

See 2 corrections

**Title 14—Aeronautics and Space
CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION**

[Docket No. 13243; Amdts. ~~31-42~~; 36-4]

PART 21—CERTIFICATION PROCEDURES FOR PRODUCTS AND PARTS

PART 36—NOISE STANDARDS: AIRCRAFT TYPE AND AIRWORTHINESS CERTIFICATION

Noise Standards for Propeller Driven Small Airplanes

The purpose of these amendments is to prescribe noise standards for the issue of normal, utility, acrobatic, transport, and restricted category type certificates for propeller driven small airplanes; to prescribe noise standards for the issue of standard airworthiness certificates and restricted category airworthiness certificates for newly produced propeller driven small airplanes of older type designs; and to prohibit "acoustical changes," in the type design of those airplanes, that increase their noise levels beyond specified limits.

The primary basis for these amendments is section 611 of the Federal Aviation Act of 1958 (49 U.S.C. 1431), as

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amended by the Noise Control Act of 1972 (Pub. L. 92-574).

These amendments are based on Notice 73-26, published in the *FEDERAL REGISTER* on October 10, 1973 (38 FR 23016). Interested persons have been afforded an opportunity to comment on the matters contained herein, and all relevant comments have been considered in the issuance of these amendments.

Pursuant to 49 U.S.C. 1431(b) (1), the Federal Aviation Administration has consulted with the Secretary of Transportation, concerning all matters contained herein, prior to the adoption of this amendment. Pursuant to that paragraph and § 1500.9(b) of the guidelines of the Council on Environmental Quality concerning statements on proposed Federal actions affecting the environment, published in the *FEDERAL REGISTER* on August 1, 1973 (38 FR 20550), the Federal Aviation Administration has consulted with the Environmental Protection Agency (EPA) and has submitted this amendment to that agency for review and comment.

A. Background: Relation to Proposed Regulations Submitted to FAA by EPA. During the period of FAA consultation with EPA on this amendment, EPA transmitted to the FAA (on December 6, 1974), its proposed regulation concerning the noise of propeller driven small airplanes, pursuant to section 611(c) (1) of the Federal Aviation Act of 1958, as amended by the Noise Control Act of 1972 (Pub. L. 92-574). Section 611(c) (1) of the Federal Aviation Act of 1958 provides that EPA shall submit to the FAA proposed regulations to provide such control and abatement of aircraft noise and sonic boom as EPA determines is necessary to protect the public health and welfare. That section also provides that the FAA "shall consider such proposed regulations submitted by EPA under this paragraph and shall, within thirty days of its submission to the FAA, publish the proposed regulations in a Notice of Proposed Rule Making." Pursuant to that provision of law, a notice of proposed rule making, entitled "Proposed Regulations submitted to the FAA by the Environmental Protection Agency: Noise Standards for Propeller Driven Small Airplanes" is being issued by the FAA simultaneously with this amendment. A detailed project report, dated November 25, 1974, was also transmitted to the FAA by EPA to support its proposed regulations. Since receiving the EPA proposed regulation and supporting project report (and in view of the fact that this amendment, representing a year of FAA analysis and review of public comments in response to Notice 73-26, was ready for issuance when the EPA proposal was received), the FAA has conducted a comparative study of the EPA proposal (and its supporting project report), and the provisions of this amendment. This study was conducted to determine whether issuance of this amendment at this time would in any manner commit the FAA to a course of action that would conflict with an objective review of the EPA pro-

posals under the procedures prescribed in section 611(c) of the Federal Aviation Act of 1958, or in any other way impair its ability to discharge its obligations under the Noise Control Act of 1972.

This review concentrated on the areas in which the EPA proposal may differ from this amendment with respect to the protection of persons from the noise of propeller driven small airplanes. The study, thus, concentrated on differences involving (1) the unit of noise measurement, (2) the compliance dates, (3) the noise levels for each affected airplane weight, (4) the climb performance correction procedure, (5) the treatment of agricultural and fire fighting airplanes, (6) weight limitations derived from the noise compliance test, (7) the effect of wind on conduct of the noise test, (8) correction of test data for microphone losses, (9) the supplementing of field calibrations with the use of a voltage insert device, (10) the engine power that must be used, and (11) the methods of correcting acoustical and performance information. The review of these eleven areas was conducted in the light of EPA's supporting data in its Project Report.

Based on this review, the FAA is confident that there is no provision of the EPA proposals submitted on December 6, 1974, that could not be adopted later, as a supplement to this amendment, if justified on the basis of public participation and comment in response to the NPRM being issued simultaneously with this amendment, and in response to Public Hearings conducted on that NPRM. Furthermore, the FAA, by issuing this amendment at this time, has in no way limited its ability or intent to respond fully to the corresponding EPA proposals in a manner contemplated by section 611(c) of the Federal Aviation Act of 1958.

In addition to preserving FAA's ability to take any action that may be shown to be valid under the section 611(c) process, this amendment reflects FAA's awareness of the need for timely action to protect the public from the noise of propeller driven small airplanes. This amendment, thus, establishes immediate criteria for the manufacturers of propeller driven small airplanes, consistent with the direction in section 611(b) that the public be protected from aircraft noise.

FAA's decision to issue this amendment at this time was coordinated with EPA. That agency stated that it had no objection to such issuance provided that it is understood that (1) this amendment may be changed on the basis of comments received in response to the EPA proposals (issued as an FAA NPRM simultaneously with this amendment) and (2) while EPA does not object to issuance of this amendment, it does not concur in the substance of this amendment.

EPA also requested that the FAA explain, in this preamble, its reasons for issuing this amendment at this time. These reasons are stated above, and may be summarized as follows: Considering the public need for timely action and the

fact that all of the provisions of the corresponding EPA proposals that are shown to be valid can be fully and objectively considered for subsequent FAA rule making, the FAA believes that it would be contrary to the public interest, and to the intent of the Noise Control Act of 1972, to delay this immediately available regulatory action until the regulatory process prescribed in section 611(c) is completed anew with respect to the recent EPA proposals.

