

DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration****14 CFR Part 36**

[Docket No. FAA-1998-4731; Amendment No. 36-22]

RIN 2120-AG65

Noise Certification Standards for Propeller-Driven Small Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is amending the noise certification standards for propeller-driven small airplanes. These changes are based on the joint effort of the Federal Aviation Administration (FAA), the European Joint Aviation Authorities (JAA), and Aviation Rulemaking Advisory Committee (ARAC), to harmonize the U.S. noise certification regulations and the European Joint Aviation Requirements (JAR) for propeller-driven small airplanes. These changes will provide uniform noise certification standards for airplanes certificated in the United States and in the JAA countries. The harmonization of the noise certification standards will simplify airworthiness approvals for import and export purposes.

EFFECTIVE DATE: December 13, 1999.

FOR FURTHER INFORMATION CONTACT: Mehmet Marsan, Office of Environment and Energy (AEE), Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 267-7703.

SUPPLEMENTARY INFORMATION:**Availability of Final Rules**

An electronic copy of this document can be downloaded using a modem and suitable communications software from the FAA regulations section of the Fedworld electronic bulletin board service (telephone: (703) 321-3339) or, the Government Printing Office's (GPO) electronic bulletin board service (telephone: (202) 512-1661).

Internet users may reach the FAA's web page at <http://www.faa.gov/avr/arm/nprm/nprm.htm> or the GPO's web page at <http://www.access.gpo.gov/nara> for access to recently published rulemaking documents.

Any person may obtain a copy of this document by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267-9680. Communications must

identify the amendment number or docket number of this final rule.

Persons interested in being placed on the mailing list for future rulemaking documents should request from the above office a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

Small Entity Inquiries

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996, requires the FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. Therefore, any small entity that has a question regarding this document may contact their local FAA official. Internet users can find additional information on SBREFA in the "Quick Jump" section of the FAA's web page at <http://www.faa.gov> and may send electronic inquiries to the following Internet address: 9-AWA-SBREFA@faa.gov.

Background*Current Regulations*

Under 49 U.S.C. 44715, the Administrator of the Federal Aviation Administration is directed to prescribe "standards to measure aircraft noise and sonic boom; * * * and regulations to control and abate aircraft noise and sonic boom." Part 36 of Title 14 of the Code of Federal Regulations contains the FAA's noise standards and regulations that apply to the issuance of type certificates for all types of aircraft. The standards and requirements that apply to propeller-driven small airplanes and propeller-driven commuter category airplanes are found in § 36.501 and Appendix G to Part 36. Appendix G addresses Takeoff Noise Requirements for Propeller-Driven Small Airplane and Propeller-Driven Commuter Category Airplane Certification Tests on or after December 22, 1988. This appendix was added to part 36 in 1988 to require an actual takeoff noise test instead of the level flyover test that is required under Appendix F, and applies only to airplanes for which certification tests were completed before December 22, 1988.

Appendix G specifies the test conditions, procedures, and noise levels necessary to demonstrate compliance with certification requirements for propeller driven small airplanes and propeller-driven commuter category airplanes.

Government and Industry Cooperation

In June 1990 at a meeting of the Joint Aviation Authorities (JAA) Council,

which consists of JAA members from European countries and the FAA, the FAA Administrator committed the FAA to support the harmonization of the U.S. regulations with the Joint Aviation Regulations (JAR). The Joint Aviation Regulations are being developed for use by the European authorities that are member countries of the JAA.

In January 1991, the FAA established the Aviation Rulemaking Advisory Committee to serve as a forum for the FAA to obtain input from outside the government on major regulatory issues facing the agency. The FAA has tasked ARAC with noise certification issues. These issues involve the harmonization of 14 CFR part 36 (part 36) with JAR part 36, the associated guidance material including equivalent procedures, and the interpretation of the regulations. On May 3, 1994, the ARAC established the Harmonization Working Group for Propeller-Driven Small Airplanes (59 FR 22885). The working group was tasked with reviewing the applicable provisions of subparts A and F, and appendices F and G of part 36, and harmonizing them with the corresponding applicable provisions of JAR 36. The working group was tasked to consider the current international standards and recommended practices, as issued under International Civil Aviation Organization (ICAO), Annex 16, Volume 1, and its associated Technical Manual, as the basis for development of the harmonization proposals. The working group was also asked to recommend a process whereby subsequent ICAO Annex 16 changes could be easily incorporated into JAR 36 and part 36.

