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Australian STANDARD

Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields

Part 1: Comparison method for a hard-walled test room

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Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee EV-010, Acoustics Community Noise.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to specify methods for determining the sound power level or sound energy level of a noise source by comparing measured sound pressure levels emitted by this source (machinery or equipment) mounted in a hard-walled test room, the characteristics of which are specified, with those from a calibrated reference sound source. The sound power level (or, in the case of noise bursts or transient noise emission, the sound energy level) produced by the noise source, in frequency bands of width one octave, is calculated using those measurements. The sound power level or sound energy level with frequency A-weighting applied is calculated using the octave-band levels.

This Standard is identical with, and has been reproduced from, ISO 3743-1:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields — Part 1: Comparison method for a hard-walled test room.*

As this document has been reproduced from an International Standard, the following applies:

(a) In the source text "this part of ISO 3743" should read "this Australian Standard".

(b) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms "normative" and "informative" are used in Standards to define the application of the appendices or annexes to which they apply. A "normative" appendix or annex is an integral part of a Standard, whereas an 'informative' appendix or annex is only for information and guidance.

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3743-1 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

This second edition cancels and replaces the first edition (ISO 3743-1:1994), which has been technically revised.

ISO 3743 consists of the following parts, under the general title *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields*:

— *Part 1: Comparison method for a hard-walled test room*

— *Part 2: Methods for special reverberation test rooms*

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Introduction

This part of ISO 3743 is an element of the series ISO 3740[1] to ISO 3747[7], which specify various methods for determining the sound power levels and sound energy levels of noise sources including machinery, equipment and their sub-assemblies. The selection of one of the methods from the series for use in a particular application depends on the purpose of the test to determine the sound power level or sound energy level and on the facilities available. General guidelines to assist in the selection are provided in ISO 3740[1]. ISO 3740[1] to ISO 3747[7] give only general principles regarding the operating and mounting conditions of the machinery or equipment for the purposes of the test. It is important that test codes be established for individual kinds of noise source, in order to give detailed requirements for mounting, loading, and operating conditions under which the sound power levels or sound energy levels are to be obtained.

The method given in this part of ISO 3743 is based on a comparison of the sound pressure levels in octave frequency bands of a noise source under test with those of a calibrated reference sound source; A-weighted sound power levels or sound energy levels may be calculated from the octave-band levels. The method is applied in a hard-walled test room with prescribed acoustical characteristics, where it can be used for small items of portable equipment. Such a room allows either the sound power levels or the sound energy levels of the noise source under test to be determined, depending on the character of the noise emitted by the source. However, this kind of test room is not suitable for larger pieces of stationary equipment which, due to their manner of operation or installation, cannot readily be moved. The application of the method for use where the equipment or machinery is found *in situ* is described in ISO 3747[7].

The methods specified in this part of ISO 3743 permit the determination of the sound power level and the sound energy level in frequency bands and/or with frequency A-weighting applied.

This part of ISO 3743 describes a method of accuracy grade 2 (engineering grade) as defined in ISO 12001. For applications where greater accuracy is required, reference can be made to ISO 3741[2] or an appropriate part of ISO 9614[15][17]. If the relevant criteria for the measurement environment specified in this part of ISO 3743 are not met, it might be possible to refer to another standard from this series, or to an appropriate part of ISO 9614[15][17].

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Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields

Part 1: Comparison method for a hard-walled test room

1 Scope

1.1 General

This part of ISO 3743 specifies methods for determining the sound power level or sound energy level of a noise source by comparing measured sound pressure levels emitted by this source (machinery or equipment) mounted in a hard-walled test room, the characteristics of which are specified, with those from a calibrated reference sound source. The sound power level (or, in the case of noise bursts or transient noise emission, the sound energy level) produced by the noise source, in frequency bands of width one octave, is calculated using those measurements. The sound power level or sound energy level with A-weighting applied is calculated using the octave-band levels.

1.2 Types of noise and noise sources

The method specified in this part of ISO 3743 is suitable for all types of noise (steady, non-steady, fluctuating, isolated bursts of sound energy, etc.) defined in ISO 12001.

The noise source under test may be a device, machine, component or sub-assembly. The maximum size of the source depends upon the size of the room used for the acoustical measurements (see 4.2).

1.3 Test environment

The test environment that is applicable for measurements made in accordance with this part of ISO 3743 is a hard-walled test room with prescribed acoustical characteristics.

1.4 Measurement uncertainty

Information is given on the uncertainty of the sound power levels and sound energy levels determined in accordance with this part of ISO 3743, for measurements made in frequency octave bands and for A-weighted frequency calculations performed on them. The uncertainty conforms to ISO 12001:1996, accuracy grade 2 (engineering grade).

2 Normative references

The following referenced documents are indispensable for the application 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 5725 (all parts), *Accuracy (trueness and precision) of measurement methods and results*

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

ISO 12001:1996, *Acoustics — Noise emitted by machinery and equipment — Rules for the drafting and presentation of a noise test code*

ISO/IEC Guide 98-3, *Uncertainty in measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

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