Finally, in response to Notice 73-26, EPA submitted, on December 20, 1973, its comments in the form of a comprehensive project report. This amendment is issued after analysis of that project report. A summary of FAA responses to that project report has been prepared in support of this amendment. However, since this earlier project report has been superseded by the later EPA proposal and project report, it is now moot. This summary has, therefore, been placed in the docket as history and is not recited in this preamble. To prevent confusion, and unless otherwise noted, all FAA responses to EPA's submittals in this matter will relate to EPA's second project report (dated November 25, 1974) and its proposed regulation.

B. Public Comments on Notice 73-26. One comment stated that the acoustical change provisions of the proposed regulations would result in unwarranted constraints on operators of antique aircraft. It was argued that powerplant conversions of antique aircraft are necessitated by the unreliability of the original model engine or are desirable either to substitute alternate engines offered as original equipment by the manufacturer, or to achieve more performance. The FAA believes that, for antique aircraft that cannot achieve the noise limits of § F36.301 (b) prior to the change in type design, no valid reason has been submitted for permitting further noise increases. If the antique aircraft is quieter than those limits prior to the change in type design, this amendment permits noise increases up to that limit.

In either case, the FAA will monitor the burden of the regulation on antique aircraft to determine if the problem of aging aircraft justifies further review of the noise limits proposed herein. The commentator also stated that the acoustical change proposal appears to prohibit powerplant conversions that do not involve issuance of a supplemental type certificate. It was stated that this would be an unwarranted burden on antique aircraft owners. The general answer to this comment is stated above. The commentator is correct in that the acoustical change provisions of this proposal apply to the issuance of any type design change approval, not only the issuance of supplemental type certificates.

One comment stated that it was not clear whether the proposed acoustical change provisions applied only to aircraft type certificates under the proposed rules, or whether they apply also to older aircraft. As stated in § 36.1(e), this amendment applies to the issuance of

certain airworthiness certificates for new production versions of older aircraft types, not only to the issuance of new type certificates.

One comment stated that the acoustical change rules were proposed in such a manner that the tests required by Part 36, Appendix F, must be conducted by persons authorized to perform functions under Part 43 Maintenance, Preventive Maintenance, Rebuilding, and Alteration. This comment is not correct. The acoustical change provisions of Part 36 are limited by the terms of § 21.93 to changes in the type design of an aircraft. These provisions do not change, in any respect, the provisions of Part 43 concerning alteration of aircraft to conform to changes in type design that have already been approved. The acoustical change requirements in this amendment must be met, however, as a condition for the issuance of type design change approvals after the effective date of this amendment. The commentator also stated that no person has been identified as having noise compliance testing authority under Part 43. Since the approval of type design changes is the function of the Administrator or his designated representative, and is not the function of persons authorized to perform alterations under Part 43, it would not be appropriate, at this time, to designate persons under Part 43 to conduct the required tests.

One comment stated that the proposed acoustical change provisions place an expensive and time consuming burden on aircraft modifiers because of the required climatic conditions. This comment recommended that testing not be required unless there is "reasonable evidence" that the modification will result in noise levels exceeding the regulatory limit. The climatic conditions proposed within which no corrections for temperature and humidity are required cannot be expanded due to the need for consistent and reproducible results. The applicant has the choice of waiting for the test window, conducting the test in a more favorable climate, or correcting the data if the tests are conducted outside the "no correction test window." Further, the design changes which constitute an acoustical change for propeller driven small airplanes are delineated in § 21.93 (b) (3). If the type design change is an "acoustical change" under the above section, the FAA believes that reasonable evidence does exist that modification may result in increased noise. For this reason, this amendment requires that the acoustical change compliance test be conducted.

One comment stated that the acoustical change provisions should only apply to aircraft exceeding a specified horsepower/propeller or horsepower/RPM combination. Section 21.93(b) (3) specifies the alterations that constitute an acoustical change. Because of the range of noise levels and propulsion systems addressed by this amendment, it would be unworkable to attempt to specify horsepower/propeller or horsepower/

RPM combinations that would adequately describe the type design changes that may result in noise increases.

One comment stated that acrobatic aircraft should be excluded from the regulations on the same basis as agricultural and fire fighting aircraft since acrobatic aircraft also need all available horsepower and any noise related power losses would result in an unacceptable tradeoff between safety and noise reductions. The FAA does not believe that the fact that an aircraft is type certificated in the acrobatic category under Part 23 of the Federal Aviation Regulations justifies exclusion of the aircraft from noise rules. It should be noted, however, that this amendment does not apply to experimentally certificated aircraft used for acrobatics.

One comment stated that the type certification noise standards, while essential, must be supplemented with operational procedures in order to ensure adequate noise control. This comment stated that all airplane flight manuals should contain a chapter on noise causes and abatement procedures to make pilots sensitive to noise problems. The FAA agrees that operating procedures are an important aspect of the overall solution to the aircraft noise problem. It is also agreed that airplane flight manuals (in addition to containing noise information obtained during type certification) may be a useful means of conveying an awareness of aircraft noise problems to the owners and operators of aircraft. While the FAA encourages manufacturers to develop general information in this area, the FAA, because of the close relationship between noise operating procedures and safety, does not believe that specific procedures should be recommended and approved in an airplane flight manual.

One comment cited two reports ("Transportation Noise and Noise from Equipment Powered by Internal Combustion Engines," NTID 300.13, U.S. Environmental Protection Agency, December 31, 1971, and Results of Noise Survey of Seventeen General Aviation Aircraft, FAA, December, 1972) and performance data on the aircraft of two manufacturers as indicating that, for new production aircraft of current types, the proposed standard to be applied to airworthiness certification should be made effective for all types prior to January 1, 1980. While the FAA does not disagree with the general accuracy of much of the information cited by the commentator, that information does not address the potentially serious impacts on certain aircraft types, that could result if the January 1, 1980, date were accelerated.