The working group reviewed 16 items related to noise limits and measurement procedures for propeller driven small airplanes in the regulations. For six of these items, the working group recommended that Appendix G of part 36 be amended to harmonize the regulations with JAR 36. For four of these items, the working group recommended that Chapter 10 of JAR 36 be amended to harmonize those regulations with part 36. For the six remaining items, the working group found that no harmonization is necessary. The working group also recommended changes to harmonize FAA and JAA interpretive and advisory material relating to noise limits for propeller-driven small airplanes. The ARAC agreed with the working group's recommendations and they were forwarded to the FAA for consideration.

On November 18, 1998, the FAA published Notice No. 98-16 entitled "Noise Certification Standards for Propeller-Driven Small Airplanes." (63

FR 64146). The notice reflected the six recommendations that address changes to part 36. The FAA solicited comments on the proposals, which are discussed in the following section. This final rule is based on Notice No. 98-16.

Discussion of Comments

The changes to appendix G of part 36 will affect the provisions that establish noise measurement procedures (§ G36.107), corrections to test results (§ G36.201) and specific aircraft noise limits that are tied to aircraft weight (§ G36.301).

There were a total of four comments in response to the proposed rule. Two commenters were in agreement with the proposed rule—the General Aviation Manufacturers Association (GAMA) and Transport Canada. The other two commenters were the French DGAC (Direction Generale de l'Aviation Civile) and Aeromod Services, Inc. The two latter comments are discussed below.

Section G36.107 Noise Measurement Procedures

Currently, § G36.107 prescribes specific procedures for the placement of microphones, system calibration and consideration of ambient noise. The FAA proposed changes to affect the microphone requirements of paragraph (a) of that section. Currently, microphones are required to 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, and the microphone sensing elements must be placed four feet (1.2 m) above ground level.

The FAA proposed changing § G36.107(a) to require the microphone to be a pressure-type microphone with a protective grid that is 12.7 mm in diameter. The microphone would have to be mounted in an inverted position so that the diaphragm is 7 mm above and parallel to a white-painted metal circular plate. The plate would have to be 40 cm in diameter and at least 2.5 mm thick. The plate would have to be placed horizontally and flush with the surrounding ground surface with no cavities below the plate. The microphone would have to be located three-quarters of the distance from the center to the edge of the plate along a radius normal to the line of flight of the test airplane. To maintain the present level of noise stringency, a corresponding change to § G36.301(b) would also be necessary, as discussed below.

Comments

The French DGAC comments that in paragraph (a), the figure "0.7 mm" should be replaced with "7 mm" to harmonize with ICAO Annex 16 and JAR 36. The commenter says that "7 mm" is the figure used in Paragraph 4.4 of Appendix 6 of Annex 16, vol. 1, as well as in Paragraph 4.4 of Appendix B of JAR 36.

Aeromod Services, Inc. has no objection to the proposed change. The commenter says that using a ground plane microphone provides data that are applicable to both FAA and ICAO certification activities, eliminating duplication of equipment or testing. The commenter says that the additional equipment requirement adds negligible cost to the test.

FAA Response

The FAA agrees with the DGAC's comment. An error occurred in the NPRM. The value 0.7 mm should be changed to 7 mm wherever that value applies.

Section G36.201 Corrections to Test Results

Current § G36.201 prescribes corrections to be made to test results to account for the effects of differences between the conditions referenced in the prescribed procedures and existing conditions during an actual test.

Current § G36.201(b) requires atmospheric absorption correction for noise data obtained when the test conditions are outside those specified in appendix G, figure G1. Noise data collected outside the prescribed range of figure G1 are required to be corrected to 77 degrees Fahrenheit and 70 percent relative humidity by an FAA approved method. The FAA proposed changing the 77 degrees Fahrenheit reference temperature to 59 degrees Fahrenheit, to be consistent with the ambient temperature requirement in current § G36.111(b)(2), that is used for performance calculations.

