inoperative should be limited to "the extent that the utilization is necessary for the airplane to avoid, without necessitating turning maneuvers, obstacles beneath the flight path intended for the airplane prior to the loss of the engine." In light of these comments and after further review, the FAA concludes that these proposals are premature and they are withdrawn.

In addition, the proposed transfer of the definitions for rated power and thrust from § 1.1 to proposed new § 33.6, Proposal 8-1, is withdrawn since the transfer may cause confusion in the administration of the aircraft certification requirements. Accordingly, Proposals 8-1, 8-20, 8-56, and 8-94 are withdrawn.

*Proposal 8-95.* For discussion of proposed § 33.19(b) see the discussion under Proposal 8-103. Revised § 33.19 is adopted without substantive change.

*Amendment to §§ 33.55(c), 33.57(b), 33.93(b), and 33.99(b).* Because of the deletion of §§ 33.5 (c), (d), and (e), and the addition of a new § 33.4, the reference to "§ 33.5" in §§ 33.55(c), 33.57(b), 33.93(b), and 33.99(b) is no longer appropriate. For consistency, the reference is "§ 33.4." This change was inadvertently overlooked and was not proposed in Notice 75-31 (40 FR 29410; July 11, 1975). This editorial change corrects that discrepancy. Since this amendment is clarifying in nature and does not impose a burden on the public, notice and public procedure are unnecessary and good cause exists for adopting this amendment.

*Proposal 8-97.* A commenter recommends that § A33.3(a)(6) of Appendix A to Part 33 be revised by adding the words "requiring periodic attention" so as to make it clear that scheduling information is required solely for parts that require such attention. The language in this section is adequate. For parts not needing periodic attention, the applicant has only to state that parts not scheduled need not be serviced.

A commenter infers incorrectly that proposed §§ 43.16 and 91.163(c) apply only to rotorcraft. These regulations with the revision proposed also affect other classes of aircraft, as well as engines and propellers.

Some comments received on the proposed appendices for Parts 23, 25, 27, and 29 (Proposal 8-25) were equally valid with respect to proposed Appendix A to both Parts 33 and 35. Accordingly, the appendices to Parts 33 and 35 are revised in substance as applicable.

*Proposal 8-98.* For a discussion related to proposed § 35.3 see Proposal 8-93. A commenter observes that § 35.3 requires that the instruction manual for installing and operating the propeller be "approved," whereas § 35.4 requires that the Instructions for Continued Airworthiness be "acceptable to the Administrator," and recommends that the latter term be used for consistency. The FAA notes that the term "acceptable to the Administrator" is widely used in Part 43 in connection with maintenance requirements, while the term "approved" is more frequently used in FAR parts containing installation and operating requirements. Considering the FAR as a whole, the FAA does not agree that consistency is required in this instance. Accordingly, § 35.3 is adopted as proposed.

*Proposal 8-99.* In response to the concern of a commenter representing a number of Part 121 operators, the FAA notes that there is no requirement that any operator/owner use the Instructions for Continued Airworthiness referred to

in proposed § 35.4. The new §§ 43.13(a), 43.16, and 91.163(c) allow the use of other methods. In particular, the use of maintenance manuals and continuous airworthiness maintenance programs developed under Parts 121, 123, 127, and 135, or an inspection program approved under § 91.217(e), would be acceptable alternatives to the Airworthiness Limitations section. This commenter suggests that language be added to proposed § 35.4 to make it clear that such alternatives may be used. The FAA agrees. The language in §§ 43.16 and 91.163(c) is revised accordingly.

Consistent with the discussion on proposed § 33.4 dealing with engines (see Proposal 8-92), the FAA finds that requiring the propeller manufacturer to complete the Instructions for Continued Airworthiness before the type certificate is issued would constitute an unnecessary burden. Accordingly, § 35.4, as adopted, requires that those instructions be made available and furnished upon delivery of the first aircraft with the propeller installed, or upon issuance of a standard certificate of airworthiness for an aircraft with the propeller installed, whichever occurs later.

*Proposal 8-100.* No unfavorable comments were received on the proposal to amend § 35.5 to more clearly indicate the basis for operating limitations and where they are listed. Accordingly, § 35.5 is adopted without substantive change.

*Proposal 8-101.* No unfavorable comments were received on the proposal to amend § 35.23 to provide an extreme low pitch indication. Accordingly, § 35.23 is adopted without substantive change.

*Proposal 8-102.* A commenter does not concur with the proposal to revise § 35.37 to require fatigue evaluation of metallic hubs and blades, stating that the words "must", "all", and "reasonably foreseeable" in the second sentence imply responsibility beyond current knowledge and the state of the art. The FAA does not agree. These terms are used in the current rule and the current state of the art defines the limits of the provision.

The same commenter recommends that § 35.37 be revised to apply to consideration of "normal and reasonably foreseeable load patterns," to account for the fact that only normal operations will or should be considered. The FAA does not agree. Load patterns which are reasonably foreseeable are critical and should be investigated even if they are not normal.

The same commenter also indicates that the third sentence should be revised to eliminate the term "reduction

factors," since reduction factors are identified with only one particular method of presentation. The FAA agrees and the section is revised accordingly. This commenter finally states that the explanation implies that manufacturers have not taken permissible damage and material variation into account. This implication is not intended. It is the FAA's view that the fatigue evaluation should consider the occurrence of typical service damage and variation in material properties and the rule would provide for such an evaluation.

Another commenter suggests that the section be revised by adding certain technical requirements that are related to infinite component life. It is not necessary to specify technical requirements concerning infinite component life, since they are considered a normal part of propeller fatigue testing.

Section 35.37 is adopted as revised.

*Proposal 8-103.* A commenter objects to the proposal to add a new § 35.42 to define durability requirements for propeller blade pitch control system components, stating that the term "bench tests" in §§ 35.42 (a) and (b) is too descriptive and restrictive. The FAA agrees that a reference to "bench tests" may be too restrictive. Other test methods may be equally acceptable in providing the necessary data. Accordingly, §§ 35.42 (a) and (b) are revised to eliminate the specific reference to "bench."

The commenter also suggests that the words "in frequency and amplitude" be eliminated from § 35.42(a) since the words "cyclic testing" are fully descriptive. The FAA believes that these words are needed to prescribe key elements in the required test.

The commenter further suggests that the proposed testing to the equivalent of 1,000 hours of propeller operation is too restrictive in the case of a propeller with an overhaul period of less than 1,000 hours. The FAA considers the specific testing to be the minimum necessary to provide an acceptable safety level in service. The rule does not, however, prevent the selection of overhaul intervals of less than 1,000 hours.

Finally, the commenter suggests that the rule should permit an alternate of acceptance based upon service experience. The FAA recognizes that service experience can provide a statistical basis for determining component reliability. Its applicability, however, may vary according to such considerations as type of operation, the nature of the article under consideration, the degree of similarity between the reference article and the certification article, and the

completeness of service records. Since it is dependent on such a variety of factors, the FAA does not agree that a specific alternative based on service experience should be included.

The proposal to add a new § 35.42, therefore, is adopted with the change discussed above. No adverse comments were received on the related proposed revisions to §§ 23.905, 25.905, and 33.19 to add the reference to new § 35.42, and the revisions are adopted.

*Proposal 8-104.* For comments related to the proposal to add a new Appendix A to Part 35, see Proposals 8-25 and 8-97.

A commenter objects to proposed § A35.1(c) of the appendix because the propeller owner (aircraft operator) would be wastefully provided with instructions and data that the propeller owner has no authority to use. The FAA does not agree. The Instructions for Continued Airworthiness must be furnished to the aircraft owner/operator who is the person responsible for maintaining the aircraft (including the propeller). The owner/operator may not be authorized to maintain the propeller, but the owner/operator can place the instructions in the hands of persons who are authorized.

The new Appendix A to Part 35, as adopted, is revised in accordance with comments discussed in Proposal 8-97.

*Proposal 8-105.* The proposed revision of § 43.9(a)(4) is being deferred for consideration in a forthcoming notice of proposed rule making of the Operations Review Program.

*Proposal 8-106.* A commenter representing a number of scheduled air carriers is concerned that the use of maintenance manuals and continued airworthiness programs developed under current § 121.133 and Subpart L of Part 121 (generally via Maintenance Review Board procedures), or under similar provisions of Parts 127 and 135, might not be acceptable as "other methods, techniques, and practices" under the terms of proposed § 43.13(a). This commenter suggests that language be added to proposed § 43.13(a) to make this clear. The FAA does not agree. The proposed language states that the use of such manuals and continued airworthiness programs is acceptable.

*Proposal 8-107.* A commenter representing a number of scheduled air carriers recommends that the Airworthiness Limitations section referred to in proposed § 43.16 include life limitations only and not inspections or other maintenance items. As discussed under Proposal 8-3, the FAA does not agree.

A commenter suggests that the words "or other methods, techniques; and

practices acceptable to the Administrator" be added at the end of proposed § 43.16 to make it consistent with proposed § 43.13(a). The Airworthiness Limitations section contains specific mandatory replacement times and inspection intervals (with related procedures) that must be complied with, unless it can be shown by an operator with an approved maintenance program that these times are inappropriate for his operation. The use of alternatives not covered in the Airworthiness Limitations section would be allowed if approved by the Administrator. Section 43.16 is revised to specifically state the alternatives to compliance with the Airworthiness Limitations section.

*Proposal 8-108.* No unfavorable comments were received on the proposal to amend § 45.11 to qualify, with respect to manned free balloons, the requirements in § 45.11(a) that deal with the location of the identification plate. Accordingly, the proposal is adopted without substantive change.

*Proposal 8-109.* No unfavorable comments were received on the proposal to amend § 45.13 to correctly reference §§ 45.11 (a) and (b) with regard to identification plate requirements. Accordingly, the proposal is adopted without substantive change.

*Proposal 8-110.* A commenter representing a number of scheduled air carriers recommends that the words "inspection interval, or related procedure" be deleted from proposed § 45.14. The supporting rationale is the same as submitted by this commenter concerning Proposal 8-3 to amend § 21.31(c). As discussed under Proposal 8-3, the FAA disagrees.

The language in § 45.14 covers rotorcraft as well as airplanes, balloons, engines, and propellers. To make this clear, the word "Rotorcraft" is changed to "Manufacturer's."

