



NSAI
Standards

Irish Standard
I.S. EN ISO 3745:2012&A1:2017

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 3745:2012)

I.S. EN ISO 3745:2012&A1:2017

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National Foreword

I.S. EN ISO 3745:2012&A1:2017 is the adopted Irish version of the European Document EN ISO 3745:2012, 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 3745:2012)

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EUROPEAN STANDARD

EN ISO 3745:2012/A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2017

ICS 17.140.01

English Version

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 - Amendment 1 (ISO 3745:2012/Amd
1:2017)

Acoustique - Détermination des niveaux de puissance
acoustique et des niveaux d'énergie acoustique émis
par les sources de bruit à partir de la pression
acoustique - Méthodes de laboratoire pour les salles
anéchoïques et les salles semi-anéchoïques -
Amendement 1 (ISO 3745:2012/Amd 1:2017)

Akustik - Bestimmung der Schalleistungs- und
Schallenergiepegel von Geräuschquellen aus
Schalldruckmessungen - Verfahren der
Genauigkeitsklasse 1 für reflexionsarme Räume und
Halbräume - Änderung 1 (ISO 3745:2012/Amd
1:2017)

This amendment A1 modifies the European Standard EN ISO 3745:2012; it was approved by CEN on 20 March 2017.

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This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN ISO 3745:2012/A1:2017) has been prepared by Technical Committee ISO/TC 43 “Acoustics” in collaboration with Technical Committee CEN/TC 211 “Acoustics” the secretariat of which is held by DIN.

This Amendment to the European Standard EN ISO 3745:2012 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

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

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For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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Endorsement notice

The text of ISO 3745:2012/Amd 1:2017 has been approved by CEN as EN ISO 3745:2012/A1:2017 without any modification.

EUROPEAN STANDARD

EN ISO 3745

NORME EUROPÉENNE

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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 3745:2012)

Acoustique - Détermination des niveaux de puissance acoustique et des niveaux d'énergie acoustique émis par les sources de bruit à partir de la pression acoustique - Méthodes de laboratoire pour les salles anéchoïques et les salles semi-anéchoïques (ISO 3745:2012)

Akustik - Bestimmung der Schalleistungs- und Schallenergiepegel von Geräuschquellen aus Schalldruckmessungen - Verfahren der Genauigkeitsklasse 1 für reflexionsarme Räume und Halbräume (ISO 3745:2012)

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EN ISO 3745:2012 (E)

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Foreword

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This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.

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For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

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Endorsement notice

The text of ISO 3745:2012 has been approved by CEN as a EN ISO 3745:2012 without any modification.

Annex ZA (informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC, *Machinery directive*.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

INTERNATIONAL STANDARD

**ISO
3745**

Third edition
2012-03-15

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

*Acoustique — Détermination des niveaux de puissance acoustique et
des niveaux d'énergie acoustique émis par les sources de bruit à partir
de la pression acoustique — Méthodes de laboratoire pour les salles
anéchoïques et les salles semi-anéchoïques*



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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 3745 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

This third edition cancels and replaces the second edition (ISO 3745:2003), which has been technically revised.

ISO 3745:2012(E)

Introduction

This International Standard is one of the series ISO 3741^[3] to ISO 3747^[8], 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^[2]. ISO 3741^[3] to ISO 3747^[8] 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 on mounting, loading and operating conditions under which the sound power levels or sound energy levels are to be obtained and to select the appropriate measurement surface and microphone array from among those specified in this International Standard.

The methods given in this International Standard require the source to be mounted in either an anechoic room or a hemi-anechoic room having specified acoustical characteristics. The methods are then based on the premise that the sound power or sound energy of the source is directly proportional to the mean-square sound pressure over a hypothetical measurement surface enclosing the source and otherwise depends on the physical constants of air.

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

The methods give a precision grade of accuracy (grade 1) as defined in ISO 12001. The resulting sound power levels and sound energy levels include corrections to allow for any differences that might exist between the meteorological conditions under which the tests are conducted and reference meteorological conditions. For applications where there are large uncertainties due to operating conditions or where reduced accuracy is acceptable, reference can be made to the more practical methods of ISO 3744^[6] or ISO 3746^[7]. Guidance on evaluation of measurement uncertainty is given in Annex I.

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

1 Scope

1.1 General

This International Standard specifies methods for measuring the sound pressure levels on a measurement surface enveloping a noise source (machinery or equipment) in an anechoic room or a hemi-anechoic room. The sound power level (or, in the case of impulsive or transient noise emission, the sound energy level) produced by the noise source, in frequency bands of width one-third octave or with frequency weighting A applied, is calculated using those measurements, including corrections to allow for any differences between the meteorological conditions at the time and place of the test and those corresponding to a reference characteristic acoustic impedance.

In general, the frequency range of interest includes the one-third-octave bands with mid-band frequencies from 100 Hz to 10 000 Hz. In practice, the range is extended or restricted to frequencies beyond or within these limits, to those between which the test room is qualified for the purposes of the measurements.

1.2 Types of noise and noise sources

The methods specified in this International Standard are 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 can be a device, machine, component or sub-assembly. The maximum size of the noise source depends on specified requirements regarding the radius of the hypothetical sphere or hemisphere used as the enveloping measurement surface.

1.3 Test room

The test rooms that are applicable for measurements made in accordance with this International Standard are an anechoic room or hemi-anechoic room, also called, respectively, a free-field test room or hemi-free-field test room.

1.4 Measurement uncertainty

Information is given on the uncertainty of the sound power levels and sound energy levels determined in accordance with this International Standard, for measurements made in limited bands of frequency and with frequency weighting A applied. The uncertainty conforms to ISO 12001:1996, accuracy grade 1 (precision 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 9613-1:1993, *Acoustics — Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere*

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

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