Current § G36.201(c) requires that helical tip Mach number and power corrections must be made if the propeller is a variable pitch type or if the propeller is a fixed pitch type and the test power is not within five percent of the reference power. The FAA proposed changing this paragraph to provide an additional exception to the tip Mach number correction by stating that a correction is not necessary if the helical tip Mach number meets one of the following:

1. The number is at or below 0.70 and the test helical tip Mach number is within 0.014 of the reference helical tip Mach number.

2. The number is above 0.70 and at or below 0.80 and the test helical tip Mach number is within 0.007 of the reference helical tip Mach number.

3. The number is above 0.80 and the test helical tip Mach number is within 0.005 of the reference helical tip Mach number. For mechanical tachometers, if the helical tip Mach number is above 0.8 and the test helical tip Mach number is within 0.008 of the reference helical tip Mach number.

Current § G36.201(d)(1) requires that the measured sound levels must be corrected from the test day meteorological conditions by adding an increment equal to the result gained from the following equation:
Delta (M) = $(\alpha - 0.7) H_T / 1000$.

In this equation, H_T is the height in feet of the test aircraft when directly over the noise measurement point, and α is the rate of absorption for the test day conditions at 500 Hertz as referenced in Society of Automotive Engineers (SAE) Publication Aerospace Recommended Practice (ARP) 866A, which has been incorporated by reference in part 36.

The equation in § G36.201(d)(1) is an approximation. The accuracy of the calculations can be improved by adopting the exact form of the equation. Therefore, the FAA proposed changing the equation to the exact form which reads as follows:

$$\text{Delta (M)} = (H_T \alpha - 0.7 H_R) / 1000.$$

In this equation, H_T is the height in feet under test conditions, H_R is the height in feet under reference conditions when the aircraft is directly over the noise measurement point, and α is the rate of absorption for the test day conditions at 500 Hertz as specified in SAE ARP 866A, the same as the current rule.

The proposed equation would make Appendix G absorption calculations the same as the rest of part 36 and Annex 16 absorption calculations.

Current § G36.201(d)(4) requires that the measured sound levels in decibels must be corrected for engine power by algebraically adding an increment equal to:

$$\text{Delta (3)} = 17 \log (P_R / P_T)$$

where P_T and P_R are the test and reference engine powers respectively.

The FAA proposed that the algebraic correction for engine power be changed to:

$$\text{Delta (3)} = K_3 \log (P_R / P_T)$$

where P_R and P_T are the test and reference engine powers respectively obtained from the manifold pressure/torque gauges and engine rpm. Under this proposal, the value of K_3 would be

determined from approved data from the test airplane. In the absence of flight test data and at the discretion of the Administrator, a value of $K_3 = 17$ could still be used as under the current rule.

Comments on Section G36.201(b)

Aeromod Services, Inc. objects to changing the 77 degree Fahrenheit reference temperature to 59 degree Fahrenheit in paragraph (b) because it "harmonizes in the wrong direction." The commenter says that the section should be "placed on the list for JAR 36 harmonization with FAR 36."

Aeromod's comment goes on to state:

If we examine the existing FAA and ICAO noise rules, we find that the only rule which does not have a primary or absolute acoustical reference day defined by 77°F/70%RH is Annex 16, Chapter 10. All of the other noise rules, to include FAR 36 Appendix A, Current Appendix G, Appendix H, ICAO Annex 16 Chapter 3, Chapter 4, and Chapter 8, use 77°F/70%RH as the primary or absolute acoustical reference day.

Aeromod adds that there appears to be "no instance of confusion and delay caused by the difference in performance and acoustic reference conditions, as is mentioned in the Notice."