One comment stated that the public is concerned with the noise generated by an aircraft and, from this standpoint, is not concerned with the weight of the aircraft generating the noise. This being the case, the comment asks why aircraft smaller than 12,500 pounds should be subject to noise limits lower than those that apply at the higher weight. The FAA agrees that the annoyance caused

by aircraft noise is not related directly to the weight of an aircraft. However, weight is chosen as the basis for selecting the applicable noise limits because the weight of an aircraft is directly related to the engine power required by the aircraft, and, in general, the higher horsepower engines are capable of generating more noise than low horsepower engines. From the standpoint of technological practicability and economic reasonableness, it is appropriate that weight differences be reflected in the limiting noise levels.

One comment pointed out differences between the proposed FAA standards and procedures being considered for adoption by the International Standardization Organization (ISO). These comments concerned the measurement unit, the test conditions, and the number of required overflights. First, the comment recommends the addition of a duration conversion to dB(A). The addition of a duration correction adds complexity to the certification process similar to that required for other units rejected for that reason. There has been no demonstrated requirement for a measurement unit more complex than the universally accepted A-weighted decibel. The comment also noted differences between the "test window" (i.e. the limiting atmospheric conditions) proposed for ISO adoption and that proposed for adoption by the FAA. The ISO proposal is more restrictive than the FAA proposal in that it allows less variation in the atmospheric absorption coefficients. The FAA does not believe that this more restrictive test is necessary in order to obtain valid acoustical data for propeller driven small airplanes. The "test window" proposed in the Notice is believed to be adequate. The commentator stated that the ISO proposal would permit a ± 100 -foot variation in test altitude but would require correction to the required 1,000-foot altitude, whereas the Notice proposed only a ± 30 -foot variation and did not propose any correction procedure. The FAA believes that the smaller altitude variation can be practically complied with during the test flights and believes that correction procedures, within the permitted altitude variation, would merely add unnecessary complexity without significantly affecting the noise levels generated by the aircraft. This aspect of the proposal is, therefore, believed to be valid. Finally, the commentator suggested that six overflights, rather than four, would be appropriate considering the confidence limits proposed in the notice. This comment has merit. Six overflights are specified herein.

One comment pointed out a conflict between proposed § F36.101(b) (which prohibits all testing at relative humidities higher than 90 percent), and § F36.201(a) which implies that tests may be conducted with relative humidities higher than 90 percent, if data corrections are made. It was not intended that the effect of § F36.101(b) be altered by the data correction procedures in § F36.201. To eliminate this inconsistency,

the words "above 90 percent or" are not included in § F36.201(a).

One comment stated that rather than requiring maximum continuous power and permitting accelerated flight (for aircraft that can exceed a limiting airspeed at maximum continuous power), the regulation should require the test to be conducted at the airspeed limit but at reduced power. The FAA believes that reduced power may mask noise problems that may be evident at maximum continuous power. The use of accelerated flight does not significantly affect the accuracy of measured data. Therefore, this amendment specifies maximum continuous power and permits accelerated flight.

One comment stated that § F36.105(e) implies the use of the "slow" dynamic characteristics of the sound level meter and that this should be expressly stated. The FAA agrees. This provision, therefore, includes the words "with dynamic characteristics designated 'slow'" after the words "A filter."

One comment questioned the need for, and the added regulatory complexity caused by, permitting aircraft of 3,300 pounds and above to generate 2 more dB(A) now than in the future. The FAA believes that the overall noise levels and timing provisions in this amendment properly reflect economic and technological factors involved in the certification of propeller driven small airplanes.

One comment noted the possibility of an abrupt change in severity as between the provisions of Appendix F for aircraft close to 12,500 pounds, and the provisions of Appendix C for turbojets and for transport category airplanes slightly heavier than 12,500 pounds. The FAA agrees that Appendix F does represent a significant advance in noise reduction over Appendix C for aircraft close to the 12,500 pound dividing line. However, this reflects the fact that Appendix C was primarily developed to respond to the technological problems associated with the abatement of turbojet noise, whereas the provisions of Appendix F deal exclusively with the inherently lower noise levels of propeller driven small airplanes.

One comment opposed the proposal that aircraft used for dispensing fire fighting or agricultural materials be required to comply with FAA approved noise abatement routes and flight plans if they cannot meet the prescribed noise limits. This comment indicated that neither agricultural nor fire fighting operations can be continued under such a restraint since both kinds of operation may require a capability of rapid response that is incompatible with a job-by-job approval of routes for noise abatement purposes. The FAA agrees with this comment and does not adopt this proposal.

One comment raised the question of whether the recording of flyover noise should be made with "A" or "linear" weighting. There is no need to specify which weighting is required since the "A" weighting required to obtain a dB(A) noise value may be applied during the recording or during the analysis of the tape. The comments also asked

whether a specified calibration procedure is intended. There does not appear to be a need to restrict the applicant to a particular calibration procedure, in view of the rapidly changing technology in this field. The FAA, therefore, will consider, for approval, any calibration procedure that yields accurate and reproducible results.

One comment asked whether a non-directional microphone could be used. This amendment does not prohibit the use of such microphones.

One comment stated that the noise tests cannot be conducted at maximum weight because of the burnoff of fuel needed to conduct the tests. The FAA agrees. This amendment provides that, if the test is conducted at weights less than an airworthiness limited weight, the lower weight becomes an operating limitation. However, to reflect this comment, this amendment adds an exception where needed to account for fuel that must be used during the test itself.

One comment recommended that testing be prohibited at altitudes greater than 6,000 feet above sea level. The FAA believes that this comment may have merit for airplanes powered by supercharged engines and will monitor the administration of this amendment to those airplanes to determine if additional rulemaking is needed. For normally aspirated engines, the decrease of available power with altitude normally would, in any case, prevent the developing of maximum continuous power at high altitudes. This amendment does not contain an altitude limit as a test requirement.

One comment stated that proposed § F36.109(g) implies that a time history record of position must be kept. Beyond requiring the applicant to demonstrate that the position of the airplane, during the actual measurement of noise, complies with the regulation, this amendment does not require the keeping of a time history of position.

One comment stated that the methods used to correct for temperature and humidity data outside of the specified limits should either be specified in the regulations or should be methods complying with acceptable industry practices. The FAA does not believe that a particular correction method should be prescribed and will consider any method that adequately corrects the data to the acoustical standard day.