Two commenters object to proposed § 45.14 on the grounds that it would be impracticable to mark small parts with a part and serial number. The FAA is not aware that the marking of small parts under current § 45.14 has presented a problem. In any event, the rule allows markings that are equivalent to part and serial numbers, such as symbols enabling the identification of the part as one for which a replacement time, inspection interval, or related procedure is specified in an Airworthiness Limitations section. Identification of such parts is clearly essential for safety. Accordingly, § 45.14 is adopted as revised.

*Proposal 8-111.* A commenter representing a number of scheduled air carriers recommends that the words

"inspection interval, or related procedure" be deleted from proposed § 91.163(c). The supporting rationale is the same as that submitted by this commenter concerning Proposal 8-3 to amend § 21.31(c). As discussed under Proposal 8-3, the FAA disagrees. However, § 91.163(c) is revised to specifically identify the acceptable alternatives to compliance with the "Airworthiness Limitations" section.

The language in proposed § 91.163(c) covers rotorcraft as well as airplanes, balloons, engines, and propellers. To make this clear, the word "Rotorcraft" in § 91.163(c) has been changed to "Manufacturer's", and a statement has been added that operations specifications approved by the Administrator may be used in lieu of the Instructions for Continued Airworthiness. Section 91.163(c) is adopted as revised.

*Proposal 8-112.* No unfavorable comment was received on the proposal to amend § 91.165 to clarify maintenance personnel entries in maintenance records. Accordingly, the proposal is adopted without substantive change.

*Proposal 8-113.* Several commenters object to §§ 91.173(a)(2) (i) and (iii). A commenter states that adoption of the proposal would result in an inconsistency between § 91.173 and § 121.380, which contains the recordkeeping requirements for aircraft maintained under Part 121. The commenter also states that this inconsistency would cause great difficulty and economic hardship whenever an aircraft is sold by a Part 121 operator to a Part 91 operator and the Part 91 aircraft is maintained by a Part 121 operator under its repair station certificate. According to the commenter, the economic hardship would occur to both the Part 91 operator and the repair station. The same commenter contends that reliability information accumulated in recent years on transport category airplanes shows that there is no need for individualized total time records on equipment and components. Another commenter states that proposed requirements would result in large increases in maintenance costs for Part 91 operators and that only those components that are life-limited should have to carry total times.

The FAA concludes, however, that revision of § 91.173(a)(2)(i) would contribute significantly to safety with little burden on those affected. The currently prescribed record of total time in service for the airframe does not generally apply to the aircraft's engines or propellers, since these components are frequently overhauled (or replaced)

at different times. As a practical matter, it is known that operators of such aircraft normally keep records from which the total time in service of engines and propellers can be derived. Therefore, the FAA does not agree that the requirement to keep total times on engines and propellers would be a hardship and burden upon the operators. Accordingly, § 91.173(a)(2)(i) is adopted without change.

In light of the comment on proposed § 91.173(a)(2)(iii), the FAA has given further review of the proposal and has concluded that existing requirements satisfy the objective of the proposal. Accordingly proposed § 91.173(a)(2)(iii) is withdrawn.

The reporting and recordkeeping requirements contained in § 91.173 have been approved by the Office of Management and Budget in accordance with the Federal Reports Act of 1942.

*Proposal 8-114.* Several commenters agree with the intent of proposed § 91.193(c)(4) but suggest changes. A commenter suggests that the proposed installation instructions for hand fire extinguishers would be more appropriately placed in the type certification rules. The FAA does not agree. New type certification rules do not apply to aircraft already in service.

A commenter suggests that the words "unless obvious" be added to clarify when the hand fire extinguisher stowage provisions must be properly identified. The FAA agrees. Proposed § 91.193(c)(4) is revised and adopted accordingly.

*Proposal 8-115.* One commenter objects to the proposal to revise § 91.197(a) to require passenger information signs to meet the requirements of § 25.791. The commenter states that it is unnecessary, in many small general aviation aircraft operating under Subpart D of Part 91, to have such signs just for the sake of uniformity. The commenter also states that "nonstandard" signs now in use are wholly adequate to meet the needs of the type of operation. Finally, the commenter points out that installation costs for aircraft not currently having signs would be high and the pilot could just as easily announce the information as he could activate the signs.

Based on these comments and considering the type of operation involved, the FAA finds that the benefits associated with the proposal do not warrant its adoption. The proposal to revise § 91.197(a) is withdrawn.

*Proposals 8-116, 8-117, 8-118, and 8-119.* Final action on Proposals 8-116, 8-117, 8-118, and 8-119 was taken in Airworthiness Review Program, Amendment No. 8: Cabin Safety and

Flight Attendant Amendments (45 FR 7750; February 4, 1980).

*Proposal 8-120.* In light of the need to conduct further testing of protective breathing equipment, the FAA withdraws its proposal to amend § 121.337, which will be addressed in an upcoming notice of proposed rule making.

**Adoption of the Amendment**

Accordingly, Parts 11, 21, 23, 25, 27, 29, 31, 33, 35, 43, 45, and 91 of the Federal Aviation Regulations are amended as follows, effective October 14, 1980.

**PART 11—GENERAL RULE-MAKING PROCEDURES**

1. By redesignating §§ 11.11 (k), (l), and (m) as §§ 11.11 (m), (n), and (o), respectively, and adding new §§ 11.11(k) and (l) to read as follows:

**§ 11.11 Docket.**

(k) Special conditions required, as prescribed under § 21.16 or § 21.101(b)(2).

(l) Written material received in response to published special conditions,

2. By adding a new § 11.28 to read as follows:

**§ 11.28 Action on special conditions.**

(a) *General.* Except for the publication and comment procedures provided for in this section, no public hearing, argument, or other formal proceeding is held directly on a special condition established by the Administrator.

(b) *Procedures.* This subpart and Subpart C apply to the issue, amendment, and repeal of special conditions under Part 21. In addition to the information required by § 11.29(b), each notice will include—

(1) The name and address of the applicant;

(2) The model designation and a summary description of the affected product;

(3) The applicable type design approval regulations designated in accordance with § 21.17 or § 21.101 of Part 21; and

(4) A summary description of the novel or unusual design features that make the issue or amendment of special conditions necessary.

3. By adding a new § 11.49(b)(4) to read as follows:

**§ 11.49 Adoption of final rules.**

(b) \* \* \*

(4) Special conditions under Part 21 of this chapter to the Director of Airworthiness.

**PART 21—CERTIFICATION PROCEDURES FOR PRODUCTS AND PARTS**

**§ 21.16 [Amended]**

3a. By deleting § 21.16(b), redesignating § 21.16(a) as § 21.16, and by replacing the phrase "paragraph (b) of this section" in the second sentence of the paragraph with "Part 11 of this chapter".

3b. By deleting the word "and" from the end of § 21.31(b), redesignating § 21.31(c) as § 21.31(d), and revising § 21.31(a) and adding a new § 21.31(c) to read as follows:

**§ 21.31 Type design.**

(a) The drawings and specifications, and a listing of those drawings and specifications, necessary to define the configuration and the design features of the product shown to comply with the requirements of that part of this subchapter applicable to the product;

(c) The Airworthiness Limitations section of the Instructions for Continued Airworthiness as required by Parts 23, 25, 27, 29, 31, 33, and 35 of this chapter; and

**§ 21.35 [Amended]**

4. By amending § 21.35(b) (2) by deleting the word "airplane" near the end of the sentence and inserting in its place the word "aircraft".

5. By redesignating § 21.50 as § 21.50(a), and by revising the heading of § 21.50 and adding a new § 21.50(b) to read as follows:

**§ 21.50 Instructions for continued airworthiness and manufacturer's maintenance manuals having airworthiness limitations sections.**

(b) The holder of design approval, including either the type certificate or supplemental type certificate for an aircraft, aircraft engine, or propeller for which application was made after October 14, 1981, shall furnish at least one set of complete Instructions for Continued Airworthiness, prepared in accordance with §§ 23.1529, 25.1529, 27.1529, 29.1529, 31.82, 33.4, or 35.4 of this chapter, as applicable, to the owner of each type aircraft, aircraft engine, or propeller upon its delivery, or upon issuance of the first standard certificate of airworthiness for the affected aircraft, whichever occurs later, and thereafter

make available those instructions to any other person required by this chapter to comply with any of the terms of those instructions. In addition, changes to the Instructions for Continued Airworthiness shall be made available to any person required by this chapter to comply with any of those instructions.

6. By deleting from § 21.123(b) the word "and" following the semicolon, inserting at the end of § 21.123(c) a semicolon and the word "and" in place of the period, and adding a new § 21.123(d) to read as follows:

**§ 21.123 Production under type certificate.**

(d) Upon the establishment of the approved production inspection system (as required by paragraph (c) of this section) submit to the Administrator a manual that describes that system and the means for making the determinations required by § 21.125(b).

**§ 21.143 [Amended]**

7. By deleting from § 21.143(a) (2) the phrase "subsidiary manufacturers" and replacing it with the phrase "manufacturers' suppliers" and by deleting from § 21.143(f) the phrase "subsidiary manufacturers" and replacing it with the word "suppliers".

**§ 21.182 [Amended]**

8. By deleting the reference to "§ 45.11(a)" in §§ 21.182 (a) and (b)(3) and inserting "§ 45.11" in its place.

9. By revising § 21.197 by deleting the phrase "the purpose of—" from the lead in of § 21.197(a) and inserting the phrase "the following purposes:" in its place; by replacing the semicolons in §§ 21.197(a) (1) and (2) with periods; by replacing the semicolon and the word "and" at the end of § 21.197(a) (3) with a period; and by adding a new § 21.197(a) (5) to read as follows:

**§ 21.197 Special flight permits.**

(5) Conducting customer demonstration flights in new production aircraft that have satisfactorily completed production flight tests.

**PART 23—AIRWORTHINESS STANDARDS: NORMAL, UTILITY, AND ACROBATIC CATEGORY AIRPLANES**

10. By revising § 23.253(b)(3) to read as follows:

**§ 23.253 High-speed characteristics.**

(3) Buffeting that would impair the pilot's ability to read the instruments or to control the airplane for recovery.

11. By revising § 23.361 to read as follows:

**§ 23.361 Engine torque.**

(a) Each engine mount and its supporting structure must be designed for the effects of—

- (1) A limit engine torque corresponding to takeoff power and propeller speed acting simultaneously with 75 percent of the limit loads from flight condition A of § 23.333(d);
- (2) The limit engine torque as specified in § 23.361(c) acting simultaneously with the time loads from flight condition A of § 23.333(d); and
- (3) For turbopropeller installations, in addition to the conditions specified in paragraphs (a)(1) and (a)(2) of this section, a limit engine torque corresponding to takeoff power and propeller speed, multiplied by a factor accounting for propeller control system malfunction, including quick feathering, acting simultaneously with lg level flight loads. In the absence of a rational analysis, a factor of 1.6 must be used.