FAA Response

Aeromod comments that the only section of part 36 which does not have both the performance and acoustic reference day conditions as 77 degree Fahrenheit and 70 percent relative humidity is Appendix G. The reason for this apparent inconsistency is based on the different noise characteristics of other airplane classes, namely large transports and helicopters. Propeller-driven small airplane noise levels are dominated by the low frequency tone noise under 500 Hz. Other classes of airplanes have noise characteristics that can be concentrated at higher frequencies. This difference in noise characteristics is reflected in the regulations by the different atmospheric absorption correction requirements for each class of airplanes.

The regulation requires that an atmospheric absorption correction at 500 Hz $\frac{1}{3}$ -octave-band frequency must be applied to the measured noise levels of propeller-driven small airplanes. For large transports and helicopters, the measured levels have to be corrected to reference conditions of 77 degree Fahrenheit by applying atmospheric absorption correction for each $\frac{1}{3}$ -octave-band frequency. The atmospheric absorption is minimal at 500 Hz and increases with the increase in frequency. The correction is always small for propeller-driven small airplanes and can be very large for other

classes of airplanes. The choice of the 77 degree Fahrenheit reference temperature assures that the measured levels are corrected upwards for most large transport and helicopter tests since a typical test temperature is lower than 77 degree Fahrenheit. If a low reference temperature was chosen, the cumulative effect of the corrections could become positive or negative depending on the frequency content of the noise from the large transport and helicopters being tested. This effort would benefit some aircraft and unfairly penalize other aircraft depending on the test day temperature and frequency content. The high reference temperature of 77 degree Fahrenheit removes this uncertainty for large transport and helicopter noise certification testing.

However, the small atmospheric absorption correction values at low frequencies for propeller-driven airplanes do not warrant the use of a reference atmospheric temperature of 77 degree Fahrenheit which is different than standard reference conditions used in most aircraft testing. In the field of aeronautics, the International Standard Atmosphere (ISA) is usually used as the standard ambient conditions, and uses a temperature as 59 degrees Fahrenheit. All the performance information in the flight manuals (carried aboard each airplane) are given for ISA conditions. The proposed changes to Appendix G simplifies the data reduction by uniting the performance and acoustic reference conditions for propeller-driven small airplanes at 59 degrees Fahrenheit and 70 percent relative humidity. This section was adopted as proposed.

Comments on Section G36.201(c)

The only comment regarding this section did not object to the proposed change; the revision to paragraph (c) is adopted as proposed.

Comments on Section G36.201(d)

Aeromod's comment on proposed paragraph (d)(1) is as follows:

The proposed change to the equation for atmospheric absorption is indeed more accurate. However, if the comments provided for section 36.201(b) above are adopted, the 0.7 constant in the equation would need to be changed to 0.9, which is the proper constant for a 77°F/70%RH reference day. The equation currently published in FAR 36, Appendix G is incorrect for the current acoustic reference day, and has been for more than 10 years. The current published equation, using a 0.7 constant, actually corrects to a 59°F/70%RH, resulting in a 0.2 dB error which is detrimental to the applicant.

Aeromod also states that it has no objection to the proposed change in paragraph (d)(4), but notes that "the

option to determine the value of K_3 experimentally, as is allowed for tip Mach corrections, is a welcome addition to the rule."

FAA Response

Aeromod's comment was based on the FAA incorporating Aeromod's suggested change to § G36.201(b). The FAA is not incorporating Aeromod's change to G36.201(b); accordingly, the change to paragraph (d) is not accepted, and the equation in § 36.201(d)(1) is adopted as proposed.

Comment on Section G36.201(d)

The French DGAC comments that in the equation in paragraph (d)(1), the figure "0.7" should be replaced with "0.6" to harmonize with ICAO Annex 16, Chapter 10 and JAR 36 so that the equation reads " $\Delta(m) = (Ht \alpha - 0.6 Hr) / 1000$."

FAA Response

The FAA disagrees with the DGAC. The FAA uses English Units version of the SAE ARP 866A, which has the absorption value for 59 degrees Fahrenheit, 77 percent relative humidity as 0.7. The DGAC first derived the equation for absorption in metric units then converted the results into English Units. The DGAC derivation and conversion processes introduce an error of 0.1 in the absorption correction equation. The equation in paragraph (d) is adopted as proposed.

