

December 23, 1976

test engine power setting. This document also contains the FAA's decision, pursuant to section 611(c) (1) of the Federal Aviation Act of 1958, as amended, not to prescribe further amendments to the Federal Aviation Regulations based upon the remaining proposals contained in the EPA recommended regulation (Notice 74-39) regarding noise standards and procedures for propeller-driven small airplanes. However, as part of its response to the EPA recommended regulation, the FAA is also issuing a separate notice of proposed rule making (NPRM) under section 611(b) (1) of the Federal Aviation Act of 1958, as amended, containing a proposal that is beyond the scope of the EPA recommended regulation in Notice 74-39. That NPRM is published in the "Proposed Rule" portion of today's FEDERAL REGISTER. If adopted, the proposed rule would apply to small propeller-driven airplanes designed for "agricultural airplane operations," or for dispensing fire-fighting materials, which do not comply with the noise limits of FAR Part 36, and would prohibit operation except to the extent necessary to accomplish the work activity directly associated with the purpose for which the airplane is designed.

#### I. REGULATORY PROCEEDING HISTORY

On December 31, 1974, the FAA issued FAR Amendment 36-4 (40 FR 1029; January 6, 1975) to prescribe noise standards and procedures for propeller-driven small airplanes. FAR Amendment 36-4 was based upon FAA Notice 73-26 published October 10, 1973 (38 FR 23016).

On December 6, 1974, the EPA submitted to the FAA proposed amendments to the Federal Aviation Regulation for consideration and publication in the FEDERAL REGISTER under section 611(c) of the Federal Aviation Act of 1958, as amended ("the Act"). Accordingly, the FAA issued Notice 74-39 containing EPA's recommended regulations and a notice of publication regarding the notice of proposed rule making. Those notices were published on January 6, 1975 (40 FR 1061), and January 3, 1975 (40 FR 820), respectively.

Pursuant to section 611(c) of the Act and based upon a notice published January 30, 1975 (40 FR 4478), on March 3, 1975, a public hearing was held in Washington, D.C. to receive oral and written presentations on the matters contained in the notices. Interested persons were also afforded the opportunity to submit written comments to the regulatory docket.

After due and careful consideration of the information provided by the EPA and by the written and oral comments presented at the public hearing, or submitted to the regulatory docket, and after consultation with the EPA and with the Secretary of Transportation, the FAA concludes that it should adopt certain amendments to the FARs contained in the EPA recommended regulation but that it should not prescribe regulations based on other EPA proposals.

Forty-four written or oral comments in response to Notice 74-39 were received

from private citizens, citizens groups, state and local governments, aviation trade and user associations, and aircraft manufacturers. These comments, including the five oral presentations at the public hearing, address or affect the EPA proposals discussed below.

#### II. AMENDMENTS TO THE FEDERAL AVIATION REGULATIONS

##### A. TEST FLIGHT PROCEDURES

FAA Notice 73-26 (38 FR 23016; October 10, 1973) proposed to require a minimum of four horizontal test flights at maximum continuous power 1000 feet over a single noise measuring station to demonstrate compliance with the proposed noise level requirements. The EPA in response to that NPRM recommended that a minimum of six test flights should be required. The EPA contended that at least six flights (as required for turbojet and turbofan powered aircraft under FAR Part 36) are necessary to establish an adequate sample size to properly evaluate the noise emission of an airplane regardless of aircraft size. Based on the EPA recommendation and public comments submitted to the docket, the FAA adopted the EPA's recommendation in FAR Amendments 36-4 (§ F36.111). The FAA believes that the adoption of this recommendation has significantly improved the achievement of the confidence level of the noise data and evaluation in the noise certification test procedure for propeller-driven small airplanes. Since the FAA has already adopted this proposal in a previous amendment, further regulatory action is not needed in this proceeding.

Three commenters addressed the issue of the number of required test flights. Two simply agreed with the proposal without explanation. However, one commenter reported that its experience with noise measurement for German and Swiss noise certification has shown that four measurements are sufficient, if the measured levels difference is 1.5 dB(A) or less. The additional measurements are conducted only if that condition is not satisfied. The FAA is aware of this reported experience and procedure. However, as stated in the preamble to FAR Amendment 36-4, the FAA concluded that the six-flight requirement is necessary to achieve the required confidence level under FAR Part 36 Appendix F.

##### B. PERFORMANCE CORRECTION

The EPA stated in its recommended regulation (Notice No. 74-39) that it believed that the performance correction concept, which had been proposed (and subsequently adopted) by the FAA, was reasonable, but that it needed minor changes, including an additional factor to account for any difference between the aircraft test speed and the aircraft take-off speed. (Proposed § F36.201(b)).

The FAA and EPA each recognizes that the measurement of noise levels only during level flight has one deficiency; it does not account for the take-off performance of an aircraft.

The perceived and measured noise levels depend upon both the noise energy

*See correction*

{Docket No. 13243; Amdt. 36-6}

#### PART 36—NOISE STANDARDS; AIRCRAFT TYPE AND AIRWORTHINESS CERTIFICATION

##### Noise Regulations for Propeller-Driven Small Airplanes Submitted to the FAA By the Environmental Protection Agency; Notice of Decision

This document contains an amendment to Part 36 of the Federal Aviation Regulations (14 CFR Part 36) and a notice of decision not to prescribe certain additional amendments to the current noise certification standards and test procedures applicable to propeller-driven small airplanes. This action is in response to recommended regulations submitted to the Federal Aviation Administration (FAA) on December 6, 1974, by the U.S. Environmental Protection Agency (EPA), under section 611(c) of the Federal Aviation Act of 1958, as amended, which were published in a notice of proposed rule making identified as Notice 74-36. The amendment to the Federal Aviation Regulations (FARs) is based on the EPA proposals and involves (1) an increase in the number of test flights over the measuring point; (2) an increase in the substitute "D<sub>w</sub>" distances used in the performance correction formula when the actual distance is not listed in the approved performance information; and (3) a revision of the noise

of the source and distance between the noise source and the sound measuring device. Thus, the performance of the aircraft directly affects the level of noise perceived or measured on the ground. While the sound energy generated is constant for a given engine power setting (such as takeoff or maximum continuous), the noise level at the ground is dependent upon the climb path. In demonstrating takeoff noise, the steeper the climb, the higher the airplane above the measuring point, and the lower the measured or perceived noise level.

The level flight noise certification procedure prescribed for propeller-driven small airplanes does not itself provide information on the relationship between airplane performance and noise exposure on the ground. For example, two airplanes with the same power plant would be expected to produce about the same noise level over the measuring station at a height of 1000 feet, even though the total weight of one may be substantially greater than the other. However, for the reasons given above, a higher performance airplane (greater horsepower to weight ratio) would be expected to have the capability of achieving a higher altitude sooner, thus, producing less community noise impact and reduced perceived noise at the noise measuring point. To compensate for this factor in the simple flyover certification procedure, the FAA rule and the EPA proposal provide a "performance correction methodology" which would benefit airplanes with good take-off performance. As stated in the preamble of Notice 73-26, the proposed correction reflects the importance of good performance in removing the airplane as a noise source from the airport environs as rapidly as possible. As adopted by the FAA in Amendment 36-4, the performance correction factor is computed by using the following formula:

$$\Delta dB = 60 - 20 \log_{10} [(11430 - D_{50}) (R/C) / V_s + 50]$$

Where:  $\Delta dB$  is the correction that must be added algebraically to the measured values (limited to  $\pm 5$  dB);  $D_{50}$  is the takeoff distance in feet from brake release to a point at which the airplane is at a height of 50 feet at maximum certificated takeoff weight;  $R/C$  is the certificated best rate of climb in feet per minute; and  $V_s$  is the airplane speed in feet per minute corresponding to the best rate of climb. When  $D_{50}$  is not listed in the approved performance information, the FAA correction procedure requires the use of 1,375 feet for a single engine airplane and 1,600 feet for a multi-engine airplane.