One comment stated that the formula in § F36.201(c) should be limited to sea level standard day conditions for a normal takeoff distance. The values used in the formula (except for takeoff distance in some cases) are those developed during type certification under the airworthiness regulations. It is, therefore, not believed to be necessary to specify the conditions under which they are developed. Where takeoff distance is not developed as approved performance information, the values in § F36.201(d) must be applied in each case, so that reference to sea level is not needed.

One comment requested that the definition of "acoustical change" in § 21.93(b) be amended to specify that an acoustical change is one that may increase the noise levels of the airplane

"in terms of FAR 36 measurement criteria." Since that paragraph begins with the words "for the purpose of complying with Part 36 of this chapter . . ." and in view of several years of administering § 21.93(b) without problems concerning the definition of "acoustical change," the FAA does not believe that the suggested language is necessary.

One comment stated that the proposed amendment to § 21.115(a) (which proposed to add a reference to the acoustical change requirements to that paragraph) is unnecessary since § 21.115(b) already requires compliance with § 21.33(b) which includes required noise standards. The FAA agrees in part. However, to ensure that the section heading and paragraph (a) of § 21.115 are consistent with the other regulatory changes in this amendment, the change to that section is adopted as proposed.

One comment stated that, while noise standards are appropriate conditions of type certification, they should not be applied to the issuance of airworthiness certificates. The question of application of noise standards to type and airworthiness certificates was addressed in Notice No. 72-19, Newly Produced Airplanes of Older Type Designs, published in the FEDERAL REGISTER (37 FR 14813) on July 25, 1972. In that Notice, (which first associated noise standards with airworthiness certificates) it was stated that the proposed application of noise standards to airworthiness certificates—

. . . reflects the requirement in § 611(a) of the Federal Aviation Act of 1958 that the Administrator shall issue noise abatement regulations including the application of such standards, rules, and regulations in the issuance . . . of any certificate authorized by this title. Whereas the appropriate certificate for insuring that new type designs incorporate acoustical performance features is the type certificate, and Part 36 therefore currently governs the issuance of type certificates . . . only, the airworthiness certificate is an appropriate title VI certificate for insuring that new production copies of previously type certificated aircraft incorporate acoustical performance design features prior to operation. This is the case because the airworthiness certificate is individually issued to each aircraft after production, and is therefore useful as a means of distinguishing (e.g. by date of issuance) those particular aircraft within a production run that require noise compliance demonstration . . .

For the reasons discussed in Notice 72-19, the FAA believes that it is appropriate to apply noise standards to the issuance of airworthiness certificates to previously type-certificated aircraft where the objective is imposing noise standards on newly produced aircraft of older type designs.

One comment stated that the proposed regulation is not adequate since—(1) it does not account for the noise of aircraft operating below 1,000 feet, as during landing and takeoff, and (2) it does not involve retrofit of the current fleet of propeller driven small airplanes. By requiring maximum continuous power at the 1,000-foot altitude, the FAA believes that this amendment also addresses the noise source that is also a problem at lower altitudes, and that the added complexity of takeoff and approach noise

measurements would not be justified at this time. With respect to retrofit of the current fleet, the FAA is considering the advisability of such a regulation, but does not believe that adoption of this amendment should be delayed pending the results of this review.

One comment, in addition to recommending omission of the performance correction and increasing the severity of the regulation also recommended that low speed multi-bladed propellers and chamber-type mufflers be required. The FAA believes that, rather than require specific type design details, this first issuance of a noise rule for propeller driven small airplanes should set quantitative noise limits and permit any means of compliance that also complies with the applicable airworthiness requirements.

One comment stated that there should be provision in the regulation itself for progressively reducing the maximum permitted noise level as new and more advanced technology is developed. The FAA agrees that the regulation should be reviewed and amended when justified by new technology. However, this should be accomplished, in each case, with notice and public procedure as required by the Administrative Procedure Act. Provision for the future lowering of noise limits is not, therefore, included in this amendment.

Consistent with the fact that certain propeller driven small airplanes are not required to have an Airplane Flight Manual, but may have any combination of manuals, markings or placards, this amendment revises the statement required by § 36.1581 to refer to "noise levels of this airplane" rather than "noise levels in this manual."

Finally, editorial changes are made to improve the presentation of regulatory material. These include moving all of the acoustical change provisions of Part 36 to a new § 36.7, and the restructuring of the applicability provisions of § 36.1.

(Secs. 313(a), 601, 603, and 611 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, and 1431); sec. 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)); title I of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.); and Executive Order 11514, March 5, 1970.)

In consideration of the foregoing, Parts 21 and 36 of the Federal Aviation Regulations are amended, effective February 7, 1975, as follows:

A. Part 21 of the Federal Aviation Regulations is amended as follows:

1. Section 21.17(a) (introductory clause) is amended to read as follows:

§ 21.17 Designation of applicable regulations.

(a) Except as provided in § 25.2 and in Part 36 of this chapter, an applicant for a type certificate must show that the aircraft, aircraft engine, or propeller concerned meets—

2. Section 21.25(a) (introductory clause) is amended to read as follows:

§ 21.25 Issue of type certificate: Restricted category aircraft.

(a) An applicant is entitled to a type certificate for an aircraft in the restricted category for special purpose operations if he shows compliance with the applicable noise requirements of Part 36 of this chapter, and if he shows that no feature or characteristic of the aircraft makes it unsafe when it is operated under the limitations prescribed for its intended use, and that the aircraft—

3. Section 21.93(b) is amended to read as follows:

§ 21.93 Classification of changes in type design.

(b) For the purpose of complying with Part 36 of this chapter, and except as provided in subparagraph (b)(3) of this paragraph, any voluntary change in the type design of an airplane that may increase the noise levels of that airplane is an "acoustical change" (in addition to being a minor or major change as classified in paragraph (a) of this section) for the following airplanes:

(1) Subsonic transport category large airplanes.

(2) Subsonic turbojet powered airplanes (regardless of category).