Section G36.301 Aircraft Noise Limits

Current § G36.301(b) states that for aircraft weights up to 1,320 pounds (600 kg) the noise level must not exceed 73 dB(A); for weights greater than 1,320 pounds, the noise limit increases at the rate of 1 dB /165 pounds up to 85 dB(A) at 3,300 pounds, after which the noise level remains constant at 85 dB(A) up to and including aircraft weight of 19,000 pounds.

As previously discussed, considerations of microphone location, configuration, and resulting noise limits are interrelated. Since the proposed changes to the noise measurement procedures of § G36.107(a) would result in increases in the measured noise levels of about 3 dB(A), the FAA proposed to increase the limits in § 36.301(b) from 73 dB(A) to 76 dB(A) and from 85 dB(A) to 88 dB(A) to account for these different measurement procedures, but without changing the stringency of the current rule.

In addition to the dB(A) increases discussed, the FAA proposed a change to the interpolation requirement of § G36.301(b). For airplane weights greater than 1,320 pounds, the allowable

dB(A) would increase "with the logarithm of airplane weight at the rate of 9.83 dB(A) per doubling of weight until the limit of 88 dB(A) is reached * * *," rather than at the rate of 1 dB/165 pounds up to 85 dB(A) at 3,300 pounds, as under the current rule. The new logarithmic interpolation between the low and high takeoff weights was adopted from the Annex 16, Volume I Chapter 10. The working group analyzed the available data obtained by use of a ground microphone, and decided to adopt the logarithmic interpolation that is between low and high takeoff weights.

Comments

The only comment regarding this section did not object to the proposed change; § G36.301(b) is adopted as proposed.

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. § 3507(d)), the FAA has determined that there are no requirements for information collection associated with this final rule.

Compatibility with ICAO Standards

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA's policy to comply with International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. For this final rule, the FAA has reviewed part 36 Appendix G and ICAO Annex 16 Volume 1, Chapter 10. The review showed that the following two items were left unharmonized: (1) For fixed pitch type propellers, § G36.201 specifies a simplified data correction procedure if the engine test power is within 5% of the reference power. Annex 16 does not have a corresponding simplification. (2) The use of maximum continuous installed power during the second segment of the flight path is allowed under § G36.111. The power definition in Annex 16 for the second segment is defined as maximum power in Chapter 10 section 10.5.2 of Annex 16. The maximum installed power is typically lower than the maximum power and applicable only to old technology engines. The above two unharmonized items only affect airplanes with old technology engines, which are diminishing in number every year. The old airplanes equipped with old technology engines are not required to undergo noise certification or already are noise certificated. On very rare occasions, these airplanes may be required to

perform a new noise test, but are not significant enough to be considered as harmonization issues.

Regulatory Evaluation Summary

Economic Summary

Four principal requirements pertain to the economic impacts of changes to the Federal Regulations. First, Executive Order 12866 directs Federal agencies to promulgate new regulations or modify an existing regulations after consideration of the expected benefits to society and the expected costs. The order also requires Federal agencies to assess whether a final rule is considered a "significant regulatory action." Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Office of Management and Budget directs agencies to assess the effect of regulatory changes on international trade. Finally, Public Law 104-4, Department of Transportation Appropriations Act (November 15, 1995), requires Federal agencies to assess the impact of any Federal mandates on State, Local, Tribal governments, and the private sector.

Executive Order 12866 and DOT's Policies and Procedures

Under Executive Order 12866, each Federal agency shall assess both the costs and the benefits of final regulations while recognizing that some costs and benefits are difficult to quantify. A final rule is promulgated only upon a reasoned determination that the benefits of the final rule justify its costs.

The benefit of the final rule is that it will harmonize the U.S. noise certification regulations with the European Joint Aviation Requirements for propeller-driven small airplanes. The changes will provide nearly uniform noise certification standards for airplanes certificated in the United States and by the European Joint Aviation Authorities (JAA). This is expected to reduce the number of noise tests that need to be conducted. The costs to implement this rulemaking are negligible, if any. There are no additional costs imposed by this final rule.