The EPA concurred with the concept, but proposed modifying the correction factor formula to read:

$$P = 60 - 20 \log [(11,500 - D_{50}) \sin \epsilon + 50] - 10 \log (V_s / V_h)$$

Where:  $\epsilon = \arcsin (R/C) / V_h$ ;  $V_h$  = maximum speed (expressed in feet per minute) in horizontal flight at maximum continuous power or maximum test speed over the noise measuring station averaged for all test flights, whichever is greater; and  $V_s$  = best rate of climb speed at maximum takeoff weights, expressed in feet per minute.

In its recommended regulation, the EPA stated that it was concerned with

the FAA substitute  $D_{50}$  distance, because it believes that the distances of 1,375 and 1,600 feet are too short and that manufacturers of low performance airplanes might, therefore, choose not to list the actual  $D_{50}$  distances. To encourage the manufacturers to determine performance correction factors based upon actual performance characteristics, the EPA proposed to increase those distances to 2,000 feet for single-engine airplanes and 3,000 feet for multi-engine airplanes. The current rule (§ F36.201 (d)) uses approximate average distances for existing airplane types and models.

The FAA agrees with the EPA that the goal of the performance correction procedure is to create a regulatory incentive for increasing the performance of propeller-driven small airplanes. Thus, the substitute  $D_{50}$  distance (for use when an actual  $D_{50}$  takeoff distance is not listed in the approved performance information) should be more representative of approximately the longest  $D_{50}$  distance of current types and models of propeller-driven small airplanes. However, the FAA believes that the 3,000-foot distance (for multi-engine airplanes) recommended by the EPA exceeds the longest actual distance of any current type or model and, therefore, would result in an excessive penalty.

FAA review indicates that the longest  $D_{50}$  distances of current single-engine and multi-engine airplanes are approximately 2,000 feet and 2,700 feet, respectively. These distances are adopted in this amendment.

The EPA also noted that aircraft under test conditions (i.e. horizontal flight, maximum continuous power at 1,000 feet height above the test site) can be expected to fly over the test site at a speed greater than the takeoff climb speed. Therefore, the duration of the sound would be less under test conditions than the duration of sound experienced under or alongside an actual takeoff flight path. To better assess the noise measured under the specified test conditions, the EPA proposed to correct the noise level for performance ( $10 \log (V_s / V_h)$ ) to account for the change in speed which results in a change in noise duration. The measurement of duration is a factor in EPNL, also proposed by the EPA, but does not affect noise measurements using A-weighted dB, adopted by the FAA for the reasons discussed in the preamble to Amendment 36-4 and below. The FAA concludes that FAR Part 36 noise levels include consideration of performance and of noise duration and that further correction of measured data is not needed.

Four commenters responding to Notice 74-39 discussed the EPA proposed test performance correction. One commenter stated that while the performance correction contained in the proposed rule acknowledged the superior takeoff performance of turboprop aircraft, it is inadequate when related to the 11,500 feet correction distance point. The commenter felt that the correction should be related to the 21,000 feet (3.5 n.m.) point for better consistency with the FAR Part

36, Appendix C procedure which is applicable to propeller-driven large airplanes.

The FAA disagrees, since the purpose of the correction procedure is to reward those aircraft with good takeoff performance which will result in lower community noise impacts. The 3.5 n.m. point is used in the certification of large and jet powered aircraft but is not representative of noise impact-area at general aviation airports which primarily serve propeller-driven small airplanes.

Another commenter suggested that the certified best rate of climb (R/C) and corresponding airplane speed ( $V_s$ ) must be determined from data for "aircraft in clean configuration." The FAA notes that these factors are measured during the airworthiness certification of the aircraft where it is also in the applicant's best interests to insure that these values are derived with the aircraft in a clean configuration. Therefore, leaving the choice of configuration to the applicant (as is presently done) will generally achieve the result sought by the commenter. The FAA believes it is not necessary to require noise certification testing in a clean configuration.

One commenter indicated that there is a need for a special factor for a fixed-pitch propeller in the performance correction formula. According to the commenter, this need arises from the fact that while the noise from the propeller rises at a rate almost linearly with the rotational Mach number (tip speed/speed of sound), the aerodynamic performance of a fixed-pitch propeller does not rise as rapidly as it does for a variable-pitch propeller. However, since the purpose of the performance correction is to reward the better noise reduction designs, the FAA does not agree. The commenter's recommendation would, in effect, provide an increased benefit to a noisier aircraft design feature, and thereby negate the intended incentive for employing the better designs.

Another commenter recommended that to obtain the equivalent of EPNL data, the correction should be made to the 1,000-foot altitude horizontal flight measurements, rather than to the takeoff climb data. This commenter felt that if the manufacturer does not choose to use actual takeoff distances in calculating the correction to his EPNL, he should be required to use distances which do not permit rating the airplane quieter than it is. While the commenter may be confusing a decrease in perceived or measured noise levels due to improved climb performance with a decrease in noise produced by an airplane, the FAA agrees that the incentive to develop better performance designs should not be limited to those airplanes which already have better than average performance characteristics. A manufacturer who does not list the actual  $D_{50}$  distance in the approved performance information should be required to use the approximate  $D_{50}$  distance of the current lowest performance airplane when calculating the performance correction. Thus, the com-

menter's argument has been essentially accepted in adopting the amendment.

The effect of a longer substitute D<sub>50</sub> distance than that prescribed in FAR § F36.201 would be an increased incentive for aircraft manufacturers who do not achieve the average takeoff performance. The intent of the Noise Control Act of 1972, upon which the FAA and the EPA actions are based, is in part, to encourage the early and widespread application of the best available noise reduction technology consistent with economic reasonableness. With this objective in mind, the FAA analyzed the effects of the correction procedures proposed by the EPA and those adopted in FAR Amendment 36-4. As the EPA acknowledges, the differences are relatively minor and the precise effects on the takeoff performance of future aircraft types are not completely predictable; however, the FAA's analysis indicates that the procedure adopted in FAR § F36.201 does not create an adequate climb performance incentive, since it does not consistently apply to those airplanes which have less than average takeoff performance and which are not required to include the actual D<sub>50</sub> distance in approved performance information during certification. Therefore, the FAA agrees that § F36.201 should be amended to create an increased incentive to produce aircraft with improved performance capabilities. The FAA concludes that the EPA proposal, as modified, accomplishes that purpose. Thus, the FAA is adopting the EPA recommended regulation regarding this proposal, as modified.