(b) For turbine engine installations, the engine mounts and supporting structure must be designed to withstand each of the following:

- (1) A limit engine torque load imposed by sudden engine stoppage due to malfunction or structural failure (such as compressor jamming).
- (2) A limit engine torque load imposed by the maximum acceleration of the engine.
- (c) The limit engine torque to be considered under paragraph (a)(2) of this section must be obtained by multiplying the mean torque for maximum continuous power by a factor of—
  - (1) 1.25 for turbopropeller installations;
  - (2) 1.33 for engines with five or more cylinders; and
  - (3) Two, three, or four, for engines with four, three, or two cylinders, respectively.

**§ 23.371 [Amended]**

12. By deleting the word "turbopropeller" in the lead-in of § 23.371 and inserting the word "turbine" in its place.

13. By revising the heading of § 23.729 and §§ 23.729 (c) and (e) to read as follows:

**§ 23.729 Landing gear extension and retraction system.**

(c) *Emergency operation.* For a airplane having retractable landing gear that cannot be extended manually, there must be means to extend the landing gear in the event of either—

(1) Any reasonably probable failure in the normal landing gear operation system; or

(2) Any reasonably probable failure in a power source that would prevent the operation of the normal landing gear operation system.

(e) *Position indicator.* If a retractable landing gear is used, there must be a landing gear position indicator (as well as necessary switches to actuate the indicator) or other means to inform the pilot that the gear is secured in the extended (or retracted) position. If switches are used, they must be located and coupled to the landing gear mechanical system in a manner that prevents an erroneous indication of either "down and locked" if the landing gear is not in a fully extended position, or of "up and locked" if the landing gear is not in the fully retracted position. The switches may be located where they are operated by the actual landing gear locking latch or device.

14. By adding new §§ 23.903 (f) and (g) to read as follows:

**§ 23.903 Engines.**

(f) *Restart capability.* An altitude and airspeed envelope must be established for the airplane for in-flight engine restarting and each installed engine must have a restart capability within that envelope.

(g) For turbine engine powered airplanes, if the minimum windmilling speed of the engines, following the in-flight shutdown of all engines, is insufficient to provide the necessary electrical power for engine ignition, a power source independent of the engine-driven electrical power generating system must be provided to permit in-flight engine ignition for restarting.

15. By adding a new § 23.905(d) to read as follows:

**§ 23.905 Propellers.**

(d) Each component of the propeller blade pitch control system must meet the requirements of § 35.42 of this chapter.

16. By revising § 23.967(e)(2) and adding a flush paragraph at the end of § 23.967(e) to read as follows:

**§ 23.967 Fuel tank installations.**

(2) Under conditions likely to occur when the airplane lands on a paved runway at a normal landing speed under each of the following conditions:

(i) The airplane in a normal landing attitude and its landing gear retracted.

(ii) The most critical landing gear leg collapsed and the other landing gear legs extended.

In showing compliance with paragraph (e)(2) of this section, the tearing away of an engine mount must be considered unless all the engines are installed above the wing or on the tail or fuselage of the airplane.

17. By adding a new § 23.991(d) to read as follows:

**§ 23.991 Fuel pumps.**

(d) Operation of any fuel pump may not effect engine operation so as to create a hazard, regardless of the engine power or thrust setting or the functional status of any other fuel pump.

18. By revising § 23.1305(n) to read as follows:

**§ 23.1305 Powerplant instruments.**

(n) A blade position indicating means for each turbopropeller engine propeller to provide an indication to the flight crew when the propeller blade angle is below the flight low pitch position. The required indicator must begin indicating before the blade moves more than 8° below the flight low pitch stop. The source of indication must directly sense the blade position.

19. By revising § 23.1529, including its heading, to read as follows:

**§ 23.1529 Instructions for Continued Airworthiness.**

The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix G to this part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first airplane or issuance of a standard certificate of airworthiness, whichever occurs later.

20. By adding a new Appendix G to Part 23 to read as follows:

**Appendix G—Instructions for Continued Airworthiness**

**G23.1 General.**

(a) This appendix specifies requirements for the preparation of Instructions for Continued Airworthiness as required by § 23.1529.

(b) The Instructions for Continued Airworthiness for each airplane must include the Instructions for Continued Airworthiness for each engine and propeller (hereinafter designated 'products'), for each appliance required by this chapter, and any required information relating to the interface of those

appliances and products with the airplane. If Instructions for Continued Airworthiness are not supplied by the manufacturer of an appliance or product installed in the airplane, the Instructions for Continued Airworthiness for the airplane must include the information essential to the continued airworthiness of the airplane.

(c) The applicant must submit to the FAA a program to show how changes to the Instructions for Continued Airworthiness made by the applicant or by the manufacturers of products and appliances installed in the airplane will be distributed.

**G23.2 Format.**

(a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.

(b) The format of the manual or manuals must provide for a practical arrangement.

**G23.3 Content.**

The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:

(a) *Airplane maintenance manual or section.*

(1) Introduction information that includes an explanation of the airplane's features and data to the extent necessary for maintenance or preventive maintenance.

(2) A description of the airplane and its systems and installations including its engines, propellers, and appliances.

(3) Basic control and operation information describing how the airplane components and systems are controlled and how they operate, including any special procedures and limitations that apply.

(4) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and leveling information.

(b) *Maintenance Instructions.*

(1) Scheduling information for each part of the airplane and its engine auxiliary power units, propellers, accessories, instruments, and equipment that provides the recommended periods at which they should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection, the applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross reference to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the airplane.

(2) Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.

(3) Information describing the order and method of removing and replacing products and parts with any necessary precautions to be taken.

(4) Other general procedural instructions including procedures for system testing during ground running, symmetry checks, weighing and determining the center of gravity, lifting and shoring, and storage limitations.

(c) Diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided.

(d) Details for the application of special inspection techniques including radiographic and ultrasonic testing where such processes are specified.

(e) Information needed to apply protective treatments to the structure after inspection.

(f) All data relative to structural fasteners such as identification, discard recommendations, and torque values.

(g) A list of special tools needed.

**G23.4 Airworthiness Limitations section.**

The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, structural inspection interval, and related structural inspection procedure required for type certification. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual. This section must contain a legible statement in a prominent location that reads: "The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§ 43.16 and 91.163 of the Federal Aviation Regulations unless an alternative program has been FAA approved."

**PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES**

21. By revising § 25.111(c)(4) to read as follows:

**§ 25.111 Takeoff path.**

\* \* \* \* \*

(c) \* \* \*

(4) Except for gear retraction and propeller feathering, the airplane configuration may not be changed, and no change in power or thrust that requires action by the pilot may be made, until the airplane is 400 feet above the takeoff surface.

\* \* \* \* \*

22. By revising § 25.253(a)(2)(iii) to read as follows:

**§ 25.253 High-speed characteristics.**

(a) \* \* \*

(2) \* \* \*

(iii) Buffeting that would impair the pilot's ability to read the instruments or control the airplane for recovery.

\* \* \* \* \*

23. By revising § 25.305(d) to read as follows:

**§ 25.305 Strength and deformation.**

\* \* \* \* \*

(d) The dynamic response of the airplane to vertical and lateral continuous turbulence must be taken into account. The continuous gust design criteria of Appendix G of this part must be used to establish the dynamic response unless more rational criteria are shown.

24. By revising § 25.307(a) to read as follows:

**§ 25.307 Proof of structure.**

(a) Compliance with the strength and deformation requirements of this subpart must be shown for each critical loading condition. Structural analysis may be used only if the structure conforms to that for which experience has shown this method to be reliable. The Administrator may require ultimate load tests in cases where limit load tests may be inadequate.

\* \* \* \* \*

25. By revising § 25.365(e) to read as follows:

**§ 25.365 Pressurized cabin loads.**

\* \* \* \* \*

(e) Partitions, bulkheads, and floors in pressurized cabins must be designed to withstand the effects of a sudden release of pressure through an opening in any compartment at any approved operating altitude resulting from any of the following conditions (to be considered as ultimate conditions):

(1) The penetration of the cabin by a portion of an engine following an engine disintegration;

(2) An opening in any passenger or cargo compartment given by the equation—

$$H_o = PA_s$$

where,  
 $H_o$  = maximum opening in square feet, not to exceed 20 square feet.

$$P = \frac{A_s}{6,240} + .024$$

$A_s$  = maximum cross sectional area of pressurized shell normal to the longitudinal axis, in square feet; and

(3) The maximum opening caused by airplane or equipment failures not shown to be extremely improbable.

**§ 25.571 [Amended]**

26. By deleting the phrase "maintenance manual" from § 25.571(a)(3) and inserting the phrase "Airworthiness Limitations section of the Instructions for Continued Airworthiness" in its place.

27. By redesignating § 25.783(f) and the first sentence of § 25.783(g) as §§ 25.783 (g) and (h), respectively; by redesignating the second sentence of § 25.783(g) as § 25.783(i); by inserting the phrase "either during or after closure" following the phrase "single structural element" within the parenthetical expression in § 25.783(b); and by revising § 25.783(e) and new § 25.783(i) and adding new §§ 25.783 (f) and (j) to read as follows:

**§ 25.783 Doors.**

(e) There must be a provision for direct visual inspection of the locking mechanism to determine if external doors, for which the initial opening movement is not inward (including passenger, crew, service, and cargo doors), are fully closed and locked. The provision must be discernible under operational lighting conditions by appropriate crewmembers using a flashlight or equivalent lighting source. In addition, there must be a visual warning means to signal the appropriate flight crewmembers if any external door is not fully closed and locked. The means must be designed such that any failure or combination of failures that would result in an erroneous closed and locked indication is improbable for doors for which the initial opening movement is not inward.

(f) External doors must have provisions to prevent the initiation of pressurization of the airplane to an unsafe level if the door is not fully closed and locked. In addition, it must be shown by safety analysis that inadvertent opening is extremely improbable.

(i) If an integral stair is installed in a passenger entry door that is qualified as a passenger emergency exit, the stair must be designed so that under the following conditions the effectiveness of passenger emergency egress will not be impaired:

(1) The door, integral stair, and operating mechanism have been

subjected to the inertia forces specified in § 25.561(b)(3), acting separately relative to the surrounding structure.