The final rule will also not be considered a significant regulatory action because (1) it does not have an annual effect of \$100 million or more or adversely affect in a material way the economy or a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, Local or Tribal governments or

communities; (2) it does not create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) it does not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients; and (4) it does not raise novel legal or policy issues arising out of legal mandates, the President's priorities or principles set forth in the Executive Order. Because the final rule is not considered significant under these criteria, it was not reviewed by the Office of Management and Budget (OMB) for consistency with applicable law, the President's priorities, and the principles set forth in this Executive Order nor was OMB involved in deconflicting this final rule with ones from other agencies.

Final Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (the Act) establishes "as principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that and to explain the rationale for their actions, the Act covers a wide-range of small entities, including small businesses, not-for-profit organizations and small governmental jurisdictions.

Agencies must perform a review to determine whether a final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a Regulatory Flexibility Analysis (RFA) as described in the Act.

However, if an agency determines that a final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the 1980 Act provides that the head of the agency may so certify and an RFA is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

The FAA conducted the required review of this final rule and determined that the cost imposed by this rule will be negligible and that it will not have a significant economic impact on a substantial number of small entities. Accordingly, pursuant to the Regulatory Flexibility Act, 5 U.S.C. 605 (b), the FAA certifies that this rule will not have a significant economic impact on a substantial number of small entities

because the costs imposed by this rule will be negligible.

Final International Trade Impact Assessment

The FAA has determined that the final rule will promote the sale of foreign products and services in the United States and the sale of U.S. products and services in foreign countries. This determination is based on the FAA's determination that the rule harmonizes U.S. standards with the JAR's standards for noise certification for propeller-driven small airplanes.

Federalism Implications

The regulations herein do not have a substantial direct effect on the States, on the relationship between national Government and the States, or on the distribution of power and responsibilities among various levels of government. Thus, in accordance with Executive Order 12612, it is determined that this rule does not have sufficient federalism implications to warrant the preparation of a federalism assessment.

Final Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (the Reform Act) enacted as Pub. L. 104-4 on March 22, 1995, requires each Federal agency, to the extent permitted by law, to prepare a written assessment of the effects of any Federal mandate in a final agency rule that may result in the expenditure by State, Local, and Tribal governments, in the aggregate, or by the private sector, of \$100 million or more (adjusted annually for inflation) in any one year.

Section 204(a) of the Reform Act, 2 U.S.C. 1534(a), requires the Federal agency to develop an effective process to permit timely input by elected officers (or their designees) of State, Local, and Tribal governments on a final "significant intergovernmental mandate." A "significant intergovernmental mandate" under the Reform Act is any provision in a Federal

agency regulation that will impose an enforceable duty upon State, Local, and Tribal governments, in the aggregate, of \$100 million (adjusted annually for inflation) in any one year.

Section 203 of the Reform Act, 2 U.S.C. 1533, which supplements section 204(a), provides that before establishing any regulatory requirements that might significantly or uniquely affect small governments, the agency shall have developed a plan that, among other things, provides for notice to potentially affected small governments, if any, and for a meaningful and timely opportunity to provide input in the development of regulatory proposals.

This rule does not contain a Federal intergovernmental or private sector mandate that exceeds \$100 million a year, therefore the requirements of the Reform Act do not apply.

Environmental Analysis

FAA Order 1050.1D defines FAA actions that may be categorically excluded from preparation of a National Environmental Policy Act (NEPA) environmental assessment (EA) or environmental impact statement (EIS). In accordance with FAA Order 1050.1D, appendix 4, paragraph 4(j), this rulemaking action qualifies for a categorical exclusion.

Energy Impact

The energy impact of the notice has been assessed in accordance with the Energy Policy and Conservation Act (EPCA) Pub. L. 94-163, as amended (43 U.S.C. 6362) and FAA Order 1053.1. It has been determined that the final rule is not a major regulatory action under the provisions of the EPCA.

List of Subjects in 14 CFR Part 36

Agriculture, Aircraft, Noise Control.