#### C. ENGINE POWER SETTING

The EPA proposed rule (§ F36.111(b)) would require that demonstration test overflights be performed at the "highest propeller rotational speed (rpm) corresponding to rated maximum continuous power," and that accelerated flight be measured and reported. Appendix F of FAR Part 36, as adopted in FAR Amendment 36-4, currently prescribes the test requirement in terms of "rated maximum continuous power" which necessarily has a corresponding rotational speed.

The EPA recommended regulation in Notice 74-39 does not discuss the purpose of the proposed redefinition of the required power setting and neither of the commenters on this proposal provided any reason for their positions (one in favor, one opposed) or what, if any, impact the amendment would have. However, the EPA project report submitted to the FAA indicates an intention to delete the current requirement for a specific engine power setting. The EPA reasons that, since the effectiveness of applied noise control techniques would be determined at the highest propeller rotational speed (rpm) corresponding to maximum continuous power, the resulting test data would be valid for other power settings as well. Further, since takeoff power (when available), is used only for takeoff and a relatively short portion of the climb path, after which power is reduced to less than takeoff power, the reduced power is appropriate in the horizontal

flight test procedure, if the overflight is performed at the corresponding highest propeller rotation speed.

The FAA agrees, in general, particularly since use of takeoff power is limited to the period of time shown in the approved engine specification, but notes that "rated maximum continuous power" is a term of engine rating generally applicable only to engine certification and not to aircraft certification or operation. The FAA agrees that the current engine power requirement is not realistic since it also relates to engine operating limitations established during engine certification. Since current FAR § F36.111(b) requires noise test flights at rated maximum continuous power, the EPA proposal would, in effect, delete the engine-power component of the requirement and rely solely on propeller rotation speed as the controlling mechanism. While the propeller is the dominant noise source and that propeller tip speed relates directly to the level of noise generated, the FAA believes that to properly account for the noise of the propeller/engine combination, the test procedure must retain an engine power specification no less than the maximum power approved for continuous normal operation (as well as, a propeller speed corresponding to that power).

The FAA notes that, since under certain conditions the highest propeller rotational speed can be achieved or maintained at significantly reduced manifold pressure (engine power) or turbine rpm, high propeller rotational speed does not necessarily have a corresponding high engine power level. Therefore, the FAA agrees with the proposal, except for its redefinition of engine power so as to completely eliminate the engine power requirement. The FAA also concludes that the standard should be prescribed in terms of engine power which has a corresponding propeller rotational speed (rpm).

The EPA also proposed to require measuring and reporting accelerated flight (where it is permitted); however, the FAA believes that the use of accelerated flight does not have a significant effect on the accuracy of measured data under the current rule. The purpose of the EPA proposal regarding accelerated flight is adequately satisfied under FAR § F36.109(g), which requires that aircraft speed and position and engine performance parameters be recorded at an approved sampling rate sufficient to insure compliance with the test procedures and conditions. Further, most propeller-driven small airplanes are not equipped with acceleration measuring instruments or devices and, if adopted, the proposal would require additional test measuring equipment to be installed. The FAA concludes that the measuring and reporting portion of the EPA proposal should not be adopted at this time and consideration of amending the test procedure should focus on the propeller/engine specification.

The FAA believes that the purpose of the noise regulation is to prescribe noise standards and test procedures for propeller-

driven small airplanes which reflect the noise levels to which the community is exposed during normal operation of the aircraft, rather than theoretical levels or those generated in abnormal or emergency operation. Thus, the FAA concludes that noise test (engine) power should be prescribed at no less than the power corresponding to the highest normal operating power consistent with airworthiness requirements and safe operating conditions for normal operation. As previously stated, the FAA believes that since propeller/engine noise is a function of power, as well as propeller rotation speed, the engine power specifications should not be deleted entirely but amended to require the highest power in the normal operating range which is provided in an Airplane Flight Manual, or in any combination of approved manual material, approved placard, or approved instrument markings. Thus, the test power requirement must be consistent with airworthiness requirements for normal operation and with safe operating considerations. The FAA concludes that the EPA proposal, as modified, accomplishes that purpose. Thus, the FAA is adopting the EPA recommended regulation regarding this proposal, as modified. This results in a required power level that is not greater than that in the prior rule but greater than that potentially permitted in the EPA proposal.

#### D. COMPLIANCE/EFFECTIVE DATES

The EPA proposed to apply its recommended regulations to applications for type certificates made after October 10, 1973 (the date of FAA Notice 73-26). Since notice and public procedure regarding the EPA proposals did not begin until January 3, 1975 (the date of the notice of publication regarding Notice 74-39), and since the FAA had issued its own regulations based on FAA Notice 73-26 on December 31, 1974, the FAA believes that it should not adopt the EPA proposed compliance/effective date which related to the prior FAA NPRM.

In considering the date for compliance with the amendments being adopted, the FAA notes that the amendments involve the noise test and noise evaluation procedure and have no significant effect on the noise limits prescribed for propeller-driven airplanes under Appendix F. Thus, there will be little, if any, impact upon applications for type certificates or acoustical change approvals. However, the FAA is aware that some potential burden may result from these changes in the manner of conducting the noise certification test and evaluating the resulting data. In this case, the FAA concludes that, while the necessary adjustments will be minor, a reasonable period must be provided for them to be made. Similarly, those noise tests that are completed prior to the effective date of this amendment should not be required to be repeated under the amended procedure. The FAA believes 30 days is an adequate and reasonable period. Thus, the FAA is adopting a compliance date which requires that noise tests conducted after

the effective date of this amendment be performed under the amended procedure. This amendment is effective January 24, 1977.

III. NOTICE OF DECISION NOT TO PRESCRIBE AMENDMENTS

A. AGRICULTURAL OPERATION AND FIRE FIGHTING AIRPLANES

Under the EPA recommended regulation contained in Notice No. 74-39, an airplane designed for agricultural or fire fighting operation would be required to undergo noise measurement testing in accordance with the Appendix F of FAR Part 36, even though that airplane may be excepted from demonstrating compliance with the noise levels prescribed in § 36.301. The EPA proposed exception to compliance would apply only if an operating limitation (proposed § 36.1583 (c)) regarding FAA approved noise abatement flight plans and routes were issued. Similar requirements were originally proposed by the FAA in Notice 73-26; however, in FAR Amendments 36-4, the FAA proposal was modified to make the rule more workable and to eliminate unnecessary restrictions on the continuation of those beneficial operations.

The FAA believes that the cost burden on certification applicants in submitting extensive noise test data and analyses primarily for statistical and informational purposes is not justified. Conducting noise testing solely to establish the noise levels produced by these excepted airplanes without also requiring compliance has not been shown to be needed. Further, as previously stated in the preamble to FAR Amendment 36-4, the FAA concludes that neither agricultural nor fire fighting operations could be continued under the operating limitation as proposed because those operations frequently involve practical exigencies requiring a greater than average performance and the capability of rapid response which is not compatible with flight-by-flight approval of all routes and all flight plans to promote noise abatement. Thus, the current noise limits do not apply to propeller-driven small airplanes "designed for 'agricultural operations' \* \* \* or for dispensing fire fighting materials" (FAR § 36.1(a)(2)).