(3) Propeller driven small airplanes in the normal, utility, acrobatic, transport, and restricted categories (except for airplanes that are designed for "agricultural aircraft operations" as defined in § 137.3 of this chapter, as effective on January 1, 1966, or for dispensing fire fighting materials). For airplanes to which this subparagraph applies, "acoustical changes" are limited to the following type design changes:

(i) Any change to, or removal of, a muffler or other component designed for noise control.

(ii) Any change to, or installation of, a powerplant or propeller that increases maximum continuous power or thrust at sea level, or increases the propeller tip speed at that power or thrust, over that previously approved for the airplane.

4. Section 21.101(a) (introductory clause) is amended to read as follows:

§ 21.101 Designation of applicable regulations.

(a) Except as provided in § 25.2 and in Part 36 of this chapter, an applicant for a change to a type certificate must comply with either—

5. Section 21.115 (section heading and paragraph (a)) are amended to read as follows:

§ 21.115 Applicable requirements.

(a) Each applicant for a supplemental type certificate must show that the altered product meets applicable airworthiness requirements as specified in paragraphs (a) and (b) of § 21.101 and, in the case of an acoustical change de-

scribed in § 21.93(b), show compliance with the applicable noise requirements of § 36.7 of this chapter.

6. Section 21.183(e) is amended to read as follows:

§ 21.183 Issue of standard airworthiness certificates for normal, utility, acrobatic, and transport category aircraft.

(e) Noise requirements. Notwithstanding all other provisions of this section, the following must be complied with for the original issuance of a standard airworthiness certificate:

(1) For subsonic transport category large airplanes and subsonic turbojet powered airplanes that have not had any flight time before the dates specified in § 36.1(d), no standard airworthiness certificate is originally issued under this section unless the Administrator finds that the type design complies with the noise requirements in § 36.1(d) in addition to the applicable airworthiness requirements in this section. For import airplanes, compliance with this paragraph is shown if the country in which the airplane was manufactured certifies, and the Administrator finds, that § 36.1(d) (or the applicable airplane noise requirements of the country in which the airplane was manufactured and any other requirements the Administrator may prescribe to provide noise levels no greater than those provided by compliance with § 36.1(d)) and paragraph (c) of this section are complied with.

(2) For normal, utility, acrobatic, or transport category propeller driven small airplanes (except for airplanes that are designed for "agricultural aircraft operations" as defined in § 137.3 of this chapter, as effective on January 1, 1966, or for dispensing fire fighting materials) that have not had any flight time before the applicable date specified in Part 36 of this chapter, no standard airworthiness certificate is originally issued under this section unless the applicant shows that the type design complies with the applicable noise requirements of Part 36 of this chapter in addition to the applicable airworthiness requirements in this section. For import airplanes, compliance with this paragraph is shown if the country in which the airplane was manufactured certifies, and the Administrator finds, that the applicable requirements of Part 36 of this chapter (or the applicable airplane noise requirements of the country in which the airplane was manufactured and any other requirements the Administrator may prescribe to provide noise levels no greater than those provided by compliance with the applicable requirements of Part 36 of this chapter) and paragraph (c) of this section are complied with.

7. Section 21.185 is amended by adding a new paragraph (d) to read as follows:

§ 21.185 Issue of airworthiness certificates for restricted category aircraft.

(d) *Noise requirements.* For propeller-driven small airplanes (except airplanes designed for "agricultural aircraft operations," as defined in § 137.3 of this chapter, as effective on January 1, 1966, or for dispensing fire fighting materials) that have not had any flight time before the applicable date specified in Part 36 of this chapter, and notwithstanding the other provisions of this section, no original restricted category airworthiness certificate is issued under this section unless the Administrator finds that the type design complies with the applicable noise requirements of Part 36 of this chapter in addition to the applicable airworthiness requirements of this section. For import airplanes, compliance with this paragraph is shown if the country in which the airplane was manufactured certifies, and the Administrator finds, that the applicable requirements of Part 36 of this chapter (or the applicable airplane noise requirements of the country in which the airplane was manufactured and any other requirements the Administrator may prescribe to provide noise levels no greater than those provided by compliance with the applicable requirements of Part 36 of this chapter) and paragraph (c) of this section are complied with.

8. Section 21.257 is amended to read as follows:

§ 21.257 Type certificates—issue.

An applicant is entitled to a type certificate for a product manufactured under a delegation option authorization if the Administrator finds that the product meets the applicable airworthiness and noise requirements (including applicable acoustical change requirements in the case of changes in type design).

9. A new § 21.451(d) is added to read as follows:

§ 21.451 Limits of applicability.

(d) Notwithstanding any other provision of this subpart, a DAS may not issue a supplemental type certificate involving the acoustical change requirements of Part 36 of this chapter until the Administrator finds that those requirements are met.

B. Part 36 of the Federal Aviation Regulations is amended as follows:

1. Section 36.1 is amended to read as follows:

§ 36.1 Applicability.

(a) This Part prescribes noise standards for the issue of the following certificates:

(1) Type certificates, and changes to those certificates, and standard airworthiness certificates, for subsonic transport category large airplanes, and for subsonic turbojet powered airplanes regardless of category.

(2) Type certificates and changes to those certificates, and standard airworthiness certificates and restricted

category airworthiness certificates, for propeller driven small airplanes, except airplanes that are designed for "agricultural aircraft operations" as defined in § 137.3 of this chapter, as effective on January 1, 1966, or for dispensing fire fighting materials.

(b) Each person who applies under Part 21 of this chapter for a type or airworthiness certificate specified in this Part must show compliance with the applicable requirements of this Part, in addition to the applicable airworthiness requirements of this chapter.

(c) Each person who applies under Part 21 of this chapter for approval of an acoustical change described in § 21.93(b) of this chapter must show that the airplane complies with § 36.7 of this Part in addition to the applicable airworthiness requirements of this chapter.

