

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electroacoustics – Instruments for measurement of aircraft noise – Performance requirements for systems to measure sound pressure levels in noise certification of aircraft

Électroacoustique – Instruments pour la mesure du bruit des aéronefs – Exigences relatives aux systèmes de mesure des niveaux de pression acoustique pour la certification acoustique des aéronefs



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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	7
4 Purpose.....	11
5 Requirements	12
5.1 General.....	12
5.1.1 Output data	12
5.1.2 Time-pressure history	12
5.1.3 Measurements of sound from aircraft ground power units	12
5.1.4 Measurements of aircraft operations on the ground	12
5.2 Measurement uncertainty.....	12
5.2.1 Relationship with regulatory requirements	12
5.2.2 Performance verification	13
5.2.3 Periodic tests.....	13
5.3 Reference environmental conditions	13
5.4 Sound calibrator.....	13
5.5 Microphone system	13
5.5.1 Pressure and free-field type microphones.....	13
5.5.2 Grazing incidence microphone configuration.....	14
5.5.3 Ground plane microphone configuration.....	15
5.5.4 Measurement configurations.....	16
5.6 Measurement system exclusive of the microphone.....	16
5.6.1 Frequency response	16
5.6.2 Level linearity	16
5.6.3 Floating-range measurement systems	17
5.7 Spectrum analysis system.....	17
5.7.1 Third-octave analysis.....	17
5.7.2 Time constants	17
5.7.3 Time offset	17
5.7.4 Anti-aliasing.....	18
5.8 Readout device resolution.....	18
5.9 Sensitivity to various environments	18
5.9.1 General	18
5.9.2 Atmospheric pressure	18
5.9.3 Air temperature.....	18
5.9.4 Humidity	19
5.9.5 Electromagnetic compatibility	19
Annex A (informative) Methods of testing the electroacoustical performance of a measurement system.....	20
A.1 General.....	20
A.2 Operating conditions for test	20
A.3 Sound calibrator.....	20

A.4	Microphone system frequency response	20
A.5	Frequency response of the measurement system exclusive of the microphone	21
A.6	Linear operating range of the measurement system exclusive of the microphone	21
A.7	Spectrum analysis system.....	21
Annex B (informative) Relationship between tolerance interval, corresponding acceptance interval and the maximum permitted uncertainty of measurement.....		22
Bibliography.....		24
Figure 1 – Illustration of sound incidence angles from the principal axis of the microphone.....		15
Figure B.1 – Relationship between tolerance interval, corresponding acceptance interval and the maximum permitted uncertainty of measurement		22
Table 1 – ICAO measurement protocols (informative)		11
Table 2 – Maximum difference between the free-field sensitivity level of a microphone used in grazing-incidence microphone configuration at normal incidence and at specified sound incidence angles.....		15

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTROACOUSTICS – INSTRUMENTS FOR MEASUREMENT OF
AIRCRAFT NOISE – PERFORMANCE REQUIREMENTS FOR
SYSTEMS TO MEASURE SOUND PRESSURE LEVELS
IN NOISE CERTIFICATION OF AIRCRAFT****FOREWORD**

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International Standard IEC 61265 has been prepared by IEC technical committee 29: Electroacoustics.

This second edition cancels and replaces the first edition published in 1995. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) addition of guidance for measurements for aircraft other than large transport aeroplanes;
- b) addition of microphones used in ground plane measurement systems;
- c) addition of weighted sound level measurements other than one-third-octave band measurements, for certain aircraft types;
- d) revision and clarification of requirements for digital audio recording;

e) addition of requirements for evaluation of measurement uncertainty.

The text of this International Standard is based on the following documents:

CDV	Report on voting
29/958/CDV	29/980A/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

IEC 61265 provides requirements for the electroacoustical performance of instruments for measurement of the sound produced by aircraft in flight or on the ground, or by an aircraft engine installed on an outdoor test stand, for the purposes of demonstrating compliance with aircraft noise certification limits established by relevant national aviation authorities and for other comparisons among aircraft models. The instruments can be components of a complete measurement system. Methods are also indicated by which the performance of such instruments can be tested periodically.

Measurement and data-analysis procedures for aircraft noise certification are described in Volume I of Annex 16 to the Convention on International Civil Aviation, with further guidance and descriptions of acceptable "equivalent procedures" given in the *Environmental Technical Manual* prepared by the Committee on Aviation Environmental Protection (CAEP) of the International Civil Aviation Organization (ICAO). Together these documents are referred to in this document as "ICAO Annex 16". The procedures include measurement and analysis of the sound from aircraft in operation, and, in some circumstances, of the sound from static engines and engines under test, under given operating and atmospheric conditions.

Several of the requirements given in this document differ from the requirements of IEC 61672-1 for sound level meters, especially concerning the frequency and directional response, linear operating range and sensitivity to various environments. Many of these differences are due to the requirement for uniform response at a wide range of angles of sound arrival as an aircraft moves through the certification test flight. If the output signal from a measurement system conforming to this document is processed to yield an overall sound pressure level from all frequency bands, the level derived can differ from that obtained from a sound level meter conforming to IEC 61672-1.

Systems in accordance with this document are used to perform measurements meeting the requirements of ICAO Annex 16 or a certifying authority's specific procedures to demonstrate that a given aircraft complies with the limits for noise level near the ground over the course of a test flight. Uncertainty of each measurement is considered when establishing the test procedures, and it is not the intent of this document to duplicate the confidence interval analysis inherent in the noise flight test procedure.

ELECTROACOUSTICS – INSTRUMENTS FOR MEASUREMENT OF AIRCRAFT NOISE – PERFORMANCE REQUIREMENTS FOR SYSTEMS TO MEASURE SOUND PRESSURE LEVELS IN NOISE CERTIFICATION OF AIRCRAFT

1 Scope

This document specifies requirements for the electroacoustical performance of systems of instruments used to measure sound for the purposes of aircraft noise certification, and for other comparisons among aircraft models, and provides methods by which tests can be made periodically to verify that the performance continues to conform to the requirements within stated limits.

In general, a sound measurement system for this purpose comprises a combination of instruments extending from a microphone, including its windscreen and other accessories, through data recording and processing devices to a suitable output. Different measurement systems, regardless of their composition, perform the necessary functions in different ways and operate on either analogue or digital principles.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60942, *Electroacoustics – Sound calibrators*

IEC 61260-1, *Electroacoustics – Octave-band and fractional-octave-band filters – Part 1: Specifications*

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

calibration record

time-pressure history or recorded value obtained during a calibration procedure, consisting of a measurement system output while its acoustic input is provided by a sound calibrator