While the EPA proposal does not discuss the basis of its proposed rule, after analysis of that proposal and the regulatory docket, the FAA agrees that the current exception to the noise certification rules adopted by the FAA for agricultural and fire fighting airplanes should be amended. The FAA believes, however, that the amendment should clearly prohibit those operations which are not necessary to accomplish the work activity directly associated with the purpose for which the airplane is designed. The FAA believes that the exception is still justified as it applies to operations for which the airplane is designed but that it should not be extended to other operations by those airplanes. However, the FAA believes that such an amend-

ment is not within the scope of the notice of the EPA proposal. Thus, while the FAA concludes that it should not adopt any amendment based on the EPA proposal, the FAA is issuing a separate notice of proposed rule making which proposes to amend FAR Part 91 to prohibit operation of an airplane designed for agricultural operations or for dispensing fire fighting materials, which do not comply with the applicable noise limits of Part 36, except to the extent necessary to accomplish the work activity directly associated with the purpose for which the airplane is designed. (That NPRM is being published in the "Proposed Rule" section of Today's FEDERAL REGISTER.)

One commenter to the EPA proposal questioned both whether any small airplane exceeds "high-noise levels" except at full power and why only agricultural and fire fighting airplanes would be excluded under the rule, since safety of all operations involving full power for business and pleasure aircraft are just as important. However, stating that the health and welfare of the rural populace requires protection comparable to that afforded elsewhere, another commenter opposed the exclusion of aircraft used in agricultural operations from the noise standards for propeller-driven small airplanes. The FAA agrees that additional limitations may be needed but concludes that the distinction for agricultural and fire fighting aircraft is justified, in part, because greater than average performance and quick response time are frequently required in these operations. The public interest considerations dictate, as a matter of flight safety, that the small number of these special purpose airplanes should be partially excepted from the normal noise certification standards. A review of the safety and operating issues involved does not reveal a similar need to apply these exceptions to the noise standards to other propeller-driven small airplanes. For the unexcepted airplanes, noise certification testing and compliance is required to assure the protection of the public health and welfare from noise emissions above those noise levels prescribed in Appendix F. Further, the FAA believes that the exception to required compliance with noise emission standards for aircraft designed for agricultural or fire fighting operations should be specifically restricted solely to those operations for which the airplane is designed. Thus, while the FAA concludes that it should not adopt the amendment proposed by the EPA, based on experience in noise type certification under Subpart F of FAR Part 36, and analysis of the proposal and information in the regulatory docket, the FAA concludes that it should propose an amendment to the exception to the noise standards for agricultural operation and fire fighting airplanes which would restrict operations by excepted airplanes to those operations for which they are designed. As previously stated, such a proposal is being issued in a separate notice of proposed rule making.

B. NOISE EVALUATION MEASURING UNIT

The EPA proposed to adopt the Effective Perceived Noise Level (EPNL) in units of EPNdB, rather than the A-weighted noise level (AL) in units of dB(A) as the noise measure for propeller-driven small airplanes in current Appendix F of FAR Part 36 (Proposed § F36.301). In addition, the EPA proposes to require the use of the procedures in Appendix B of FAR Part 36 for converting the measured noise of propeller-driven small airplanes into the EPNdB units. (Proposed § F36.301(a)). According to the EPA, it proposed adopting the more complex noise evaluation unit primarily because future aircraft types may develop potentially obnoxious noise signatures which would not be reflected in the A-weighted noise measure.

In its proposal, the EPA refers to its report to Congress in August 1973, wherein it recommended a cumulative noise exposure measure based upon AL (A-weighted level). The EPA indicated, however, that the "use of an A-weighted sound level precludes the assessment of penalties for the existence of tones in the noise in the interest of simplifying the measure procedure. When appropriate, penalties for tones and other subjective attributes should be made in source regulations such as FAR 36." (Emphasis added).

The FAA believes that, in terms of providing protection to persons from noise annoyance, there is no significant achievable difference between using dB(A) or EPNdB for propeller-driven small airplane noise. Frequency tones and noise duration are not significant factors in perceived noise emissions of propeller-driven small airplanes. However, in terms of the complexity of noise testing, the difference is very significant. Further, it is unlikely that the developing technology of propeller-driven small airplanes will generate noise characteristics significantly different in quality from those currently produced. Thus, the FAA concludes that the use of EPNL would be an unwarranted and an unnecessary burden. There is no currently demonstrated need to apply the more complex unit of measurement to all current and future propeller-driven small airplanes on the assumption that new noise characteristics may emerge from new generation aircraft designs.

Information submitted to the FAA varies widely regarding the cost effectiveness of using EPNL instead of dB(A) measurements. In the EPA's project supporting its proposed regulations, the EPA estimated the cost of complying with the proposed EPA procedures, including EPNdB, to be "between 20 and 30 thousand dollars" for each aircraft manufacturer. The manufacturers' trade association comment to Notice 74-39, however, estimated that the cost of the equipment alone, which is necessary to compute aircraft noise levels in terms of EPNL, would be "\$50,000 over that required for dB(A) measurement." The FAA believes that both equipment cost estimates are essentially correct in the specific contexts in

which they are reported. However, the FAA experience with the implementation of FAR Part 36 indicates that few applicants for type certificates (usually manufacturers) actually purchase a computer or other major cost equipment items solely for noise test compliance purposes. Rather they tend to use existing commercial computation facilities/services or lease the necessary equipment for their own personnel to use. Under these conditions the FAA believes, that for most manufacturers there is not a substantial equipment cost differential incurred in using EPNdB rather than dB(A) as the unit of measurement. However, applicants for acoustic change approvals for propeller-driven small airplanes are usually individual owner/operators who have neither the facilities or equipment nor the technical know-how to operate rented equipment themselves. The owner/operator may also need to test an acoustic change before submitting it to the official FAA-witnessed tests. The complexity of calculating EPNdB under such circumstances is not as cost effective as the simpler dB(A), which reduces the down time of the airplane and equipment needs, and provides immediate test results. Another commenter correctly observed that "measurements in units of dB(A) can be evaluated and the 90% confidence interval examined in the field, to ascertain if additional noise overflights are required to obtain the required confidence level." Since a computer is required to calculate EPNL, such field determinations are practically impossible. If additional test flights are needed, it would be necessary to reschedule aircraft and acoustic equipment for a subsequent return to the field. Therefore, the FAA concludes that to be appropriate to the type of aircraft to which it applies, the designation of the simpler technique and calculation in using dB(A) for noise compliance tests for propeller-driven small airplanes should be retained.

The EPA also pointed out that "the main consideration is that EPNdB allows a correction for the presence of tone and the duration of sound, neither of which is accounted for in dB(A). As a growing number of propeller-driven planes are powered by turbine engines, it is imperative that a noise measurement standard be used which will most closely recognize that effect." The EPA estimated the current percentage of turbine powered aircraft in the propeller-driven small aircraft fleet to be 1.24 percent; this figure would increase to 1.69 percent in 1980 and reach 2.10 percent by 1985. Even assuming the need for making tonal corrections to measurements of noise from the turbine-powered propeller-driven small airplanes, the FAA concludes that the added cost involved in testing all propeller-driven small airplanes on the EPNL measurement is not justified at this time. The FAA notes, however, that nothing submitted to the rulemaking docket supports a conclusion that such a need for tonal corrections actually exists.