(d) Each person who applies for the original issue of a standard airworthiness certificate for a subsonic transport category large airplane or for a turbojet powered airplane under § 21.183, must, regardless of date of application, show compliance with the applicable provisions of this Part (including Appendix C), as effective on December 1, 1969, for airplanes that have not had any flight time before—

(1) December 1, 1973, for airplanes with maximum weights greater than 75,000 lbs., except for airplanes that are powered by Pratt and Whitney Turbo Wasp JT3D series engines;

(2) December 31, 1974, for airplanes with maximum weights greater than 75,000 lbs. and that are powered by Pratt and Whitney Turbo Wasp JT3D series engines; and

(3) December 31, 1974, for airplanes with maximum weights of 75,000 lbs. and less.

(e) Each person who applies for the original issue of a standard airworthiness certificate under § 21.183, or for the original issue of a restricted category airworthiness certificate under § 21.185, for a propeller driven small airplane that has not had any flight time before January 1, 1980, must show compliance with the applicable provisions of this Part.

2. A new § 36.7 is added to read as follows:

§ 36.7 Acoustical change.

(a) *Subsonic transport category large airplanes and turbojet powered airplanes.* For subsonic transport category large airplanes and turbojet powered airplanes for which an acoustical change approval is applied for under § 21.93(b) of this chapter, the following apply:

(1) If the airplane can achieve the noise limits prescribed in Appendix C of this Part, or lower noise levels, prior to the change in type design, it may not exceed the noise limits prescribed in Appendix C after the change in type design.

(2) If the airplane cannot achieve the noise limits prescribed in Appendix C of this Part prior to the change in type design, it may not, after the change in type design, exceed the noise levels created prior to the change in type design, measured and evaluated as prescribed in Appendices A and B of this Part. For

airplanes covered by this subparagraph for which application for acoustical change approval is made after September 17, 1971, the following must be complied with, in addition to the applicable provisions of Appendices A and B of this Part, in determining the takeoff and sideline noise levels of the airplane:

(i) There may be no reduction in power or thrust below the highest airworthiness approved power or thrust, during the tests conducted before and after the change in type design.

(ii) For the noise levels measured and evaluated before and after the change in type design, the test day speeds and the acoustic day reference speed must be the minimum approved value of $V+10$ knots, or the all-engine-operating speed at 35 feet (for turbine engine powered airplanes), or 50 feet (for reciprocating engine powered airplanes), whichever speed is greater as determined under the regulations constituting the type certification basis of the airplane. The tests must be conducted at the test day speeds ± 3 knots. Noise values measured at the test day speeds must be corrected to the acoustic day reference speed.

(iii) During the tests conducted before the change in type design, the quietest airworthiness approved configuration available for the highest approved takeoff weight must be used.

(b) *Propeller driven small airplanes.* For propeller driven small airplanes in the normal, utility, acrobatic, transport, and restricted categories for which an acoustical change approval is applied for under § 21.93(b) of this chapter after January 1, 1975, the following apply:

(1) If the airplane was type certificated under Appendix F of this Part prior to the change in type design, it may not, after the change in type design, exceed the noise limit that was applied to that approval.

(2) If the airplane was not type certificated under Appendix F but can achieve the noise limits prescribed in § F36.301(b) of that Appendix prior to the change in type design, it may not exceed those limits, measured and corrected as prescribed in Appendix F, after the change in type design.

(3) If the airplane cannot achieve the noise limits prescribed in § F36.301(b) of Appendix E prior to the change in type design, it may not, after the change in type design, exceed the noise levels created prior to the change in type design, measured and corrected as prescribed in Appendix F.

4. A new subpart F is added to read as amended to read as follows:

Subpart B—Subsonic Transport Category Large Airplanes and Turbojet Powered Airplanes

4. A new subpart is added to read as follows:

Subpart F—Propeller Driven Small Airplanes

§ 36.501 Noise limits.

(a) Compliance with this subpart must be shown for—

(1) Propeller driven small airplanes for which application for the issuance

of a type certificate in the normal, utility, acrobatic, transport, or restricted category is made on or after October 10, 1973; and

(2) Propeller driven small airplanes for which application is made for the original issuance of a standard airworthiness certificate or restricted category airworthiness certificate, and that have not had any flight time before January 1, 1980 (regardless of date of application).

(b) Compliance with this subpart must be shown with noise levels measured and corrected as prescribed in Parts B and C of Appendix F, or under approved equivalent procedures.

(c) For airplanes covered by this section, it must be shown that the noise level of the airplane is no greater than the applicable limit prescribed in Part D of Appendix F.

5. Subpart G is amended to read as follows:

Subpart G—Operating Limitations and Information

§ 36.1501 Procedures and other information.

All procedures, and other information for the flight crew, that are employed for obtaining the noise reductions prescribed in this Part must be developed. This must include noise levels achieved during type certification.

§ 36.1581 Manuals, markings, and placards.

(a) If an Airplane Flight Manual is approved, the approved portion of the Airplane Flight Manual must contain procedures and other information approved under § 36.1501. If an Airplane Flight Manual is not approved, the procedures and information must be furnished in any combination of approved manual material, markings, and placards.

(b) The following statement must be furnished near the listed noise levels:

No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

(c) For subsonic transport category large airplanes and turbojet powered airplanes, for which the weight used in meeting the takeoff or landing noise requirements of this Part is less than the maximum weight or design landing weight, respectively, established under the applicable airworthiness requirements, those lesser weights must be furnished, as operating limitations, in the operating limitations section of the Airplane Flight Manual.

(d) For propeller driven small airplanes for which the weight used in meeting the flyover noise requirements of this Part is less than the maximum weight by an amount exceeding the amount of fuel needed to conduct the test, that lesser weight must be furnished, as an operating limitation, in the operating limitations section of an approved Airplane Flight Manual, in approved manual material, or on an approved placard.

(e) Except as provided in paragraphs (c) and (d) of this section, no operating limitations are furnished under this Part.

6. Section C36.7(a) is amended to read as follows:

Section C36.7 Takeoff test conditions.

(a) Except as provided in § 36.7(a) (2) of this Part, this section applies to all takeoffs conducted in showing compliance with this Part.

