Akustika. Müraallikate helivõimsuse taseme määramine. Tehnilised meetodid väikeste liikuvate allikate jaoks reverbereeruvates väljades. Osa 1: Võrdlusmeetod kipskrohvitud katseruumide jaoks

Acoustics - Determination of sound power levels of noise sources - Engineering methods for small, movable sources in reverberant fields - Part 1: Comparison method for hard-walled test rooms

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 3743-1:2009 sisaldab Euroopa standardi EN ISO 3743-1:2009 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 3743-1:2009 consists of the English text of the European standard EN ISO 3743-1:2009.
Standard on kinnitatud Eesti Standardikeskuse 30.09.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 30.09.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 29.07.2009.	Date of Availability of the European standard text 29.07.2009.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 17.140.01

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 3743-1

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ICS 17.140.01

Supersedes EN ISO 3743-1:1995

English Version

Acoustics - Determination of sound power levels of noise sources - Engineering methods for small, movable sources in reverberant fields - Part 1: Comparison method for hard-walled test rooms (ISO 3743-1:1994)

Acoustique - Détermination des niveaux de puissance acoustique émis par les sources de bruit - Méthodes d'expertise en champ réverbéré applicables aux petites sources transportables - Partie 1: Méthode par comparaison en salle d'essai à parois dures (ISO 3743-1:1994)

Akustik - Bestimmung der Schalleistungspegel von Geräuschquellen - Verfahren der Genauigkeitsklasse 2 für kleine, transportable Quellen in Hallfeldern - Teil 1: Vergleichsverfahren in Prüfverfahren mit schallharten Wänden (ISO 3743-1:1994)

This European Standard was approved by CEN on 13 July 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard 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 Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN ISO 3743-1:2009: E

Foreword

The text of ISO 3743-1:1994 has been prepared by Technical Committee ISO/TC 43 “Acoustics” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 3743-1:2009 by Technical Committee CEN/TC 211 “Acoustics” the secretariat of which is held by DS.

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 January 2010, and conflicting national standards shall be withdrawn at the latest by January 2010.

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.

This document supersedes EN ISO 3743-1:1995.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directives.

For relationship with EC Directives, see informative Annexes ZA and ZB, which are integral parts of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 3743-1:1994 has been approved by CEN as a EN ISO 3743-1:2009 without any modification.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/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 a means of conforming to Essential Requirements of the New Approach Directive 98/37/EC, amended by 98/79/EC on machinery.

Once this standard is cited in the Official Journal of the European Communities 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 product(s) falling within the scope of this standard.

Annex ZB
(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 a means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC on machinery.

Once this standard is cited in the Official Journal of the European Communities 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.

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Contents

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Introduction

0.1 ISO 3743 is one of the ISO 3740 series, which specifies various methods for determining the sound power levels of machines, equipment and their sub-assemblies. These basic standards specify the acoustical requirements for measurements appropriate for different test environments as shown in table 0.1. When selecting one of the methods of the ISO 3740 series, it is necessary to select the most appropriate for the conditions and purposes of the noise test. General guidelines to assist in the selection are provided in ISO 3740. The ISO 3740 series gives only general principles regarding the operating and mounting conditions of the machine or equipment under test. Reference should be made to the noise test code for a specific type of machine or equipment, if available, for specifications on mounting and operating conditions.

0.2 The method given in this part of ISO 3743 enables measurement of sound pressure levels in octave bands at prescribed fixed microphone positions or along prescribed paths. A comparison method is used which allows determination of sound power levels in octave bands; A-weighted sound power levels may be calculated from the octave-band sound power levels. Quantities which cannot be determined are the directivity characteristics of the source and the temporal pattern of noise radiated by sources emitting non-steady noise.

0.3 Parts 1 and 2 of ISO 3743 specify engineering methods for determining the A-weighted and octave-band sound power levels of small noise sources. The methods are applicable to small machines, devices, components and sub-assemblies which can be installed in a hard-walled test room with prescribed acoustical characteristics or in a special reverberation test room. The methods are particularly suitable for small items of portable equipment; they are not intended for larger pieces of stationary equipment which, due to their manner of operation or installation, cannot readily be moved into the test room and operated as in normal usage. The procedures are intended to be used when an engineering grade of accuracy is desired without requiring the use of laboratory facilities.