Twelve other persons commented on the issue of the noise measurement unit. Most believe that dB(A) is the appropriate unit, because the use of the dB(A) scale is a more cost-effective and practical standard than EPNdB. They indicate that the character of the sound generated by the propeller-driven small airplane does not warrant the more sophisticated test equipment and the rigorous data reduction required by the EPNdB standard. The FAA agrees in general with the reasoning expressed by these commenters.

Two comments supported the EPA's proposal. One commenter in recommending the use of EPNL stated that "while EPNL measurements and calculations are more complicated than with dB(A), the EPNL system takes into account details regarding the noise spectrum and flyover cycle duration which are not as accurately evaluated or are not evaluated at all using dB(A)." As stated above, the FAA has carefully considered the issues involved and concludes that no real need has been shown for the more complicated measurement unit and that, therefore, the added costs have not been justified at this time.

Another commenter supporting the EPA proposal stated that as an increasing number of propeller-driven planes are powered by turbine engines, the regulatory noise measurement standard should more closely recognize the effect on the human ear. Since the FAA believes the EPA recommended noise measurement unit would not be cost effective and that there is little, if any, preferential value of EPNL to the public health and welfare when applied to propeller-driven small airplanes, it does not accept the commenter's suggestion. A second recommendation by this commenter would require the use of both EPNdB and dB(A) measurements during compliance demonstration tests. While monitoring the aircraft test using dB(A) sound level meters may in some cases reduce the need to schedule retesting at later dates, such measurements would not consistently predict the effectiveness of subsequently analyzed EPNdB data measurements. Further, the FAA considers the dual measuring procedure unnecessary. As previously stated, the current procedure provides adequate and sufficient noise data for determining compliance with noise level standards.

The adequacy of the dB(A) measuring unit to provide protection to the public health is also supported by its adoption by other Federal agencies. The dB(A) unit has been selected by the Department of Labor and the Department of Health, Education and Welfare (HEW) for the critical task of rating and limiting noise hazards. The value of dB(A) is stressed in the document entitled "Criteria for a Recommended Standard for Occupational Exposure to Noise" published by HEW in 1972.

Studies such as NASA's "Community Reaction to Airport Noise" stress the fact that simple weighted sound pressure level values (dB(A) and dB(N)) provide ade-

quate approximations to more complex measures for the purpose of determining community noise exposure.

The FAA believes the use of dB(A) is consistent with the qualifications in EPA's noise measurement recommendations, since the FAA has determined that noise emission characteristics of propeller-driven small airplanes do not need regulatory penalties to account for tone or duration, and EPA's recommendation is linked to a concern for those factors.

The use of dB(A) ensures that reasonably priced meters can give an immediate reading upon which to base a decision for additional test flights. If this decision can be made while aircraft are available and test conditions are established, savings in cost and time are possible. Finally, dB(A) is the unit used in evaluating non-aviation transportation noise sources, and is used in setting noise limits in many industrial and nonindustrial noise standards.

Since there appears to be no clear benefit in a complex measure, the FAA concludes that from an environmental standpoint and in terms of cost effectiveness, dB(A) is the unit of noise measurement that should be applied to the certification testing of propeller-driven small airplanes. Thus, no amendment is adopted based on this EPA proposal.

#### C. NOISE COMPLIANCE LEVELS AND DATES

The EPA stated in its recommended regulation that it believed that the noise level requirements achieved under FAR Part 36, Appendix F, do not sufficiently represent the maximum safe and economical noise control that can be implemented by applications of current and available technology. Further, the EPA believes that modifications are necessary to properly reflect the achievements that can be anticipated by the application of future technology.

Specifically, the EPA proposed the following noise standards and compliance dates (Proposed § F36.301):

(1) For T/C applications made between October 10, 1973, and January 1, 1975. Aircraft weighing up to 1,320 pounds (599 kg) may not exceed 79 EPNdB. That noise level limit increases at a rate of 1 EPNdB for each additional 165 pounds (75 kg) to a maximum of 93 EPNdB at 3,630 pounds (1,647 kg) which limit applies to aircraft up to 12,500 pounds (5,670 kg).

(2) For T/C applications made between January 2, 1975, and January 1, 1980, and for new production aircraft manufactured on or after January 2, 1977. The basic limit is the same as in paragraph (1) above, except that the maximum noise level is 91 EPNdB at 3,300 pounds (1,397 kg) and applies to aircraft weighing up to, and including, 12,500 pounds (5,670 kg).

(3) For T/C applications made after January 2, 1980. The noise level limit would be prescribed under the formula  $EPNL = 89 - 15 \log(12.5/W)$ ; "W" is the aircraft maximum certificated takeoff weight in thousands of pounds.

In its proposal, the EPA compared the FAR Part 36 compliance noise levels with the noise emission levels produced by a wide variety of existing propeller-driven airplanes. In so doing, the EPA stated that "a large number of the small existing propeller airplanes are capable of producing significantly lower noise levels than that being proposed by the FAA for all future types." The FAA recognizes that some current aircraft types have noise emission levels that are lower than those required under FAR Part 36, Appendix F. However, the levels adopted by the FAA in FAR Amendment 36-4 require significant noise reductions affecting approximately 20 percent of the aircraft types and approximately one-half the aircraft type-models of propeller-driven small airplanes currently in production. It was pointed out by several participants at the public hearings held on the EPA proposal that the FAR Part 36 requirement entails significant economic impact on affected aircraft manufacturers and, thus, their customers, and that the imposition of more restrictive standards or earlier compliance dates, such as those proposed by the EPA, would have profound economic implications. For example, if a sound level limit of 5 dB(A) lower than those in FAR Part 36 were adopted (a level which is still somewhat higher than the equivalent EPIdB proposed by the EPA), the FAA estimates that the noise level limits would be exceeded by approximately 90 percent of existing aircraft models. While some models that meet the present FAR Part 36, Appendix F noise standards could, with relatively minor modifications, achieve the initial lower level proposed by the EPA, this is not the case with most current models. Compliance with future noise level limits would be even more questionable. Since the Noise Control Act of 1972 requires the FAA to consider whether proposed noise standards are "economically reasonable," and appropriate for the particular type of aircraft, as well as "technologically practicable," the FAA must carefully weigh the economic consequences of incrementally lower noise level standards, applicable to both current and future airplanes.

Several commenters estimate that the majority of currently produced aircraft models would require extensive modification in order to attain the EPA recommended lower noise levels, and that the increase in cost of most models would be significantly higher than that reflected in the EPA proposal even excluding the additional higher operating costs for those models requiring more powerful engines to maintain the desired levels of performance. The FAA has not received information from which to assess whether the estimates submitted to the docket regarding the anticipated costs of significant noise level reduction are representative of those which would actually occur. It is evident, however, that if design changes such as those cited by commenters would be needed, the EPA proposal would involve a significant design modification and investment by the airframe and engine manufacturers. It

would particularly burden this segment of the aviation industry which neither has the research and development resources nor anticipates the market base to amortize the resulting costs.