The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends part 36 of Title 14, Code of Federal Regulations as follows:

PART 36—NOISE STANDARDS: AIRCRAFT TYPE AND AIRWORTHINESS CERTIFICATION

1. The authority citation for part 36 continues to read as follows:

Authority: 42 U.S.C. 4321 *et seq.*; 49 U.S.C. 106(g), 40113, 44701-44702, 44704, 44715; sec. 305, Pub. L. 96-193, 94 Stat. 50, 57; E.O. 11514, 35 FR 4247, 3 CFR, 1966-1970 Comp., p. 902.

2. Appendix G of part 36 is amended by revising sections G36.107(a), G36.201(b), including Figure G1, G36.201(c), G36.201(d)(1), G36.201(d)(4), and G36.301(b), including Figure G2, to read as follows:

Appendix G to Part 36—Takeoff Noise Requirements for Propeller-Driven Small Airplane and Propeller-Driven Commuter Category Airplane Certification Tests on or After December 22, 1988

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Sec. G36.107 Noise Measurement Procedures

(a) The microphone must be a pressure type, 12.7 mm in diameter, with a protective grid, mounted in an inverted position such that the microphone diaphragm is 7 mm above and parallel to a white-painted metal circular plate. This white-painted metal plate shall be 40 cm in diameter and at least 2.5 mm thick. The plate shall be placed horizontally and flush with the surrounding ground surface with no cavities below the plate. The microphone must be located three-quarters of the distance from the center to the back edge of the plate along a radius normal to the line of flight of the test airplane.

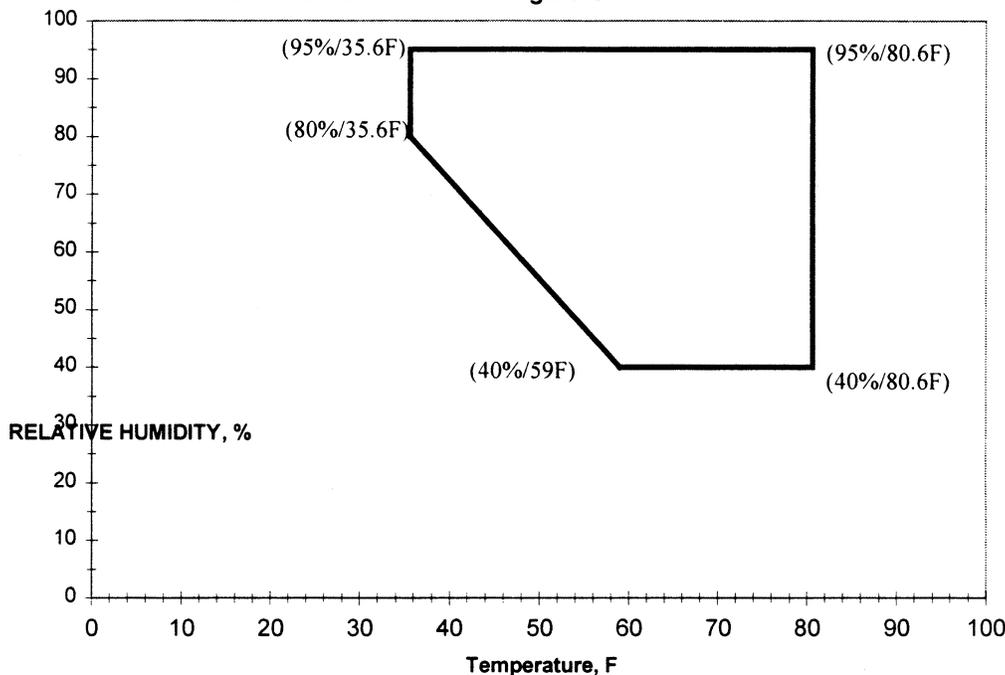
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Sec. G36.201 Corrections to Test Results

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(b) Atmospheric absorption correction is required for noise data obtained when the test conditions are outside those specified in Figure G1. Noise data outside the applicable range must be corrected to 59 F and 70 percent relative humidity by an FAA approved method.