(2) The airplane is in the normal ground attitude and in each of the attitudes corresponding to collapse of one or more legs of the landing gear.

(j) All lavatory doors must be designed to preclude anyone from becoming trapped inside the lavatory, and if a locking mechanism is installed, it be capable of being unlocked from the outside without the aid of special tools.

28. By adding new §§ 25.851 (a)(5) and (a)(6) to read as follows:

**§ 25.851 Fire extinguishers.**

(a) \* \* \*  
 (5) There must be at least the following number of hand fire extinguishers conveniently located in passenger compartments:

*Minimum Number of Hand Fire Extinguishers*

Passenger capacity:	
7 through 30 .....	1
31 through 60 .....	2
61 or more .....	3

(6) There must be at least one hand fire extinguisher conveniently located in the pilot compartment.

29. By adding a new § 25.858 to read as follows:

**§ 25.858 Cargo compartment fire detection systems.**

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

(a) The detection system must provide a visual indication to the flight crew within one minute after the start of a fire.

(b) The system must be capable of detecting a fire at a temperature significantly below that at which the structural integrity of the airplane is substantially decreased.

(c) There must be means to allow the crew to check in flight, the functioning of each fire detector circuit.

(d) The effectiveness of the detection system must be shown for all approved operating configurations and conditions.

30. By adding a new § 25.905(c) to read as follows:

**§ 25.905 Propellers.**

(c) Each component of the propeller blade pitch control system must meet the requirements of § 35.42 of this chapter.

31. By revising § 25.1305(d)(1) to read as follows:

**§ 25.1305 Powerplant instruments.**

(d) \* \* \*  
 (1) An indicator to indicate thrust, or a parameter that is directly related to thrust, to the pilot. The indication must be based on the direct measurement of thrust or of parameters that are directly related to thrust. The indicator must indicate a change in thrust resulting from any engine malfunction, damage, or deterioration.

32. By revising § 25.1307(h) to read as follows:

**§ 25.1307 Miscellaneous equipment.**

(h) Portable fire extinguishers as prescribed in §§ 25.851 (a)(5) and (a)(6).

33. By revising § 25.1529, including its heading, to read as follows:

**§ 25.1529 Instructions for continued airworthiness.**

The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix H to this part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first airplane or issuance of a standard certificate of airworthiness, whichever occurs later.

34. By adding a new Appendix G to Part 25 to read as follows:

**Appendix G—Continuous Gust Design Criteria**

The continuous gust design criteria in this appendix must be used in establishing the dynamic response of the airplane to vertical and lateral continuous turbulence unless a more rational criteria is used. The following gust load requirements apply to mission analysis and design envelope analysis:

(a) The limit gust loads utilizing the continuous turbulence concept must be determined in accordance with the provisions of either paragraph (b) or paragraphs (c) and (d) of this appendix.

(b) *Design envelope analysis.* The limit loads must be determined in accordance with the following:

(1) All critical altitudes, weights, and weight distributions, as specified in § 25.321(b), and all critical speeds within the ranges indicated in paragraph (b)(3) of this appendix must be considered.

(2) Values of  $\bar{A}$  (ratio of root-mean-square incremental load root-mean-square gust velocity) must be determined by dynamic analysis. The power spectral density of the atmospheric turbulence must be as given by the equation—

$$\phi(\Omega) = \frac{\sigma^2 L}{\pi} \frac{1 + \frac{8}{3} (1.339 L\Omega)^2}{[1 + (1.339 L\Omega)^2]^{3/2}}$$

where:

- $\phi$  = power-spectral density (ft./sec.)<sup>2</sup>/rad./ft.  
 $\sigma$  = root-mean-square gust velocity, ft./sec.  
 $\Omega$  = reduced frequency, radians per foot.  
 $L = 2,500$  ft.

(3) The limit loads must be obtained by multiplying the  $\bar{A}$  values determined by the dynamic analysis by the following values of the gust velocity  $U\sigma$ :

(i) At speed  $V_c$ :  $U\sigma = 85$  fps true gust velocity in the interval 0 to 30,000 ft. altitude and is linearly decreased to 30 fps true gust velocity at 80,000 ft. altitude. Where the Administrator finds that a design is comparable to a similar design with extensive satisfactory service experience, it will be acceptable to select  $U\sigma$  at  $V_c$  less than 85 fps, but not less than 75 fps, with linear decrease from that value at 20,000 feet to 30 fps at 80,000 feet. The following factors will be taken into account when assessing comparability to a similar design:

(1) The transfer function of the new design should exhibit no unusual characteristics as compared to the similar design which will significantly affect response to turbulence; e.g., coalescence of modal response in the frequency regime which can result in a significant increase of loads.

(2) The typical mission of the new airplane is substantially equivalent to that of the similar design.

(3) The similar design should demonstrate the adequacy of the  $U\sigma$  selected.

(ii) At speed  $V_B$ :  $U\sigma$  is equal to 1.32 times the values obtained under paragraph (b)(3)(i) of this appendix.

(iii) At speed  $V_D$ :  $U\sigma$  is equal to  $\frac{1}{2}$  the values obtained under paragraph (b)(3)(i) of this appendix.

(iv) At speeds between  $V_B$  and  $V_c$  and between  $V_c$  and  $V_D$ :  $U\sigma$  is equal to a value obtained by linear interpolation.

(4) When a stability augmentation system is included in the analysis, the effect of system nonlinearities on loads at the limit load level must be realistically or conservatively accounted for.

(c) *Mission analysis.* Limit loads must be determined in accordance with the following:

(1) The expected utilization of the airplane must be represented by one or more flight profiles in which the load distribution and the variation with time of speed, altitude, gross weight, and center of gravity position are defined. These profiles must be divided into mission segments or blocks, for analysis, and average or effective values of the pertinent parameters defined for each segment.

(2) For each of the mission segments defined under paragraph (c)(1) of this appendix, values of  $\bar{A}$  and  $N_0$  must be determined by analysis.  $\bar{A}$  is defined as the

ratio of root-mean-square incremental load to root-mean-square gust velocity and  $N_0$  is the radius of gyration of the load power spectral density function about zero frequency. The power spectral density of the atmospheric turbulence must be given by the equation set forth in paragraph (b)(2) of this appendix.

(3) For each of the load and stress quantities selected, the frequency of exceedance must be determined as a function of load level by means of the equation—

$$N_{(y)} = \sum t N_0 \left[ P_1 \exp \left( -\frac{|y - y_{one-g}|}{b_1 \bar{A}} \right) + P_2 \exp \left( -\frac{|y - y_{one-g}|}{b_2 \bar{A}} \right) \right]$$

where—

$t$  = selected time interval.

$y$  = net value of the load or stress.

$y_{one-g}$  = value of the load or stress in one-g level flight.

$N(y)$  = average number of exceedances of the indicated value of the load or stress in unit time.

$\Sigma$  = symbol denoting summation over all mission segments.

$N_0, \bar{A}$  = parameters determined by dynamic analysis as defined in paragraph (c)(2) of this appendix.

$P_1, P_2, b_1, b_2$  = parameters defining the probability distributions of root-mean-square gust velocity, to be read from Figures 1 and 2 of this appendix.

The limit gust loads must be read from the frequency of exceedance curves at a frequency of exceedance of  $2 \times 10^{-5}$  exceedances per hour. Both positive and negative load directions must be considered in determining the limit loads.

(4) If a stability augmentation system is utilized to reduce the gust loads, consideration must be given to the fraction of flight time that the system may be inoperative. The flight profiles of paragraph (c)(1) of this appendix must include flight with the system inoperative for this fraction of the flight time. When a stability augmentation system is included in the analysis, the effect of system nonlinearities on loads at the limit load level must be conservatively accounted for.

(d) *Supplementary design envelope analysis.* In addition to the limit loads defined by paragraph (c) of this appendix, limit loads must also be determined in accordance with paragraph (b) of this appendix, except that—

(1) In paragraph (b)(3)(i) of this appendix, the value of  $U\sigma = 85$  fps true gust velocity is replaced by  $U\sigma = 60$  fps true gust velocity on the interval 0 to 30,000 ft. altitude, and is linearly decreased to 25 fps true gust velocity at 80,000 ft. altitude; and

(2) In paragraph (b) of this appendix, the reference to paragraphs (b)(3)(i) through (b)(3)(iii) of this appendix is to be understood as referring to the paragraph as modified by paragraph (d)(1).

Part 25 App. G.