Testimony at the public hearing and comments submitted to the regulatory docket raise questions regarding the views expressed by the EPA concerning the ready availability of economical technology with which to meet its proposed standards. The EPA believes that a reduction in noise levels, which is larger than those prescribed in FAR Part 36, could be achieved by more effective application of "current technology," "available technology," and "future technology" without imposing a significant economic burden. According to the EPA, the equivalent of 2 or 3 dB(A) further reduction in propeller, engine, or exhaust noise, which EPA identifies as the principal noise sources in propeller-driven small airplanes, is possible and is needed to provide the required protection to the public health and welfare. The EPA states that the use of a more efficient three-bladed propeller rotating at a lower tip-speed by means of reduction gearing and the application of noise muffling materials and exhaust mufflers will achieve economical noise control at the levels it recommends. The FAA notes, however, that the EPA proposal is based upon several assumptions which are not discussed in the recommended regulation. The EPA recommended regulation and the comments received in the docket and at the public hearing do not present specific information or analysis regarding how particular aircraft types or models can achieve significant and economical noise reductions under the EPA proposal. The FAA believes that such information and supportive data is essential to the support of the proposal. Information concerning particular airplanes is needed regarding (1) any incremental noise reduction which can be economically achieved beyond those currently required by FAR Part 36, including the additional benefit, if any, of such reductions on the public health and welfare; (2) any noise control techniques which are, or may be available, but which are not or will not be effectively applied to particular aircraft unless lower noise levels are adopted; (3) any cost increases which would result from applying those techniques; and (4) any reduction in performance, fuel economy, engine emissions, or other factor which affects its use for its intended purposes, its airworthiness, or its acceptance in the market place. While the FAA is aware that the noise control techniques suggested by the EPA are, or will be applied in varying degrees to certain aircraft in achieving compliance with FAR Part 36 noise levels, it does not have, and the docket does not contain, information or data that will reasonably support a finding that these techniques can be more effectively applied at this time. In adopting FAR Amendment 36-4, the FAA concluded that the prescribed noise levels provided the protection to the pub-

lic health and welfare required by section 611(d) of the Act. Further, as stated in the preamble to FAR Amendment 36-4, "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." Since the docket has not presented information adequate to support a finding that noise control technology is not being effectively utilized or that specific design details should be required under aircraft noise regulations, the FAA concludes that it could not adopt any regulation based on this proposal at this time without ignoring the duty in section 611(d) (4) of the Act to consider economic reasonableness and technological practicability.

The EPA also recommended the use of a ducted fan propulsion system or one of its derivatives. However, several commenters were critical of a ducted fan as a noise abatement technique and the FAA generally agrees with those commenters. The ducted fan is generally not practical for most current single-engine airplanes because it seriously reduces forward visibility for the pilot and significantly affects the aircraft weight/thrust ratio. Thus, for most airplanes to use the ducted fan, they would have to be redesigned into pusher type configurations; that in turn would require extensive modification to the wings, flight control, landing gear, fuselage and seating. Such extensive redesigning virtually produces a new aircraft type. In addition, the thrust efficiency of a ducted fan propulsion system is significantly less than that of a conventional propeller at the altitudes and speeds for which propeller-driven small aircraft are usually designed. The installation of more powerful engines would be required in many cases to compensate for thrust loss and avoid decreased useful load capacity and performance.

Fourteen other comments were submitted to the docket regarding EPA's proposed noise emission levels and compliance dates. One comment expressed the views of several persons who believe "that an aircraft with less than 300 horsepower does not emit offensive noise to the extent that it warrants regulation." Another commenter complained that the limitation of noise emission on airplanes with only 150 horsepower is not justified. Under the Noise Control Act of 1972, the FAA is required to issue noise standards and rules which afford relief and protection to the public health and welfare from aircraft noise. In prescribing these regulations, the FAA must consider whether they would be "consistent with the highest degree of safety in air commerce or air transportation in the public interest" and whether they are "economically reasonable, technologically practicable, and appropriate" for the type of aircraft, engine, appliance, or certificate to which they would apply. The FAA and the EPA have determined that the prescription of rules which af-

ford relief and protection from the noise emissions of propeller-driven aircraft is appropriate, and find no rational basis for distinguishing among these airplanes, except with regard to aircraft weight which, to some extent, reflects the horsepower of the engines. Thus, lower horsepower airplanes as a class should not be excluded from the application of appropriate noise standards. However, the noise levels prescribed in the FAA noise standard applicable to propeller-driven small airplanes do reflect consideration of the extent to which their noise emissions impact the community.

Other commenters specifically addressed the need for the EPA proposed regulations and believe the FAA should reject the EPA proposed noise levels and their date of implementation. Some concern was expressed that the EPA proposals, if adopted, would eliminate the substantial equivalence with the accepted international (ICAO) standard for small propeller aircraft. In opposing the EPA's proposal, one commenter at the public hearing argued that the EPA had admittedly used NASA research goals as a basis for their recommendations. The commenter stated his belief that a base of technical data to support EPA's conclusions must have a firmer foundation. While agreeing that the noise standards initially adopted by the FAA may not attain the eventually achievable measure of protection from unwarranted small aircraft noise, the FAA believes that further noise reductions should await a more definitive showing that the required technology can be applied in an economically reasonable manner.

In its proposal, the EPA states that it may be assumed that the least noisy airplanes currently being produced meet applicable airworthiness standards and "are competing economically in the marketplace with other propeller-driven small airplanes with higher noise levels." Thus, the EPA concludes that the application of existing noise reduction technology has not had a detrimental impact on the competitiveness of such airplanes. However, no information or data is presented in the docket by which this conclusion may be assessed. The FAA believes that at least one important aspect of the competitiveness among various airplanes in the marketplace has not been addressed. While for purposes of noise control regulation propeller-driven small airplanes are treated as a class according to aircraft weight, they are designed and flown for a wide range of purposes requiring different flight and performance characteristics. Comparisons of marketplace acceptance among the least noisy airplanes and noisier airplanes should include only those airplanes which actually compete for the same portion of the market. The docket does not provide a basis for such comparisons.

Two commenters fully supported the EPA proposals at the public hearing. One comment questioned whether continued production of noisy aircraft can be justified when aircraft manufacturers can build aircraft that are much quieter than some currently in production. Another

commenter stated his belief that the FAA rule does not adequately control propeller-driven aircraft noise, but rather removes existing voluntary restraints by eliminating all incentive for the implementation of available noise control technology.

In response to questions seeking to clarify their statements, neither of these commenters offered information regarding any incremental benefits or cost/benefits tradeoffs under the EPA proposal or regarding the degree of detriment to the public health and welfare caused by noise emissions from propeller-driven small airplanes. In the preamble to FAR Amendment 36-4, the FAA responded as follows to a similar comment regarding inclusion of a more specific provision in the rule for progressively reducing the noise level limits 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." After carefully considering the EPA proposed noise levels and compliance dates in light of all comments to the docket, the FAA concludes that there is not sufficient supporting information or data to permit an informed determination as to whether these EPA proposals are currently either "economically reasonable" or "technologically practicable" within the meaning of section 611 of the Act. The docket contains no information regarding any incremental benefits to the public health and welfare which would be achieved and that would justify adopting the proposed noise level amendments to FAR Part 36.