Table 0.1 — International Standards specifying various methods for determining the sound power levels of machines and equipment

International Standard	Classification of method[1]	Test environment	Volume of source	Character of noise	Sound power levels obtainable	Optional information available
3741	Precision (grade 1)	Reverberation room meeting specified requirements	Preferably less than 1 % of test room volume	Steady, broad-band	In one-third-octave or octave bands	A-weighted sound power level
3742				Steady, discrete frequency or narrow-band		
3743-1	Engineering (grade 2)	Hard-walled test room		Steady, broad-band, narrow-band, or discrete frequency	A-weighted and in octave bands	Other weighted sound power levels
3743-2		Special reverberation test room				
3744	Engineering (grade 2)	Outdoors or in large room	Greatest dimension less than 15 m	Any	A-weighted and in one-third-octave or octave bands	Directivity information and sound pressure levels as a function of time; other weighted sound power levels
3745	Precision (grade 1)	Anechoic or semi-anechoic room	Preferably less than 0,5 % of test room volume	Any		
3746	Survey (grade 3)	No special test environment	No restrictions; limited only by available test environment	Any	A-weighted	Sound pressure levels as a function of time; other weighted sound power levels
3747	Survey (grade 3)	No special test environment; source under test not movable	No restrictions	Steady, broad-band, narrow-band, or discrete frequency	A-weighted	Sound power levels in octave bands

1) See ISO 2204.

0.4 In ISO 3743-2, the comparison method can also be used, but an alternative method permits the determination of the A-weighted sound power level of the source under test from a single A-weighted sound pressure level measurement at each microphone position, rather than from a summation of octave-band levels. This direct method eliminates the need for a reference sound source, but requires the use of a special reverberation test room. The direct method is based on the premise that the sound pressure level, averaged in space and time in the test room, can be used to determine the sound power level emitted by the source. The properties of the special reverberation test room are chosen so that the room's influence on the sound power output of the equipment under test is small. The number of microphone positions and source locations required in the test room are specified.

The requirements to be fulfilled by the special reverberation test room for measurements in accordance with the method given in ISO 3743-2 are significantly more restrictive than those placed on the hard-walled test room by the comparison method given in this part of ISO 3743.

Acoustics — Determination of sound power levels of noise sources — Engineering methods for small, movable sources in reverberant fields —

Part 1:
Comparison method for hard-walled test rooms

1 Scope

1.1 General

This part of ISO 3743 specifies a relatively simple engineering method for determining the sound power levels of small, movable noise sources. The measurements are carried out when the source is installed in a hard-walled test room. A comparison method is used to determine to the octave-band sound power levels of the source. The spatial average (octave-band) sound pressure levels produced by the source under test are compared to the spatial average (octave-band) sound pressure levels produced by a reference sound source of known sound power output. The difference in sound pressure levels is equal to the difference in sound power levels if conditions are the same for both sets of measurements. The A-weighted sound power level is then calculated from the octave-band sound power levels.

NOTE 1 Precision methods for the determination of sound power levels of small noise sources are specified in ISO 3741 and ISO 3745.

1.2 Types of noise

The method specified in this part of ISO 3743 is suitable for measurements of all types of noise within a specified frequency range, except intermittent noise consisting of isolated bursts of sound energy.

NOTES

2 A classification of different types of noise is given in ISO 2204.

3 For sources of intermittent noise consisting of short-duration noise bursts, the free-field methods specified in ISO 3744 and ISO 3745 should be used.

1.3 Noise source

The noise source may be a device, machine, component or sub-assembly.

The maximum size of the source under test depends upon the size of the room used for the acoustical measurements. (See also 4.1).

1.4 Measurement uncertainty

Determinations made in accordance with this part of ISO 3743 result, with few exceptions, in standard deviations of reproducibility of the A-weighted sound power level equal to or less than 1,5 dB (see table 1).

A single value of the sound power level of a noise source determined according to the procedures of this part of ISO 3743 is likely to differ from the true value by an amount within the range of the measurement uncertainty. The uncertainty in determinations of the sound power level arises from several factors which affect the results, some associated with environmental conditions in the measurement laboratory and others with experimental techniques.

If a particular noise source were to be transported to each of a number of different laboratories, and if, at each laboratory, the sound power level of that source were to be determined in accordance with this part of ISO 3743, the results would show a scatter. The standard deviation of the measured levels could be calculated (see examples in ISO 7574-4:1985, annex B) and would vary with frequency. With few exceptions, these standard deviations would not exceed those listed in table 1. The values given in table 1 are standard deviations of reproducibility, σ_R, as defined in ISO 7574-1. The values of table 1 take into account the cumulative effects of measurement uncertainty in applying the procedures of this part of ISO 3743, but exclude variations in the sound power output caused