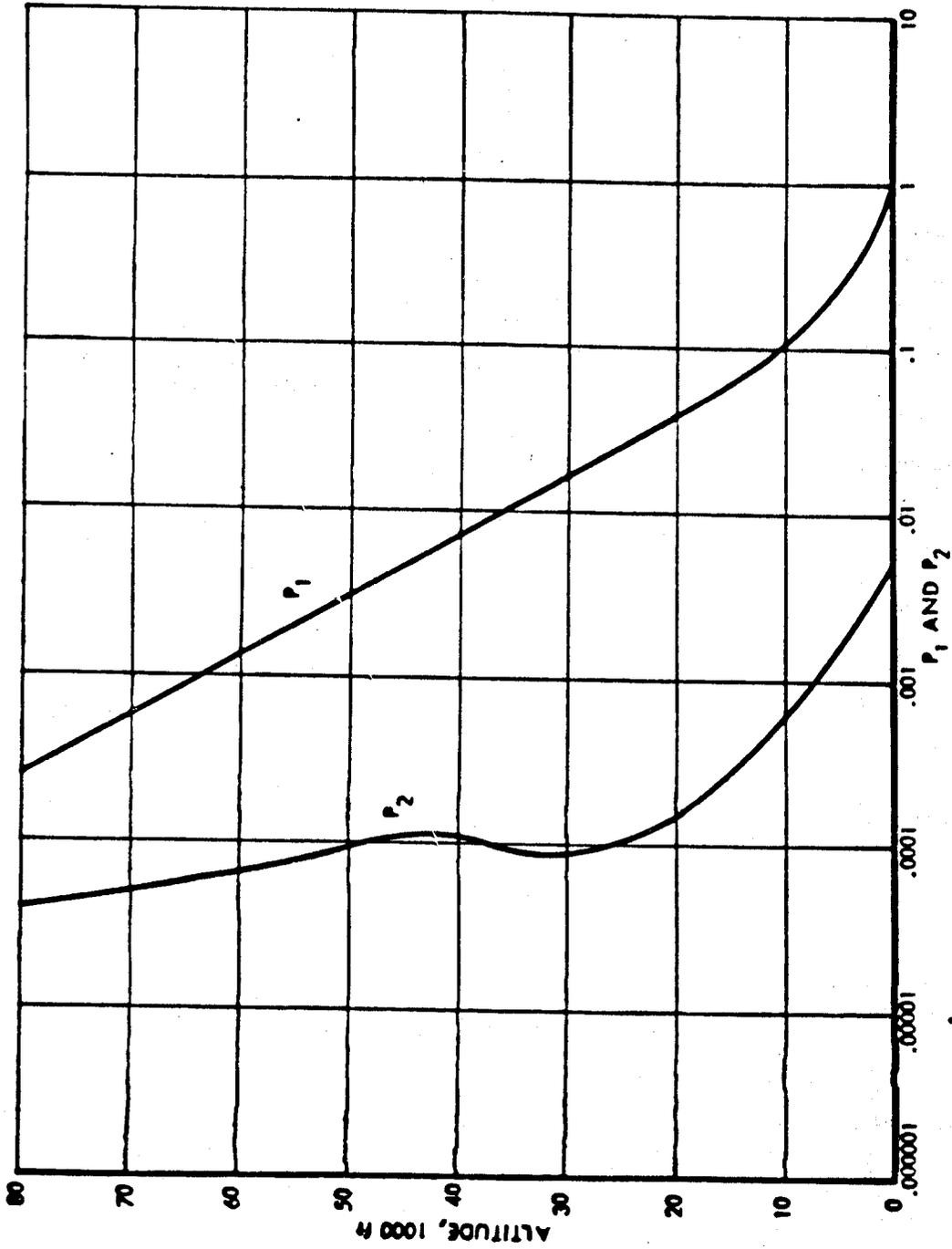


FIGURE 1 P<sub>1</sub> AND P<sub>2</sub> VALUES

Part 25 App. G.

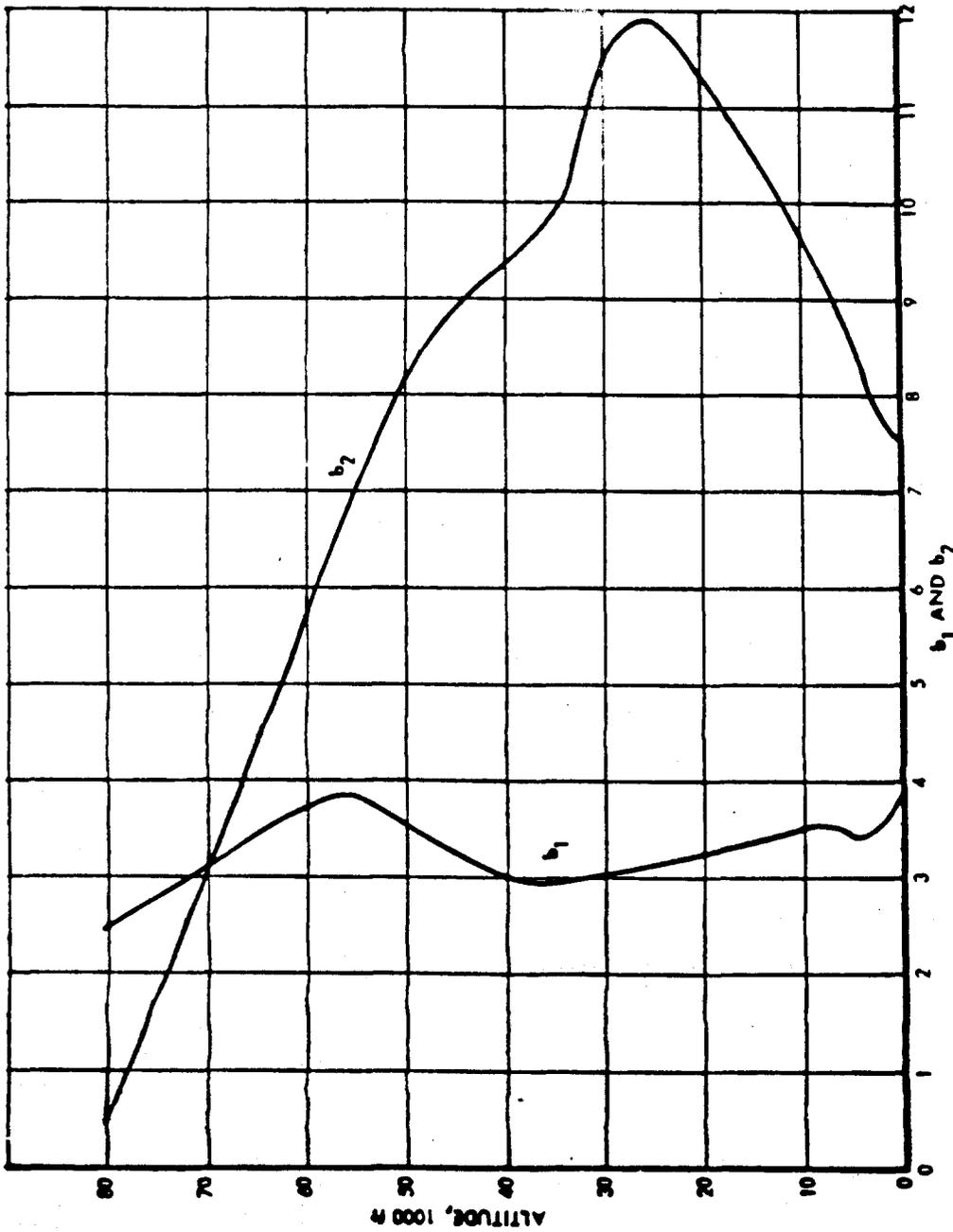


FIGURE 2  $b_1$  AND  $b_2$  VALUES

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35. By adding a new Appendix H to Part 25 to read as follows:

**Appendix H—Instructions for Continued Airworthiness**

**H25.1 General.**

(a) This appendix specifies requirements for the preparation of Instructions for Continued Airworthiness as required by § 25.1529.

(b) The Instructions for Continued Airworthiness for each airplane must include the Instructions for Continued Airworthiness for each engine and propeller (hereinafter designated "products"), for each appliance required by this chapter, and any required information relating to the interface of those appliances and products with the airplane. If Instructions for Continued Airworthiness are not supplied by the manufacturer of an appliance or product installed in the airplane, the Instructions for Continued Airworthiness for the airplane must include the information essential to the continued airworthiness of the airplane.

(c) The applicant must submit to the FAA a program to show how changes to the Instructions for Continued Airworthiness made by the applicant or by the manufacturers or products and appliances installed in the airplane will be distributed.

**H25.2 Format.**

(a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.

(b) The format of the manual or manuals must provide for a practical arrangement.

**H25.3 Content.**

The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:

(a) *Airplane maintenance manual or section.*

(1) Introduction information that includes an explanation of the airplane's features and data to the extent necessary for maintenance or preventive maintenance.

(2) A description of the airplane and its systems and installations including its engines, propellers, and appliances.

(3) Basic control and operation information describing how the airplane components and systems are controlled and how they operate, including any special procedures and limitations that apply.

(4) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and leveling information.

(b) *Maintenance Instructions.*

(1) Scheduling information for each part of the airplane and its engines, auxiliary power units, propellers, accessories, instruments, and equipment that provides the recommended periods at which they should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection, the

applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the airplane.

(2) Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.

(3) Information describing the order and method of removing and replacing products and parts with any necessary precautions to be taken.

(4) Other general procedural instructions including procedures for system testing during ground running, symmetry checks, weighing and determining the center of gravity, lifting and shoring, and storage limitations.

(c) Diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided.

(d) Details for the application of special inspection techniques including radiographic and ultrasonic testing where such processes are specified.

(e) Information needed to apply protective treatments to the structure after inspection.

(f) All data relative to structural fasteners such as identification, discard recommendations, and torque values.

(g) A list of special tools needed.

**H25.4 Airworthiness Limitations section.**

The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, structural inspection interval, and related structural inspection procedure approved under § 25.571. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual. This section must contain a legible statement in a prominent location that reads: "The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§ 43.16 and 91.163 of the Federal Aviation Regulations unless an alternative program has been FAA approved."

**PART 27—AIRWORTHINESS STANDARDS: NORMAL CATEGORY ROTORCRAFT**

**§ 27.571 [Amended]**

36. By deleting the reference to "§ 27.1529(a)(2)" in §§ 27.571 (b), (c), (d)(1), (d)(3), and (e) and replacing it with "§ A27.4 of Appendix A."

37. By revising § 27.1529, including its heading, to read as follows:

**§ 27.1529 Instructions for continued airworthiness.**

The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix A to this part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first rotorcraft or issuance of a standard certificate of airworthiness, whichever occurs later.

38. By adding a new Appendix A to Part 27 to read as follows:

**Appendix A—Instructions for Continued Airworthiness**

**A27.1 General.**

(a) This appendix specifies requirements for the preparation of Instructions for Continued Airworthiness as required by § 27.1529.

(b) The Instructions for Continued Airworthiness for each rotorcraft must include the Instructions for Continued Airworthiness for each engine and rotor (hereinafter designated "products"), for each appliance required by this chapter, and any required information relating to the interface of those appliances and products with the rotorcraft. If Instructions for Continued Airworthiness are not supplied by the manufacturer of an appliance or product installed in the rotorcraft, the Instructions for Continued Airworthiness for the rotorcraft must include the information essential to the continued airworthiness of the rotorcraft.

(c) The applicant must submit to the FAA a program to show how changes to the Instructions for Continued Airworthiness made by the applicant or by the manufacturers of products and appliances installed in the rotorcraft will be distributed.

**A27.2 Format.**

(a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.

(b) The format of the manual or manuals must provide for a practical arrangement.

**A27.3 Content.**

The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:

(a) *Rotorcraft maintenance manual or section.*

(1) Introduction information that includes an explanation of the rotorcraft's features and data to the extent necessary for maintenance or preventive maintenance.

(2) A description of the rotorcraft and its systems and installations including its engines, rotors, and appliances.

(3) Basic control and operation information describing how the rotorcraft components and systems are controlled and how they operate, including any special procedures and limitations that apply.

(4) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, the lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and leveling information.

(B) *Maintenance instructions.*

(1) Scheduling information for each part of the rotorcraft and its engines, auxiliary power units, rotors, accessories, instruments and equipment that provides the recommended periods at which they should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection, the applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the rotorcraft.