In its proposal, the EPA states it has not demonstrated any certain or probable increment of benefit to the public health or welfare that would be achieved by imposing lower noise limits. The EPA has stated that data on the magnitude of the health and welfare effects of propeller-driven small airplanes, "are not available; consequently, cost effectiveness and/or cost benefits tradeoff of how much noise reduction is justified cannot be made." The EPA indicates that its objective is the issuance of regulations that "shall be the 'umbrella' type in the sense that those aircraft regulated can all comply by use of available technology but some may be capable of achieving lower noise levels than others by virtue of being able to use the technology more effectively." While the FAA generally agrees with this regulatory philosophy, after reviewing the technology and economics involved, the FAA believes that the statutory requirements are met by the standards in FAR Part 36, which for continued production, require modification of a significant proportion of current aircraft types and of a substantial percentage of current models. Thus, existing regulations provide adequate noise control and abatement by achieving a reduction in noise level that was imposed after consideration of economic and technological impact. The FAA also believes the current standards and regu-

tions achieve the objective of the EPA recommended regulation, i.e., prescribing an "umbrella" or upper limit for aircraft noise levels which can be lowered, according to the development of technologies and to the cost effectiveness of prescribing those noise levels. Further study of the detrimental effects of noise emissions from propeller-driven small airplanes may also reveal the need and justification for lower noise levels in the future. The FAA will continue to assess the noise emission impact of propeller-driven small airplanes to determine when further reductions in noise levels become appropriate and otherwise consistent with the limitations of § 611(d)(4) of the Act.

#### D. FIELD CALIBRATIONS WITH VOLTAGE INSERT DEVICES

Under the EPA recommended rule, "field calibrations must be supplemented with the use of an insert voltage device to place a known signal at the input of the microphone, just prior to and after recording aircraft noise data." (Proposed § F36.107(c)).

While the FAA would have no objection to the use of such a device either in the laboratory or in the field, the docket does not demonstrate any persuasive technical reason for requiring it in field calibrations. In view of the rapidly changing technology in acoustical measurement, the FAA believes it should not restrict use of future technologies by prescribing the proposed calibration procedure or equipment. Rather, it should afford maximum flexibility in equipment and methodology used while setting specific requirements on the types and quality of data used to demonstrate compliance with prescribed noise level limits. No comment on this proposal was received in the regulatory docket. Thus, the FAA concludes that it should not adopt any regulation based on this EPA proposal but should continue to consider for approval any calibration procedure which yields accurate and reproducible results and which is consistent with International Electrotechnical Commission (IEC) Publication No. 179, dated 1973, entitled "Precision Sound Level Meters."

#### E. CORRECTIONS FOR WINDSCREEN LOSSES

The EPA also proposed in § F36.105(f) of its recommended regulations to require that when a windscreen is employed with the microphone during compliance testing, "corrections for any insertion loss produced by the windscreen, as a function of frequency, must be applied to the measured data and that the corrections applied must be reported."

While no commenter addressed this proposal, the FAA believes that, as adopted, the current Appendix F provides an adequate means of accounting for correction of windscreen losses without separate treatment under the rule. FAR § F36.109(a) requires that data representing physical measurements or corrections to measured data be recorded in permanent form and appended to the record (however, corrections to measurements for normal equipment response deviations need not be reported). All

other corrections must be approved and estimates must be made of the individual errors inherent in each of the operations employed in obtaining the final data. The FAA concludes, therefore, that amendment of § F36.109, based on this EPA proposal, is not necessary and that the EPA's recommended regulations on this topic should not be adopted.

#### F. MINOR LANGUAGE DIFFERENCES AND STATISTICAL DATA REQUIREMENTS

The text of the EPA's proposed rule contains several minor provisions which the EPA does not discuss in the preamble to Notice 74-39. Some of these provisions differ from the language in the rule adopted in FAR Amendment 36-4. Most of these differences appear to be minor in nature and the FAA believes that they do not affect the level of protection from aircraft noise afforded by the rule.

The FAA notes, however, that several of the differences would require measuring and reporting some data which would provide only statistical information without any apparent increase in the environmental benefits achieved by the rule. While the materials in the docket do not discuss the purpose of these provisions, the FAA believes that it should not use noise certification rules to obtain data for statistical purposes, unless there is a demonstrated relationship with the need to protect the public health and welfare. Examples of EPA recommendations that the FAA believes would be a requirement to provide statistical data not needed for noise certification or helpful in reducing noise include—(1) the recording and reporting of the "true and indicated airspeed" and engine performance in the specific terms of power, manifold pressure, and blade pitch in every test (proposed § F36.109(e)(4) and (5)); and (2) correcting test data to the additional reference conditions of "sea level pressure of 2116 psf" and "zero wind" (proposed § F36.201(c)). Further, the FAA does not believe that correction to "sea level pressure" is practicable or that correction to "zero wind" is needed for single point measurements such as those prescribed for propeller-driven small airplanes. Thus, the FAA concludes that it should not prescribe regulations based on those EPA proposals.

#### G. ECONOMIC REASONABLENESS

Section 611(d) of the Federal Aviation Act of 1958, as amended, requires, among other things, that the FAA consider whether proposed aircraft noise standards and regulations are "economically reasonable." The preceding discussions of the respective EPA proposals generally include assessment of their economic reasonableness or cost effectiveness. However, review of the regulatory docket reveals that most commenters speak to the economic implication and adequacy of the EPA recommended regulation-as-a-whole, rather than as separate proposals. Twenty-five of the 44 commenters included written submissions or oral presentations regarding the economic effects of the EPA recommended regulations.

Representative of the general tenor of the comments from small airplane pilot/owners is one which said that the commenter is troubled by an observed trend towards increasing costs of private flying as a result of regulatory amendments. Other commenters address concern for the anticipated economic burden on the aircraft manufacturers and ultimately purchasers and operators of new aircraft if the EPA proposals were adopted. Several commenters stated that they believe the impact of increased cost of aircraft as a result of implementation of the EPA proposals would be inflationary and have a stifling effect on the growth of general aviation. Another commenter stated that "With ever increasing financial demands being placed on the industry, there should be unquestionable justification for adding to the already monumental costs of purchasing and operating a small propeller-driven airplane. We certainly have no qualms about quieter aircraft; however, we do feel that new acoustical standards should be adopted only at a rate that is consistent with advances in technology and without sacrifice to performance of efficiency \* \* \*. Let's have quieter airplanes but let's not do it by forcing them to stay on the ground."

These and similar comments indicate that commenters believe that the costs of complying with EPA's proposed noise limits and other recommended regulations would be significant. The EPA itself estimated the cost of the type certification and the modifications needed for compliance with its proposal would range from \$300 to \$2,500 per airplane, depending upon the type of airplane and the production run. While the EPA concluded that this increase for an airplane ranging in price from \$14,000 to \$25,000 appeared to be "economically reasonable for the reduced noise benefits to be derived," the cost data and information submitted to the docket do not discuss what noise benefits would be achieved under the proposal. In addition aircraft manufacturers suggest that the costs would be several times as large as those estimated by the EPA.

