International Standard

ISO 13347-1

Fans — Determination of fan sound power levels under standardized laboratory conditions —

Part 1: General overview

Ventilateurs — Détermination des niveaux de puissance acoustique des ventilateurs dans des conditions de laboratoire standardisées —

Partie 1: Présentation générale

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 117, *Fans*.

This second edition cancels and replaces the first edition (ISO 13347-1:2004), which has been technically revised. It also incorporates the Technical Corrigendum ISO 13347-1:2004/Cor 1:2006 and the Amendment ISO 13347-1:2004/Amd 1:2010.

The main changes are as follows:

— inclusion of acoustic methods for installation category E fans;

— symbols harmonized with those used in ISO 5801 and other ISO standards as listed in normative references [2];

— editorial revisions.

A list of all parts in the ISO 13347 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document deals with the determination of the fan sound power level appropriate to a particular application. In describing the test and rating procedures, numerous references are made to ISO 5801 as well as to other relevant ISO standards. This general overview should be read in conjunction with the appropriate part of the ISO 13347 series that specifies, in detail, methods for determining the sound power propagated from a fan in specified installation conditions as a function of frequency.

This document primarily deals with the determination of sound power levels of fans used in five installation categories (see Clause 4) for ducted and non-ducted applications, including jet fans.

The test procedures described in this document relate to laboratory conditions. The measurement of performance under site conditions is not included. Acoustic system effects can be considerable where the airflow into and out of the fan is not free from swirl, nor fully developed.

This document describes methods for determining sound power levels of fans in one-third octave bandwidths and one octave bandwidths.

Data obtained in accordance with this document can be used for the following purposes amongst others:

a) comparison of fans which are similar in size and type;

b) comparison of fans which are different in size, type, design, speed, etc;

c) determining whether a fan is suitable for a specified upper limit of sound emission;

d) scaling of fan noise from one size and speed to another size and speed of the same type of fan;

e) prediction of sound pressure level in application of the fan;

f) engineering work to assist in developing machinery and equipment with lower sound emissions.

This document along with the other parts of the ISO 13347 series specifies a method, based on the ISO 3740 series and ISO 9614-1 and ISO 9614-2, for acoustic testing of jet fans (and partition fans) using the methods currently described in ISO 13350.

NOTE The bibliography contains further references for those wishing to explore this subject in greater detail (see References [1] to [21]).

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Fans — Determination of fan sound power levels under standardized laboratory conditions —

Part 1: General overview

1 Scope

This document establishes principles for the determination of the acoustic performance of fans. In addition, this document can be used to determine the acoustic performance of fans combined with an ancillary device such as a roof cowl or damper or, where the fan is fitted with a silencer, the sound power resulting from the fan and silencer combination.

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.

ISO 266, *Acoustics — Preferred frequencies*

ISO 3741, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Precision methods for reverberation test rooms*

ISO 3743 (all parts), *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure*

ISO 3744, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane*

ISO 3745, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Precision methods for anechoic rooms and hemi-anechoic rooms*

ISO 5136:2003, *Acoustics — Determination of sound power radiated into a duct by fans and other air-moving devices — In-duct method*

ISO 5801, *Fans — Performance testing using standardized airways*

ISO 6926, *Acoustics — Requirements for the performance and calibration of reference sound sources used for the determination of sound power levels*

ISO 9614-1, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points*

ISO 10302 (all parts), *Acoustics — Measurement of airborne noise emitted and structure-borne vibration induced by small air-moving devices*

ISO 13347-2, *Fans — Determination of fan sound power levels under standardized laboratory conditions — Part 2: Reverberant room method*

ISO 13347-3, *Industrial fans — Determination of fan sound power levels under standardized laboratory conditions — Part 3: Enveloping surface methods*

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ISO 13347-4, *Fans — Determination of fan sound power levels under standardized laboratory conditions — Part 4: Sound intensity method*

ISO 13349-1, *Fans — Vocabulary and definitions of categories — Part 1: Vocabulary*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5801, ISO 13349-1 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1.1
fan inlet
opening, usually circular or rectangular, through which the air first enters the fan casing

Note 1 to entry: If the fan is provided with an inlet-connecting flange or spigot, the fan inlet dimensions are measured inside this connection. The inlet area is the gross area measured inside this flange, i.e. no deductions are made for blockages, such as motors and bearing supports.

Note 2 to entry: When the inlet area is not clearly defined, agreement can be reached between the parties to the contract.

Note 3 to entry: The fan inlet is defined by the airflow, when you reverse the airflow, what before was the outlet, now becomes the inlet.

3.1.2
fan outlet
opening, usually circular or rectangular, through which the air finally leaves the fan casing

Note 1 to entry: If the fan is provided with an outlet connecting flange or spigot, the fan outlet dimensions are measured inside this connection. When the fan is delivered with a diffuser and the performance is quoted with this fitted, the area of the fan outlet may be taken as equal to the outlet area of the diffuser.

Note 2 to entry: Fan outlet area is, by convention, taken as the gross area in the outlet plane inside the casing, without deduction for motor, fairings or other obstructions. When the outlet area is not clearly defined, agreement can be reached between the parties to the contract.

Note 3 to entry: the fan outlet is defined by the airflow, when you reverse the airflow, what before was the inlet, now becomes the outlet

3.1.3
inlet sound power level
sound power level of a fan determined at the *fan inlet* (3.1.1) in a specified test installation categories A, B, C, D or E

Note 1 to entry: For installation category E, the inlet sound power level can be established using sound intensity methods (ISO 13347-4) or in some circumstances, methods using ISO 13347-3

3.1.4
outlet sound power level
sound power level of a fan determined at the *fan outlet* (3.1.2) in a specified installation category A, B, C, D or E

Note 1 to entry: For installation category E, the outlet sound power level can be established using sound intensity methods (ISO 13347-4) or in some circumstances, methods using ISO 13347-3

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