(2) Troubleshooting information describing problem malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.

(3) Information describing the order and method of removing and replacing products and parts with any necessary precautions to be taken.

(4) Other general procedural instructions including procedures for system testing during ground running, symmetry checks, weighing and determining the center of gravity, lifting and shoring, and storage limitations.

(c) Diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided.

(d) Details for the application of special inspection techniques including radiographic and ultrasonic testing where such processes are specified.

(e) Information needed to apply protective treatments to the structure after inspection.

(f) All data relative to structural fasteners such as identification, discarded recommendations, and torque values.

(g) A list of special tools needed.

**A27.4 Airworthiness Limitations section.**

The Instructions for Continued Airworthiness must contain a section, titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, structural inspection interval, and related structural inspection procedure approved under § 27.571. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual. This section must contain a legible statement in a

prominent location that reads: "The Airworthiness Limitations section is FAA approved and specifies inspections and other maintenance required under §§ 43.16 and 91.163 of the Federal Aviation Regulations unless an alternative program has been FAA approved."

**PART 29—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY ROTORCRAFT**

**§ 29.571 [Amended]**

39. By deleting the reference to "§ 29.1529(a) (2)" in §§ 29.571 (b), (c), (d) (1), (d) (3), and (e) and replacing it with "§ A29.4 of Appendix A".

40. By adding a new § 29.783(g) to read as follows:

**§ 29.783 Doors.**

\* \* \* \* \*

(g) If an integral stair is installed in a passenger entry door that is qualified as a passenger emergency exit, the stair must be designed so that under the following conditions the effectiveness of passenger emergency egress will not be impaired:

(1) The door, integral stair, and operating mechanism have been subjected to the inertia forces specified in § 29.561(b)(3), acting separately relative to the surrounding structure.

(2) The rotorcraft is in the normal ground attitude and in each of the attitudes corresponding to collapse of one or more legs, or primary members, as applicable, of the landing gear.

41. By revising § 29.1529, including its heading, to read as follows:

**§ 29.1529 Instructions for continued airworthiness.**

The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix A to this part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first rotorcraft or issuance of a standard certificate of airworthiness, whichever occurs later.

42. By adding a new Appendix A to Part 29 to read as follows:

**Appendix A—Instructions for Continued Airworthiness**

**A29.1 General.**

(a) This appendix specifies requirements for the preparation of Instructions for Continued Airworthiness as required by § 29.1529.

(b) The Instructions for Continued Airworthiness for each rotorcraft must include the Instructions for Continued Airworthiness for each engine and rotor (hereinafter designated "products"), for each appliance required by this chapter, and any required information relating to the interface

of those appliances and products with the rotorcraft. If Instructions for Continued Airworthiness are not supplied by the manufacturer of an appliance or product installed in the rotorcraft, the Instructions for Continued Airworthiness for the rotorcraft must include the information essential to the continued airworthiness of the rotorcraft.

(c) The applicant must submit to the FAA a program to show how changes to the Instructions for Continued Airworthiness made by the applicant or by the manufacturers of products and appliances installed in the rotorcraft will be distributed.

**A29.2 Format.**

(a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.

(b) The format of the manual or manuals must provide for a practical arrangement.

**A29.3 Content.**

The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:

(a) *Rotorcraft maintenance manual or section.* (1) Introduction information that includes an explanation of the rotorcraft's features and data to the extent necessary for maintenance or preventive maintenance.

(2) A description of the rotorcraft and its systems and installations including its engines, rotors, and appliances.

(3) Basic control and operation information describing how the rotorcraft components and systems are controlled and how they operate, including any special procedures and limitations that apply.

(4) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, the lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and leveling information.

(b) *Maintenance Instructions.* (1) Scheduling information for each part of the rotorcraft and its engines, auxiliary power units, rotors, accessories, instruments, and equipment that provides the recommended periods at which they should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection, the applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the rotorcraft.

(2) Troubleshooting information describing probable malfunctions, how to recognize

those malfunctions, and the remedial action for those malfunctions.

(3) Information describing the order and method of removing and replacing products and parts with any necessary precautions to be taken.

(4) Other general procedural instructions including procedures for system testing during ground running, symmetry checks, weighing and determining the center of gravity, lifting and shoring, and storage limitations.

(c) Diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided.

(d) Details for the application of special inspection techniques including radiographic and ultrasonic testing where such processes are specified.

(e) Information needed to apply protective treatments to the structure after inspection.

(f) All data relative to structural fasteners such as identification, discard recommendations, and torque values.

(g) A list of special tools needed.

**A29.4 Airworthiness Limitations Section.**

The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, structural inspection interval, and related structural inspection procedure approved under § 29.571. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual. This section must contain a legible statement in a prominent location that reads: "The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§ 43.18 and 91.163 of the Federal Aviation Regulations unless an alternative program has been FAA approved."

**PART 31—AIRWORTHINESS STANDARDS: MANNED FREE BALLOONS**

43. By adding a new § 31.12 to read as follows:

**§ 31.12 Proof of compliance.**

(a) Each requirement of this subpart must be met at each weight within the range of loading conditions for which certification is requested. This must be shown by—

(1) Tests upon a balloon of the type for which certification is requested or by calculations based on, and equal in accuracy to, the results of testing; and

(2) Systematic investigation of each weight if compliance cannot be reasonably inferred from the weights investigated.

(b) Except as provided in § 31.17(b), allowable weight tolerances during flight testing are +5 percent and -10 percent.

44. By adding a new § 31.16 to read as follows:

**§ 31.16 Empty weight.**

The empty weight must be determined by weighing the balloon with installed equipment but without lifting gas or heater fuel.

45. By adding a new § 31.17 to read as follows:

**§ 31.17 Performance: Climb.**

(a) Each balloon must be capable of climbing at least 300 feet in the first minute after takeoff with a steady rate of climb. Compliance with the requirements of this section must be shown at each altitude and ambient temperature for which approval is sought.

(b) Compliance with the requirements of paragraph (a) of this section must be shown at the maximum weight with a weight tolerance of +5 percent.

46. By adding a new § 31.19 to read as follows:

**§ 31.19 Performance: Uncontrolled descent.**

(a) The following must be determined for the most critical uncontrolled descent that can result from any single failure of the heater assembly, fuel cell system, gas valve system, or maneuvering vent system, or from any single tear in the balloon envelope between tear stoppers:

(1) The maximum vertical velocity attained.

(2) The altitude loss from the point of failure to the point at which maximum vertical velocity is attained.

(3) The altitude required to achieve level flight after corrective action is initiated, with the balloon descending at the maximum vertical velocity determined in paragraph (a)(1) of this section.

(b) Procedures must be established for landing at the maximum vertical velocity determined in paragraph (a)(1) of this section and for arresting that descent rate in accordance with paragraph (a)(3) of this section.

**§ 31.27 [Amended]**

47. By amending § 31.27(c) by deleting the second sentence, by deleting the word "concrete" in the third sentence, and by deleting the last sentence and inserting the following in place thereof: "A drop test height of 36 inches, or a drop test height that produces, upon impact, a velocity equal to the maximum vertical velocity determined in accordance with § 31.19, whichever is higher, must be used."

48. By revising §§ 31.65(a), (b), and (c) and adding a new § 31.65(e) to read as follows:

**§ 31.65 Position lights.**

(a) If position lights are installed, there must be one steady aviation white position light and one flashing aviation red (or flashing aviation white) position light with an effective flash frequency of at least 40, but not more than 100, cycles per minute.

(b) Each light must provide 360° horizontal coverage at the intensities prescribed in this paragraph. The following light intensities must be determined with the light source operating at a steady state and with all light covers and color filters in place and at the manufacturer's rated minimum voltage. For the flashing aviation red light, the measured values must be adjusted to correspond to a red filter temperature of at least 130° F:

(1) The intensities in the horizontal plane passing through the light unit must equal or exceed the following values:

Position light	Minimum intensity (candles)
Steady white .....	20
Flashing red or white .....	40

(2) The intensities in vertical planes must equal or exceed the following values. An intensity of one unit corresponds to the applicable horizontal plane intensity specified in paragraph (b)(1) of this section.

Angles above and below the horizontal in any vertical plane (degrees)	Minimum intensity (units)
0 .....	1.00
0 to 5 .....	0.90
5 to 10 .....	0.80
10 to 15 .....	0.70
15 to 20 .....	0.50
20 to 30 .....	0.30
30 to 40 .....	0.10
40 to 60 .....	0.05

(c) The steady white light must be located not more than 20 feet below the basket, trapeze, or other means for carrying occupants. The flashing red or white light must be located not less than 7, nor more than 10, feet below the steady white light.

(e) Each position light color must have the applicable International Commission on Illumination chromaticity coordinates as follows:

(1) *Aviation red*—

"y" is not greater than 0.335; and "z" is not greater than 0.002.

(2) *Aviation white*—

"x" is not less than 0.300 and not greater than 0.540;

"y" is not less than "x" - 0.040" or "y<sub>0</sub> - 0.010", whichever is the smaller; and

"y" is not greater than "x + 0.020" nor "0.636 - 0.0400 x";

Where "y<sub>0</sub>" is the "y" coordinate of the Planckian radiator for the value of "x" considered.

49. By revising § 31.71 to read as follows:

**§ 31.71 Function and installation.**

(a) Each item of installed equipment must—

(1) Be of a kind and design appropriate to its intended function;

(2) Be permanently and legibly marked or, if the item is too small to mark, tagged as to its identification, function, or operating limitations, or any applicable combination of those factors;

(3) Be installed according to limitations specified for that equipment; and

(4) Function properly when installed.

(b) No item of installed equipment, when performing its function, may affect the function of any other equipment so as to create an unsafe condition.

(c) The equipment, systems, and installations must be designed to prevent hazards to the balloon in the event of a probable malfunction or failure.

50. By revising § 31.81 to read as follows:

**§ 31.81 General.**

(a) The following information must be established:

(1) Each operating limitation, including the maximum weight determined under § 31.14.

(2) The normal and emergency procedures.

(3) Other information necessary for safe operation, including—

(i) The empty weight determined under § 31.16;

(ii) The rate of climb determined under § 31.17, and the procedures and conditions used to determine performance;

(iii) The maximum vertical velocity, the altitude drop required to attain that velocity, and altitude drop required to recover from a descent at that velocity, determined under § 31.19, and the procedures and conditions used to determine performance; and

(iv) Pertinent information peculiar to the balloon's operating characteristics.