Other commenters, while not providing specific cost information, frequently expressed concern for the costs of complying with the EPA proposals. All parties agree that adoption of the EPA proposals would result in increased costs. As previously stated, however, the docket does not contain data or information from which to demonstrate that any certain or probable increment of benefit to the public health and welfare would be achieved by adopting the recommended regulations. Absent such data and information regarding the achievable benefits to the public health and welfare, the FAA concludes that the EPA proposals considered in this section cannot be issued consistent with the requirement in section 611(d) of the Federal Aviation Act of 1958 to consider whether a proposed regulation is economically reasonable and technologically practicable.

#### H. GENERAL COMMENTS

The regulatory docket for Notice 74-35 received several comments addressing subjects not relevant to the issues involved in the EPA proposals. Thus, many of those comments were beyond the scope of Notice 74-39, and are not discussed in this notice. However, some comments address relevant matters not previously discussed.

One commenter argued that most of the objection to aircraft noise comes from those people in the vicinity of an airport and that most of these people knew the consequences of their decision to live near areas of aircraft noise. This commenter concluded, "we do not believe that the aviation industry should suffer because a minority of the population choose to live in such areas." Another commenter said, "Since I know that I will inevitably be taxed to support aviation, as an aircraft owner, I would prefer that my taxes went toward the support of more essential research. Research toward making aviation more acceptable to the general public, as in quieter engines, is a worthy investment." Several other commenters generally opposed the EPA proposals on various grounds relating to the lack of need for further noise constraints on general aviation airplanes or to commenters' beliefs that the sound of an aircraft engine is not as offensive as other noise sources, including other modes of transportation.

As discussed in the preamble to FAR Amendment 36-4, the FAA has determined that the control and abatement of noise produced by propeller-driven small airplanes is appropriate and necessary under the Noise Control Act of 1972. The scope of Notice 74-39 encompasses the recommended regulations submitted by the EPA which it believes are necessary to protect the public health and welfare. To the extent the commenters suggest that there is an absence of information demonstrating the extent to which the proposals would be cost-effective or benefit the public health and welfare, the FAA agrees. The FAA also agrees that further research on this important matter is essential to determine the need for further noise limit reductions in the future.

The FAA is expanding its comprehensive analysis of the public impact of aircraft noise. This effort is part of a broad FAA review of the national aviation system aimed at determining the environmental benefits and related costs of source noise controls, operating procedures, and land use planning. This study includes investigations of the noise impacts of different aircraft classes (including propeller-driven small airplanes), new technology that might be applied to each class, and forecasts of the growth of each class. As the results of this study become available over the next two years, FAA will undertake such future actions as may be appropriate.

Despite the assurance in the preamble to Notice 74-39 that the proposed rules would not require a retrofit of existing

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propeller-driven small airplanes, several persons commented on that issue. One suggested that before requiring retrofitting of existing airplanes, the FAA should provide earlier notice because "with an advance notice of retrofit requirements, airplane manufacturers will have an opportunity to plan for changes in the power plants at a later date." The FAA is aware of the problem raised by this commenter and will consider that suggestion in any future rule-making proceedings regarding proposals to prescribe retrofit requirements for propeller-driven small airplanes.

Several commenters objected generally to the EPA proposal because the FAA had already adopted noise limitations for propeller-driven small airplanes. The FAA concludes that the airplane noise regulation recommended by the EPA has been carefully considered and that the EPA has provided several significant contributions to the noise certification test procedure in its recommended regulations which contribute to carrying out the purposes of section 611 of the Act. For the reasons discussed above, those proposals are adopted by the FAA in the following amendments to the Federal Aviation Regulations or, as modified, are being proposed for adoption in separate notice of proposed rule making.

## IV. AMENDMENT AND NOTICE OF DECISION

**AUTHORITY:** [Sections 313(a), 601, 603, and 611 of the Federal Aviation Act of 1958, (49 U.S.C. 1354(a), 1421, 1423, and

1431), as amended by the Noise Control Act of 1972 (Pub. L. 92-574, Oct. 27, 1972); section 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, dated March 5, 1970.]

In consideration of the foregoing, the Federal Aviation Administration hereby takes the following actions in response to the recommended regulation submitted to it under section 611(c)(1) of the Act by the U.S. Environmental Protection Agency which was published as Notice 74-39 (40 FR 1061; January 6, 1975), regarding noise standards and test procedures applicable to propeller-driven small airplanes:

(1) Notice is hereby given in accordance with section 611(c)(1)(B) of the Federal Aviation Act of 1958, as amended (49 U.S.C. 1431(c)(1)(B)) that the Federal Aviation Administration is not prescribing regulations in response to the proposals contained in Notice 74-39 regarding (a) agricultural operation and fire fighting airplane exception to required compliance; (b) EPNdB as the noise evaluation measuring unit; (c) noise compliance levels and dates; (d) field calibrations with voltage-insert devices; (e) corrections for windscreen losses; and (f) other minor proposals and statistical data requirements not adopted under item (2).

(2) In accordance with section 611(c)(1)(A) of the Federal Aviation Act of

1958, as amended (49 U.S.C. 1431(c)(1)(A)), Appendix F of Part 36 of the Federal Aviation Regulations (14 CFR Part 36) is amended, effective January 24, 1977, as follows:

1. Paragraph (b) of section F36.111 is revised to read as follows:

**Section F36.111 Flight procedures.**

(b) Each test over flight must be conducted:

(1) At not less than the highest power in the normal operating range provided in an Airplane Flight Manual, or in any combination of approved manual material, approved placard, or approved instrument markings; and

(2) At stabilized speed with propellers synchronized and with the airplane in cruise configuration, except that if the speed at the normal operating range provided in a graph would exceed the maximum speed authorized in level flight, accelerated flight is acceptable.

**§ F36.201 [Amended]**

2. Paragraph (d) of section F36.201 is amended by deleting the figure "1375" and inserting the figure "2000" in place thereof; and by deleting the figure "1600" and inserting the figure "2700" in place thereof.

Issued in Washington, D.C., on December 17, 1976.

JOHN L. McLUCAS,  
Administrator.

[FR Doc. 76-37649 Filed 12-22-76; 8:45 am]

**Title 14—Aeronautics and Space**  
**CHAPTER I—FEDERAL AVIATION**  
**ADMINISTRATION**

[Docket No. 18243; Amdt. 36-6]

**PART 36—NOISE STANDARDS: AIRCRAFT**  
**TYPE AND AIRWORTHINESS CERTIFI-**  
**CATION**

**Noise Regulations for Propeller-Driven**  
**Small Airplanes Submitted to the FAA**  
**by the Environmental Protection Agency;**  
**Notice of Decision**

*Correction*

In FR Doc. 76-37649 appearing on page 56056 in the issue of Thursday, December 23, 1976, on page 56064, the third column, paragraph numbered (2) should read as follows:

**Section F36.111 Flight procedures.**

(b) \* \* \*

(2) At stabilized speed with propellers synchronized and with the airplane in cruise configuration, except that if the speed at the power setting prescribed in this paragraph would exceed the maximum speed authorized in level flight, accelerated flight is acceptable.

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