MEASUREMENT WINDOW FOR NO ABSORPTION CORRECTION
Figure G1



(c) Helical tip Mach number and power corrections must be made as follows:

(1) Corrections for helical tip Mach number and power corrections must be made if—

(i) The propeller is a variable pitch type;

or
 (ii) The propeller is a fixed pitch type and the test power is not within 5 percent of the reference power.

(2) No corrections for helical tip Mach number variation need to be made if the propeller helical tip Mach number is:

(i) At or below 0.70 and the test helical tip Mach number is within 0.014 of the reference helical tip Mach number.

(ii) Above 0.70 and at or below 0.80 and the test helical tip Mach number is within 0.007 of the reference helical tip Mach number.

(iii) Above 0.80 and the test helical tip Mach number is within 0.005 of the reference helical tip Mach number. For mechanical tachometers, if the helical tip Mach number is above 0.8 and the test helical tip Mach number is within 0.008 of the reference helical tip Mach number.

(d) * * *

(1) Measured sound levels must be corrected from test day meteorological conditions to reference conditions by adding an increment equal to

$$\Delta(M) = (H_T \alpha - 0.7 H_R) / 1000$$

where H_T is the height in feet under test conditions, H_R is the height in feet under reference conditions when the aircraft is directly over the noise measurement point and α is the rate of absorption for the test day conditions at 500 Hz as specified in SAE ARP 866A, entitled "Standard Values of Atmospheric Absorption as a function of Temperature and Humidity for use in Evaluating Aircraft Flyover Noise" as incorporated by reference under § 36.6.

* * * * *

(4) Measured sound levels in decibels must be corrected for engine power by algebraically adding an increment equal to

$$\Delta(3) = K_3 \log (P_R/P_T)$$

where P_R and P_T are the test and reference engine powers respectively obtained from the

manifold pressure/torque gauges and engine rpm. The value of K_3 shall be determined from approved data from the test airplane. In the absence of flight test data and at the discretion of the Administrator, a value of $K_3 = 17$ may be used.

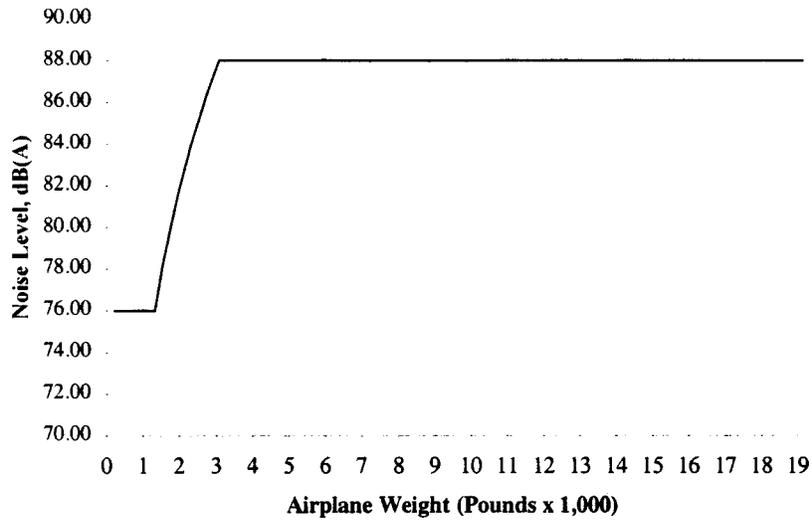
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Sec. G36.301 Aircraft Noise Limits

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(b) The noise level must not exceed 76 dB (A) up to and including aircraft weights of 1,320 pounds (600 kg). For aircraft weights greater than 1,320 pounds, the limit increases from that point with the logarithm of airplane weight at the rate of 9.83 dB (A) per doubling of weight, until the limit of 88 dB (A) is reached, after which the limit is constant up to and including 19,000 pounds (8,618 kg). Figure G2 shows noise level limits vs airplane weight.

**NOISE LEVELS vs AIRPLANE WEIGHT
FIGURE G2**



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Jane F. Garvey,
Administrator.

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