(b) The information established in compliance with paragraph (a) of this section must be furnished by means of—

(1) A Balloon Flight Manual; or

(2) A placard on the balloon that is clearly visible to the pilot.

51. By adding a new § 31.82 to read as follows:

**§ 31.82 Instructions for Continued Airworthiness.**

The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix A to this part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first balloon or issuance of a standard certificate of airworthiness, whichever occurs later.

52. By revising § 31.85(b)(1) to read as follows:

**§ 31.85 Required basic equipment.**

\* \* \* \* \*

(b) \* \* \*

(1) A fuel quantity gauge. If fuel cells are used, means must be incorporated to indicate to the crew the quantity of fuel in each cell during flight. The means must be calibrated in appropriate units or in percent of fuel cell capacity.

\* \* \* \* \*

53. By adding a new Appendix A to Part 31 to read as follows:

**Appendix A—Instructions for Continued Airworthiness**

**A31.1 General.**

(a) This appendix specifies requirements for the preparation of Instructions for Continued Airworthiness as required by § 31.82.

(b) The Instructions for Continued Airworthiness for each balloon must include the Instructions for Continued Airworthiness for all balloon parts required by this chapter and any required information relating to the interface of those parts with the balloon. If Instructions for Continued Airworthiness are not supplied by the part manufacturer for a balloon part, the Instructions for Continued Airworthiness for the balloon must include the information essential to the continued airworthiness of the balloon.

(c) The applicant must submit to the FAA a program to show how changes to the Instructions for Continued Airworthiness made by the applicant or by the manufacturers of balloon parts will be distributed.

**A31.2 Format.**

(a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.

(b) The format of the manual or manuals must provide for a practical arrangement.

**A31.3 Content.**

The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following information:

(a) Introduction information that includes an explanation of the balloon's features and data to the extent necessary for maintenance or preventive maintenance.

(b) A description of the balloon and its systems and installations.

(c) Basic control and operation information for the balloon and its components and systems.

(d) Servicing information that covers details regarding servicing of balloon components, including burner nozzles, fuel tanks, and valves during operations.

(e) Maintenance information for each part of the balloon and its envelope, controls, rigging, basket structure, fuel systems, instruments, and heater assembly that provides the recommended periods at which they should be cleaned, adjusted, tested, and lubricated, the applicable wear tolerances, and the degree of work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the balloon.

(f) Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.

(g) Details of what, and how, to inspect after a hard landing.

(h) Instructions for storage preparation including any storage limits.

(i) Instructions for repair on the balloon envelope and its basket or trapeze.

**A31.4 Airworthiness Limitations Section.**

The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, structural inspection interval, and related structural inspection procedure, including envelope structural integrity, required for type certification. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual. This section must contain a legible statement in a prominent location that reads: "The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§ 43.16 and 91.163 of the Federal Aviation Regulations."

**PART 33—AIRWORTHINESS STANDARDS: AIRCRAFT ENGINES**

54. By adding a new § 33.4 to read as follows:

**§33.4 Instructions for Continued Airworthiness.**

The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix A to this part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first aircraft with the engine installed, or upon issuance of a standard certificate of airworthiness for the aircraft with the engine installed, whichever occurs later.

55. By deleting §§ 33.5 (c), (d), and (e) and revising the lead in and heading of § 33.5 to read as follows:

**§ 33.5 Instruction manual for installing and operating the engine.**

Each applicant must prepare and make available to the Administrator prior to the issuance of the type certificate, and to the owner at the time of delivery of the engine, approved instructions for installing and operating the engine. The instructions must include at least the following:

\* \* \* \* \*

56. By redesignating § 33.19 as § 33.19(a) and adding a new § 33.19(b) to read as follows:

**§ 33.19 Durability.**

\* \* \* \* \*

(b) Each component of the propeller blade pitch control system which is a part of the engine type design must meet the requirements of § 35.42 of this chapter.

**§ 33.55 [Amended]**

57. By deleting the reference to "§ 33.5(e)" in § 33.55(c) and replacing it with "§ 33.4".

**§ 33.57 [Amended]**

58. By deleting the reference to "§ 33.5" in § 33.57(b) and replacing it with "§ 33.4".

**§ 33.93 [Amended]**

59. By deleting the reference to "§ 33.5" in § 33.93(b) and replacing it with "§ 33.4".

**§ 33.99 [Amended]**

60. By deleting the reference to "§ 33.5" in § 33.99(b) and replacing it with "§ 33.4".

61. By adding a new Appendix A to Part 33 to read as follows:

**Appendix A—Instructions for Continued Airworthiness****A33.1 General.**

(a) This appendix specifies requirements for the preparation of Instructions for Continued Airworthiness as required by § 33.4.

(b) The Instructions for Continued Airworthiness for each engine must include the Instructions for Continued Airworthiness for all engine parts. If Instructions for Continued Airworthiness are not supplied by the engine part manufacturer for an engine part, the Instructions for Continued Airworthiness for the engine must include the information essential to the continued airworthiness of the engine.

(c) The applicant must submit to the FAA a program to show how changes to the Instructions for Continued Airworthiness made by the applicant or by the manufacturers of engine parts will be distributed.

**A33.2 Format.**

(a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.

(b) The format of the manual or manuals must provide for a practical arrangement.

**A33.3 Content.**

The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:

(a) *Engine Maintenance Manual or Section.*  
(1) Introduction information that includes an explanation of the engine's features and data to the extent necessary for maintenance or preventive maintenance.

(2) A detailed description of the engine and its components, systems, and installations.

(3) Installation instructions, including proper procedures for uncrating, deinhbiting, acceptance checking, lifting, and attaching accessories, with any necessary checks.

(4) Basic control and operating information describing how the engine components, systems, and installations operate, and information describing the methods of starting, running, testing, and stopping the engine and its parts including any special procedures and limitations that apply.

(5) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, locations of lubrication points, lubricants to be used, and equipment required for servicing.

(6) Scheduling information for each part of the engine that provides the recommended periods at which it should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection the applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the engine.

(7) Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.

(8) Information describing the order and method of removing the engine and its parts and replacing parts, with any necessary precautions to be taken. Instructions for proper ground handling, crating, and shipping must also be included.

(9) A list of the tools and equipment necessary for maintenance and directions as to their method of use.

(b) *Engine Overhaul Manual or Section.* (1) Disassembly information including the order and method of disassembly for overhaul.

(2) Cleaning and inspection instructions that cover the materials and apparatus to be used and methods and precautions to be taken during overhaul. Methods of overhaul inspection must also be included.

(3) Details of all fits and clearances relevant to overhaul.

(4) Details of repair methods for worn or otherwise substandard parts and components along with the information necessary to determine when replacement is necessary.

(5) The order and method of assembly at overhaul.

(6) Instructions for testing after overhaul.

(7) Instructions for storage preparation, including any storage limits.

(8) A list of tools needed for overhaul.

**A33.4 Airworthiness Limitations Section.**

The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, inspection interval, and related procedure required for type certification. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual. This section must contain a legible statement in a prominent location that reads: "The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§ 43.16 and 91.163 of the Federal Aviation Regulations unless an alternative program has been FAA approved."

**PART 35—AIRWORTHINESS STANDARDS: PROPELLERS**

62. By revising § 35.3, including its heading, to read as follows:

**§ 35.3 Instruction manual for installing and operating the propeller.**

Each applicant must prepare and make available an approved manual or manuals containing instructions for installing and operating the propeller.

63. By adding a new § 35.4 to read as follows:

**§ 35.4 Instructions for continued airworthiness.**

The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix A to this part that are

acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first aircraft with the propeller installed, or upon issuance of a standard certificate of airworthiness for an aircraft with the propeller installed, whichever occurs later.

64. By revising § 35.5 to read as follows:

**§ 35.5 Propeller operating limitations.**

Propeller operating limitations are established by the Administrator, are included in the propeller type certificate data sheet specified in § 21.41 of this chapter, and include limitations based on the operating conditions demonstrated during the tests required by this part and any other information found necessary for the safe operation of the propeller.

65. By revising the heading of § 35.23 and adding a new § 35.23(c) to read as follows:

**§ 35.23 Pitch control and indication.**

(c) Each propeller approved for installation on a turbopropeller engine must incorporate a provision for an indicator to indicate when the propeller blade angle is below the flight low pitch position. The provision must directly sense the blade position and be arranged to cause an indicator to indicate that the blade angle is below the flight low pitch position before the blade moves more than 8° below the flight low pitch stop.

66. By revising § 35.37, including its heading, to read as follows:

**§ 35.37 Fatigue limit tests.**

A fatigue evaluation must be made and the fatigue limits determined for each metallic hub and blade, and each primary load carrying metal component of nonmetallic blades. The fatigue evaluation must include consideration of all reasonably foreseeable vibration load patterns. The fatigue limits must account for the permissible service deterioration (such as nicks, grooves, galling, bearing wear, and variations in material properties).

67. By adding a new § 35.42 to read as follows:

**§ 35.42 Blade pitch control system component test.**

The following durability requirements apply to propeller blade pitch control system components:

(a) Except as provided in paragraph (b) of this section, each propeller blade pitch control system component, including governors, pitch change

assemblies, pitch locks, mechanical stops, and feathering system components, must be subjected in tests to cyclic loadings that simulate the frequency and amplitude those to which the component would be subjected during 1,000 hours of propeller operation.

(b) Compliance with paragraph (a) of this section may be shown by a rational analysis based on the results of tests on similar components.

68. By adding a new Appendix A to Part 35 to read as follows:

**Appendix A—Instructions for Continued Airworthiness**

**A35.1 General.**

(a) This appendix specifies requirements for the preparation of Instructions for Continued Airworthiness as required by § 35.4.

(b) The Instructions for Continued Airworthiness for each propeller must include the Instructions for Continued Airworthiness for all propeller parts. If Instructions for Continued Airworthiness are not supplied by the propeller part manufacturer for a propeller part, the Instructions for Continued Airworthiness for the propeller must include the information essential to the continued airworthiness of the propeller.

(c) The applicant must submit to the FAA a program to show how changes to the Instructions for Continued Airworthiness made by the applicant or by the manufacturers of propeller parts will be distributed.

**A35.2 Format.**

(a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals/as appropriate for the quantity of data to be provided.

(b) The format of the manual or manuals must provide for a practical arrangement.

