AS 5331:2019

Australian STANDARD®

Acoustics — Determination of sound power levels of noise sources — Guidelines for the use of basic standards

STANDARDS Australia

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The following are represented on Committee EV-010:

Association of Australasian Acoustical Consultants
Australian Acoustical Society
Austroads
Bureau of Steel Manufacturers of Australia
Department of Defence (Australian Government)
Engineers Australia
Master Builders Australia
University of Sydney

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First published as AS 5331:2019.

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 provide guidance for the use of a set of 12 basic International Standards (see Tables 1, 2 and 3) describing various methods for determining sound power levels from all types of machinery, equipment and products.

This Standard provides guidance on the selection of one or more of these Standards, appropriate to any particular type of sound source, measurement environment and desired accuracy. The guidance given applies to airborne sound. It is for use in the preparation of noise test codes (refer to ISO 12001) and also in noise emission testing where no specific noise test code exists. Such standardized noise test codes can recommend the application of particular basic International Standard(s) and give detailed requirements on mounting and operating conditions for a particular family to which the machine under test belongs, in accordance with general principles given in the basic standards.

This Standard is not intended to replace any of the details of, or add any additional requirements to, the individual test methods in the basic International Standards referenced.

This Standard is identical with, and has been reproduced from, ISO 3740:2019, *Acoustics — Determination of sound power levels of noise sources — Guidelines for the use of basic standards*.

As this document has been reproduced from an International Standard, 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.

Contents

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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 43, *Acoustics*, Subcommittee SC 1, *Noise*.

This third edition cancels and replaces the second edition (ISO 3740:2000), which has been technically revised. The main change compared to the previous edition is as follows:

— All of the basic standards covered by this document with the exception of the ISO 9614 series have been revised.

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.

Introduction

For many users of machinery, equipment and products, the control of noise is a major issue which requires effective exchange of acoustical information. In this context, the main flow of information goes from the manufacturer to the purchaser, installer or user of the machines and products to describe the generated sound. In particular, information on source airborne noise emission is desired. Therefore, the sound power level, as the major parameter characterising airborne noise emission of sound sources, needs to be determined by measurement.

However, such measurements are only useful if the conditions under which they are carried out are specified; they yield defined acoustical quantities, and they are taken with standardized instruments.

Sound power levels are used for

— declaration of the noise emitted under defined conditions,

— verification of declared values,

— comparison of the noise emitted by machinery of various types and sizes,

— comparison with limits specified in a purchasing contract or a regulation,

— engineering work to control the noise emission of machinery,

— prediction of noise exposure of workers in indoor or outdoor work shops,

— prediction of noise in the environment.

International Standards describing basic methods for determining sound power level are

— ISO 3741 to ISO 3747 (sound power level determination using sound pressure level measurements),

— ISO 9614-1 to ISO 9614-3 (sound power level determination using sound intensity measurements),

— ISO/TS 7849-1 and ISO/TS 7849-2 (sound power level determination using vibration measurements).

These standards specify different methods for determination of sound power level and the achievable accuracy, characterized by the standard deviation of reproducibility of the method. Operating and mounting conditions, and the uncertainty associated with these conditions, are dealt with only in a very general manner. Specific and detailed requirements on the machinery or equipment under test are given in noise test codes prepared by machinery specific standards committees. They not only provide the necessary detailed information on the operating, installation and mounting conditions but also identify basic measurement standards that can be used and how a noise emission declaration and verification is made.

The standards mentioned above differ in their range of applications and their requirements with regard to the test environment. In practice, procedures that do not require special laboratory environments and additionally meet class 2 accuracy are particularly advantageous, especially to meet legal requirements. These include the procedures in standards ISO 3744, ISO 3747 and methods in ISO 9614-2.

To help technical committees in drafting noise test codes or to assist manufacturers of machines and equipment in determining the sound power level if a noise test code is not currently available, ISO 3740 introduces the set of twelve International Standards describing various methods for determining sound power levels of machinery, equipment and products taking into account the broad variety of practical situations for the sources under test (types of machinery, equipment and products), test environments, measurement instruments and the accuracy desired.

Some machinery, equipment and products emit high-frequency noise, which can be broad-band noise, narrow-band noise or discrete tones. ISO 9295 specifies four methods for the determination of sound power levels emitted by machinery, equipment and products in the frequency range covered by the 16 kHz octave band. In 5.6, ISO 9295 is briefly described.

More detailed definitions than those specified in this document can be found in ISO 3741, ISO 3743-1, ISO 3743-2, ISO 3744, ISO 3745, ISO 3746 and ISO 3747, in ISO 9614-1 to ISO 9614-3, ISO/TS 7849-1, ISO/TS 7849-2, and in noise test codes for specific types of machinery, equipment and products.

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Acoustics — Determination of sound power levels of noise sources — Guidelines for the use of basic standards

1 Scope

This document gives guidance for the use of a set of twelve basic International Standards (see Tables 1, 2 and 3) describing various methods for determining sound power levels from all types of machinery, equipment and products. It provides guidance on the selection of one or more of these standards appropriate to any particular type of sound source, measurement environment and desired accuracy. The guidance given applies to airborne sound. It is for use in the preparation of noise test codes (see ISO 12001) and also in noise emission testing where no specific noise test code exists. Such standardized noise test codes can recommend the application of particular basic International Standards and give detailed requirements on mounting and operating conditions for a particular family of which the machine under test belongs, in accordance with general principles given in the basic standards.

This document is not intended to replace any of the details of, or add any additional requirements to, the individual test methods in the basic International Standards referenced.

NOTE 1 Two quantities which complement each other can be used to describe the noise emission of machinery, equipment and products. One is the emission sound pressure level at a specified position and the other is the sound power level. The International Standards which describe the basic methods for determining emission sound pressure levels at work stations and at other specified positions are ISO 11200 to ISO 11205 (References [20] to [25]).

NOTE 2 The sound energy level mentioned in ISO 3741 to ISO 3747 is not addressed in this document as it is not mentioned in any legal requirement. Its application is limited to very special cases of a single burst of sound energy or transient sound defined in ISO 12001.

2 Normative references

There are no normative references in this document.

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:

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

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

3.1
emission
<acoustics> airborne sound radiated by a well-defined noise source (e.g. the machine under test) under specified operating and mounting conditions

Note 1 to entry: Emission values may be incorporated into a product noise declaration, product label and/or product specification. The basic noise emission quantities are the sound power level of the source itself and the emission sound pressure levels at the work station and/or at other specified positions (if any) in the vicinity of the source.

[SOURCE: ISO 12001:1996, 3.3, modified — Note 1 to entry "product noise declaration" added.]