7. A new Appendix F is added to Part 36 to read as follows:

APPENDIX F—NOISE REQUIREMENTS FOR PROPELLER-DRIVEN SMALL AIRPLANES

PART A—GENERAL

Section F36.1 Scope. This appendix prescribes limiting noise levels, and procedures for measuring noise and correcting noise data, for the propeller driven small airplanes specified in § 36.1.

PART B—NOISE MEASUREMENT

Section F36.101 General test conditions.

(a) The test area must be relatively flat terrain having no excessive sound absorption characteristics such as those caused by thick, matted, or tall grass, by shrubs, or by wooded areas. No obstructions which significantly influence the sound field from the airplane may exist within a conical space above the measurement position, the cone being defined by an axis normal to the ground and by a half-angle 75 degrees from this axis.

(b) The tests must be carried out under the following conditions:

(1) There may be no precipitation.
(2) Relative humidity may not be higher than 90 percent or lower than 30 percent.

(3) Ambient temperature may not be above 86 degrees F. or below 41 degrees F. at 33' above ground. If the measurement site is within 1 n.m. of an airport thermometer the airport reported temperature may be used.

(4) Reported wind may not be above 10 knots at 33' above ground. If wind velocities of more than 4 knots are reported, the flight direction must be aligned to within ±15 degrees of wind direction and flights with tail wind and head wind must be made in equal numbers. If the measurement site is within 1 n.m. of an airport anemometer, the airport reported wind may be used.

(5) There may be no temperature inversion or anomalous wind condition that would significantly alter the noise level of the airplane when the noise is recorded at the required measuring point.

(6) The flight test procedures, measuring equipment, and noise measurement procedures must be approved by the FAA.

(7) Sound pressure level data for noise evaluation purposes must be obtained with acoustical equipment that complies with section F36.103 of this appendix.

Section F36.103 Acoustical measurement system. The acoustical measurement system must consist of approved equipment equivalent to the following:

(a) A microphone system with frequency response compatible with measurement and analysis system accuracy as prescribed in section F36.105 of this appendix.

(b) Tripods or similar microphone mountings that minimize interference with the sound being measured.

(c) Recording and reproducing equipment characteristics, frequency response, and dynamic range compatible with the response and accuracy requirements of section F36.105 of this appendix.

(d) Acoustic calibrators using sine wave or broadband noise of known sound pressure level. If broadband noise is used, the signal must be described in terms of its average and maximum root-mean-square (rms) value for nonoverload signal level.

Section F36.105 Sensing, recording, and reproducing equipment.

(a) The noise produced by the airplane must be recorded. A magnetic tape recorder is acceptable.

(b) The characteristics of the system must comply with the recommendations in International Electrotechnical Commission (IEC) Publication No. 179, dated 1973, concerning microphone and amplifier characteristics. The text and specifications of IEC Publication No. 179, dated 1973, and entitled "Precision Sound Level Meters" are incorporated by reference into this appendix and are made a part hereof as provided in 5 U.S.C. 552(a) and 1 CFR Part 51. This publication was published in 1965 and revised in 1973 by the Bureau Central de la Commission Electrotechnique Internationale in Geneva, Switzerland. It is available for purchase from the following sources: (1) Bureau Central de la Commission Electrotechnique Internationale, 1, rue de Varembe, Geneva, Switzerland; and (2) American National Standard Institute, 1430 Broadway, New York City, New York 10018. The matter is available for inspection at the following locations: (1) FAA Headquarters—DOT Branch Library, and Office of Environmental Quality, 800 Independence Avenue SW., Washington, D.C.; (2) FAA Regional Offices, in their respective cities; and (3) Office of the Federal Register, 1100 "L" Street NW., Washington, D.C.

(c) The response of the complete system to a sensibly plane progressive sinusoidal wave of constant amplitude must lie within the tolerance limits specified in IEC Publication No. 179, dated 1973, over the frequency range 45 to 11,200 Hz.

(d) If limitations of the dynamic range of the equipment make it necessary, high frequency pre-emphasis must be added to the recording channel with the converse de-emphasis on playback. The pre-emphasis must be applied such that the instantaneous recorded sound pressure level of the noise signal between 800 and 11,200 Hz does not vary more than 20 dB between the maximum and minimum one-third octave bands.

(e) If requested by the Administrator, the recorded noise signal must be read through an "A" filter with dynamic characteristics designated "slow," as defined in IEC Publication No. 179, dated 1973. The output signal from the filter must be fed to a rectifying circuit with square law rectification, integrated with time constants for charge and discharge of about 1 second or 800 milliseconds.

(f) The equipment must be acoustically calibrated using facilities for acoustic free-field calibration and if analysis of the tape recording is requested by the Administrator, the analysis equipment shall be electronically calibrated by a method approved by the FAA.

(g) A windscreen must be employed with microphone during all measurements of aircraft noise when the wind speed is in excess of 6 knots.

Section F36.107 Noise measurement procedures.

(a) The microphones must be oriented in a known direction so that the maximum sound received arrives as nearly as possible in the direction for which the microphones are calibrated. The microphone sensing elements must be approximately 4' above ground.

(b) Immediately prior to and after each test; a recorded acoustic calibration of the

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system must be made in the field with an acoustic calibrator for the two purposes of checking system sensitivity and providing an acoustic reference level for the analysis of the sound level data.

(c) The ambient noise, including both acoustical background and electrical noise of the measurement systems, must be recorded and determined in the test area with the system gain set at levels that will be used for aircraft noise measurements. If aircraft sound pressure levels do not exceed the background sound pressure levels by at least 10 dB(A), approved corrections for the contribution of background sound pressure level to the observed sound pressure level must be applied.

Section F36.109 Data recording, reporting, and approval.

(a) Data representing physical measurements or corrections to measured data must be recorded in permanent form and appended to the record except that corrections to measurements for normal equipment response deviations need not be reported. All other corrections must be approved. Estimates must be made of the individual errors inherent in each of the operations employed in obtaining the final data.

(b) Measured and corrected sound pressure levels obtained with equipment conforming to the specifications described in section F36.105 of this appendix must be reported.