**A35.3 Content.**

The contents of the manual must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following sections and information:

(a) *Propeller Maintenance Section.* (1) Introduction information that includes an explanation of the propeller's features and data to the extent necessary for maintenance or preventive maintenance.

(2) A detailed description of the propeller and its systems and installations.

(3) Basic control and operation information describing how the propeller components and systems are controlled and how they operate, including any special procedures that apply.

(4) Instructions for uncrating, acceptance checking, lifting, and installing the propeller.

(5) Instructions for propeller operational checks.

(6) Scheduling information for each part of the propeller that provides the recommended periods at which it should be cleaned, adjusted, and tested, the applicable wear tolerances, and the degree of work recommended at these periods. However, the

applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if it shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross-references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the propeller.

(7) Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.

(8) Information describing the order and method of removing and replacing propeller parts with any necessary precautions to be taken.

(9) A list of the special tools needed for maintenance other than for overhauls.

(b) *Propeller Overhaul Section.* (1) Disassembly information including the order and method of disassembly for overhaul.

(2) Cleaning and inspection instructions that cover the materials and apparatus to be used and methods and precautions to be taken during overhaul. Methods of overhaul inspection must also be included.

(3) Details of all fits and clearances relevant to overhaul.

(4) Details of repair methods for worn or otherwise substandard parts and components along with information necessary to determine when replacement is necessary.

(5) The order and method of assembly at overhaul.

(6) Instructions for testing after overhaul.

(7) Instructions for storage preparation including any storage limits.

(8) A list of tools needed for overhaul.

**A35.4 Airworthiness Limitations Section.**

The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, inspection interval, and related procedure required for type certification. This section must contain a legible statement in a prominent location that reads: "The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§ 43.16 and 91.163 of the Federal Aviation Regulations unless an alternative program has been FAA approved."

**PART 43—MAINTENANCE, PREVENTIVE MAINTENANCE, REBUILDING, AND ALTERATION**

69. By revising the first sentence of § 43.13(a) to read as follows:

**§ 43.13 Performance rules (general).**

(a) Each person performing maintenance, alteration, or preventive maintenance on an aircraft, engine, propeller, or appliance shall use the methods, techniques, and practices

prescribed in the current manufacturer's maintenance manual or Instructions for Continued Airworthiness prepared by its manufacturer, or other methods, techniques, and practices acceptable to the Administrator, except as noted in § 43.16. \* \* \*

70. By revising § 43.16, including its heading, to read as follows:

**§ 43.16 Airworthiness limitations.**

Each person performing an inspection or other maintenance specified in an Airworthiness Limitations section of a manufacturer's maintenance manual or Instructions for Continued Airworthiness shall perform the inspection or other maintenance in accordance with that section, or in accordance with operations specifications approved by the Administrator under Parts 121, 123, 127, or 135, or an inspection program approved under § 91.217(e).

**PART 45—IDENTIFICATION AND REGISTRATION MARKING**

71. By revising § 45.11(a) and adding a new § 45.11(c) to read as follows:

**§ 45.11 General.**

(a) *Aircraft and aircraft engines.*  
Aircraft covered under § 21.182 of this chapter must be identified, and each person who manufactures an aircraft engine under a type or production certificate shall identify that engine by means of a fireproof plate that has the information specified in § 43.13 marked on it by etching, stamping, engraving, or other approved method of fireproof marking. The identification plate for aircraft must be secured in such a manner that it will not likely be defaced or removed during normal service, or lost or destroyed in an accident. Except as provided in paragraph (c) of this section, the aircraft identification plate must be secured to the aircraft at an accessible location near an entrance, except that if it is legible to a person on the ground it may be located externally on the fuselage near the tail surfaces. For aircraft engines, the identification plate must be affixed to the engine at an accessible location, in such a manner that it will not likely be defaced or removed during normal service, or lost or destroyed in an accident.

(c) For manned free balloons, the identification plate prescribed in paragraph (a) of this section must be secured to the balloon envelope and must be located, if practicable, where it is legible to the operator when the balloon is inflated. In addition, the

basket and heater assembly must be permanently and legibly marked with the manufacturer's name, part number (or equivalent) and serial number (or equivalent).

**§ 45.13 [Amended]**

72. By deleting the reference to "§ 45.11" in § 45.13(a) and inserting "§§ 45.11 (a) and (b)".

73. By revising § 45.14 to read as follows:

**§ 45.14 Identification of critical components.**

Each person who produces a part for which a replacement time, inspection interval, or related procedure is specified in the Airworthiness Limitations section of a Manufacturer's Maintenance Manual or Instructions for Continued Airworthiness shall mark that component with a part number (or equivalent) and serial number (or equivalent).

**PART 91—GENERAL OPERATING AND FLIGHT RULES**

74. By revising § 91.163(c) to read as follows:

**§ 91.163 General.**

(c) No person may operate an aircraft for which a manufacturer's maintenance manual or Instructions for Continued Airworthiness has been issued that contains an Airworthiness Limitations section unless the mandatory replacement times, inspection intervals, and related procedures specified in that section or alternative inspection intervals and related procedures set forth in an operations specification approved by the Administrator under Parts 121, 123, 127, or 135, or in accordance with an inspection program approved under § 91.217(e), have been complied with.

**§ 91.165 [Amended]**

75. By revising the last sentence of § 91.165 to read, "In addition, each owner or operator shall ensure that maintenance personnel make appropriate entries in the maintenance records indicating that the aircraft has been approved for return to service."

76. By revising § 91.173(a)(2)(i) to read as follows:

**§ 91.173 Maintenance records.**

(a) \* \* \*

(2) \* \* \*

(i) The total time in service of the airframe, each engine and each propeller.

77. By adding a new § 91.193(c)(4) to read as follows:

**§ 91.193 Emergency equipment.**

(c) \* \* \*

(4) Hand fire extinguishers must be installed and secured in such a manner that they will not interfere with the safe operation of the airplane or adversely affect the safety of the crew and passengers. They must be readily accessible, and unless the locations of the fire extinguishers are obvious, their stowage provisions must be properly identified.

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

*Note.*—The FAA has determined that this document involves a regulation which is not significant under Executive Order 12044, as implemented by Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A copy of the final evaluation prepared for this document is contained in the docket. A copy of it may be obtained by writing to the individual and address listed in the "For Further Information Contact" paragraph.

Issued in Washington, D.C., on August 27, 1980.

**Langhorne Bond,**  
*Administrator.*

[FR Doc. 80-27029 Filed 9-10-80; 8:45 am]

**BILLING CODE 4910-13-M**

**DEPARTMENT OF TRANSPORTATION****Federal Aviation Administration****14 CFR Parts 11, 21 and 45**

[Docket Nos. 14779 and 14324; Amdt. Nos. 11-28A; 21-51A; and 45-12A]

**Airworthiness Review Program; Amdt. No. 8A: Aircraft, Engine, and Propeller Airworthiness, and Procedural Amendments; Correction**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule; correction.

**SUMMARY:** These amendments correct certain minor omissions and typographical errors noted in Airworthiness Review Program No. 8A, Amendment Nos. 11-20, 21-51, and 45-12. These amendments are necessary to express correctly the FAA's intended statement of the rules, and to publish the correct effective date for new § 21.50(b).

**EFFECTIVE DATE:** December 29, 1980.

**FOR FURTHER INFORMATION CONTACT:** Marvin J. Walker, Regulatory Review Branch, AVS-22, Safety Regulations Staff, Associate Administrator for Aviation Standards, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591, Telephone: (202) 755-8714.

**SUPPLEMENTARY INFORMATION:** On September 11, 1980, Amendment Nos. 11-20 (45 FR 60170), 21-51 (45 FR 60170), and 45-12 (45 FR 60183) were published in the Federal Register. A review of those amendments shows that there were minor typographical errors and omissions, and that immediate amendments are needed to correct the amendments. The reasons for each of the amendments are explained below:

1. *Section 11.49.* There were two omissions and one typographical error in this section. Section "11.49(b)(4)" should be "11.49(b)(3)", and the words "is delegated" should be inserted after the word "chapter" in § 11.49(b)(3) to be internally consistent with § 11.49(b). The period at the end of § 11.49(b)(2) is replaced by a semicolon and the word "and".

2. *Section 21.50.* In § 21.50(b) the date "October 14, 1981" was a typographical error. Consistent with Notice 75-31 (40 FR 29412) the date should have been October 14, 1980 (the effective date of amendment 21-51). In order to give the notice required by the Administrative Procedure Act, the date has been amended to "January 28, 1981." (30 days after effective date of this amendment.)

3. *Section 45.11.* In § 45.11(a) the reference to § 43.13 was a typographical error. The reference to § 43.13 should be § 45.13.

Since these amendments are clarifying and editorial in nature and implement changes required to carry out the intent of amendments to Parts 11, 21, and 45, and impose no additional burden on any person, I find that notice and public procedure are unnecessary and that good cause exists for making them effective in less than 30 days.

**The Amendments**

Accordingly, Parts 11, 21, and 45 of the Federal Aviation Regulations are amended, effective December 29, 1980, as follows:

**PART 11—GENERAL RULE-MAKING PROCEDURES****§ 11.49 [Amended]**

1. By deleting the period at the end of § 11.49(b)(2) and inserting "; and" in place thereof. By redesignating § 11.49(b)(4) as § 11.49(b)(3) and inserting the words "is delegated" after the word "chapter" in § 11.49(b)(3).

**PART 21—CERTIFICATION PROCEDURES FOR PRODUCTS AND PARTS****§ 21.50 [Amended]**

2. By deleting the date "October 14, 1981" in § 21.50(b) and inserting the date "January 28, 1981" in place thereof.

**PART 45—IDENTIFICATION AND REGISTRATION MARKING****§ 45.11 [Amended]**

3. By deleting the reference "§ 43.13" in § 45.11(a) and inserting "§ 45.13." in place thereof.

(Sec. 313(a), 601, 603, and 604, Federal Aviation Act of 1958 (49 U.S.C. 1354(a)), 1421, 1423, and 1424; sec. 8(c), Department of Transportation Act (49 U.S.C. 1655(c)))

**Note.**—The FAA has determined that this document involves a regulation which is not significant under Executive Order 12044, as implemented by DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). Since this regulatory action involves amendments that are corrective and editorial in nature, and does not modify the substance of the regulation contemplated under the final rule, the anticipated impact is so minimal that it does not warrant preparation of a regulatory evaluation.

Issued in Washington, D.C., on December 19, 1980.

Langhorne Bond,  
Administrator.

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*AIR Review*