(c) The type of equipment used for measurement and analysis of all acoustic, airplane performance, and meteorological data must be reported.

(d) The following atmospheric data, measured immediately before, after, or during each test at the observation points prescribed in section F36.101 of this appendix must be reported:

- (1) Air temperature and relative humidity.
- (2) Maximum, minimum, and average wind velocities.

(e) Comments on local topography, ground cover, and events that might interfere with sound recordings must be reported.

(f) The following airplane information must be reported:

- (1) Type, model and serial numbers (if any) of airplanes, engines, and propellers.
- (2) Any modifications or nonstandard equipment likely to affect the noise characteristics of the airplane.
- (3) Maximum certificated takeoff weights.
- (4) Airspeed in knots for each overflight of the measuring point.

(5) Engine performance in terms of revolutions per minute and other relevant parameters for each overflight.

(6) Aircraft height in feet determined by a calibrated altimeter in the aircraft, approved photographic techniques, or approved tracking facilities.

(g) Aircraft speed and position and engine performance parameters must be recorded at an approved sampling rate sufficient to ensure compliance with the test procedures and conditions of this appendix.

Section F36.111 Flight procedures.

(a) Tests to demonstrate compliance with the noise level requirements of this appendix must include at least six level flights over the measuring station at a height of 1,000' \pm 30' and \pm 10 degrees from the zenith when passing overhead.

(b) Overflight must be performed at rated maximum continuous power, stabilized speed with propellers synchronized and with the airplane in the cruise configuration except that, if the speed at maximum continuous power would exceed the maximum speed authorized in level flight, accelerated flight is acceptable.

PART C—DATA CORRECTION

Section F36.201 Correction of data.

(a) Noise data obtained when the temperature is outside the range of 68 degrees F. \pm 9 degrees F., or the relative humidity is above 90 percent or below 40 percent, must be corrected to 77 degrees F. and 70 percent relative humidity by a method approved by the FAA.

(b) The performance correction prescribed in paragraph (c) of this section must be used. It must be determined by the method described in this appendix, and must be added algebraically to the measured value. It is limited to 5 dB(A).

(c) The performance correction must be computed by using the following formula:

$$\Delta dB = 60 - 20 \log_{10} \left\{ \frac{(11,430 - D_{50}) R/C + 50}{V_p} \right\}$$

Where:

D_{50} = Takeoff distance to 50 feet at maximum certificated takeoff weight.

R/C = Certificated best rate of climb (fpm).

V_p = Speed for best rate of climb in the same units as rate of climb.

(d) When takeoff distance to 50' is not listed as approved performance information, the figures of 1375' for single-engine airplanes and 1600' for multi-engine airplanes must be used.

Section F36.203 Validity of results.

(a) The test results must produce an average dB(A) and its 90 percent confidence limits, the noise level being the arithmetic average of the corrected acoustical measurements for all valid test runs over the measuring point.

(b) The samples must be large enough to establish statistically a 90 percent confidence limit not to exceed ± 1.5 dB(A). No test result may be omitted from the averaging process, unless omission is approved by the FAA.

PART D—NOISE LIMITS

Section F36.301 Aircraft noise limits.

(a) Compliance with this section must be shown with noise data measured and corrected as prescribed in Parts B and C of this appendix.

(b) For airplanes for which application for a type certificate is made on or after October 10, 1973, the noise level must not exceed 68 dB(A) up to and including aircraft weights of 1,320 pounds (600 kg.). For weights greater than 1,320 pounds up to and including 3,630 pounds (1,650 kg.) the limit increases at the rate of 1 dB/165 pounds (1 dB/75 kg.) to 82 dB(A) at 3,630 pounds, after which it is constant at 82 dB(A) up to and including 12,500 pounds. However, airplanes produced under type certificates covered by this paragraph must also meet paragraph (d) of this section for the original issuance of standard airworthiness certificates or restricted category airworthiness certificates if those airplanes have not had flight time before the date specified in that paragraph.

(c) For airplanes for which application for a type certificate is made on or after January 1, 1975, the noise levels may not exceed the noise limit curve prescribed in paragraph (b) of this section, except that 80 dB(A) may not be exceeded at weights from and including 3,300 pounds to and including 12,500 pounds.

(d) For airplanes for which application is made for a standard airworthiness certificate or for a restricted category airworthiness certificate, and that have not had any flight time before January 1, 1980, the requirements of paragraph (c) of this section apply, regardless of date of application, to

the original issuance of the certificate for that airplane.

Issued in Washington, D.C. on December 31, 1974.

ALEXANDER P. BUTTERFIELD,
Administrator.

NOTE.—The incorporation by reference provisions in this document was approved by the Director of the Federal Register on November 8, 1974.

[FR Doc.74-30537 Filed 12-31-74; 3:58 pm]

Title 14—Aeronautics and Space
CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

[Docket No. 13243; Amdts. 21-42; 36-4]

PART 21—CERTIFICATION PROCEDURES FOR PRODUCTS AND PARTS

PART 36—NOISE STANDARDS; AIRCRAFT TYPE AND AIRWORTHINESS CERTIFICATION

Noise Standards for Propeller Driven Small Airplanes

Correction

In FR Doc. 74-30537 appearing at page 1029, in the issue of Monday, January 6, 1975, on page 1034, third column, the text following § 36.7(b) (3) reading,

“4. A new Subpart F is added to read as amended to read as follows:

Subpart B—Subsonic Transport Category Large Airplanes and Turbojet Powered Airplanes

4. A new subpart is added to read as follows:

Subpart F—Propeller Driven Small Airplanes”

should read:

“3. The heading of Subpart B is amended to read as follows:

Subpart B—Subsonic Transport Category Large Airplanes and Turbojet Powered Airplanes

4. A new Subpart F is added to read as follows:

Subpart F—Propeller Driven Small Airplanes”

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Correction

In FR Doc 74-30537 appearing at page 1029 in the issue of Monday, January 6, 1975, the following changes should be made on page 1034:

In the third column, paragraph (3), beginning "If the airplane * * *" the words "Appendix E" in the third line should read "Appendix F".