

**Akustika. Mürallikate helivõimsuse taseme määramine helirõhu abil. Tehnilised meetodid väikeste liikuvate allikate jaoks reverbereeruvates väljades. Osa 2: Meetodid spetsiaalse järelkõlakestusega katseruumide jaoks**

Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering methods for small, movable sources in reverberant fields - Part 2: Methods for special reverberation test rooms

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 3743-2:2009 sisaldab Euroopa standardi EN ISO 3743-2:2009 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 30.09.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 29.07.2009.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN ISO 3743-2:2009 consists of the English text of the European standard EN ISO 3743-2:2009.

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.

Date of Availability of the European standard text 29.07.2009.

The standard is available from Estonian standardisation organisation.

ICS 17.140.01

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English Version

Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering methods for small, movable sources in reverberant fields - Part 2: Methods for special reverberation test rooms (ISO 3743-2:1994)

Acoustique - Détermination des niveaux de puissance acoustique émis par les sources de bruit à partir de la pression acoustique - Méthodes d'expertise en champ réverbéré applicables aux petites sources transportables - Partie 2: Méthodes en salle d'essai réverbérante spéciale (ISO 3743-2:1994)

Akustik - Bestimmung der Schalleistungspegel von Geräuschquellen aus Schalldruckmessungen - Verfahren der Genauigkeitsklasse 2 für kleine, transportable Quellen in Hallfeldern - Teil 2: Verfahren für Sonder-Hallräume (ISO 3743-2:1994)

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

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## Foreword

The text of ISO 3743-2:1994 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 3743-2:2009 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 3743-2:1996.

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.

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### Endorsement notice

The text of ISO 3743-2:1994 has been approved by CEN as a EN ISO 3743-2:2009 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.

**WARNING —** Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

## 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 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 with A-weighting and in octave bands at prescribed fixed microphone positions or along prescribed paths. It allows determination of A-weighted sound power levels or sound power levels with other weighting and 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 special reverberation test room or in a hard-walled test room with prescribed acoustical characteristics. 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.

**0.4** In ISO 3743-1, a comparison method is used to determine 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.

The requirements to be fulfilled by the special reverberation test room for measurements in accordance with this part of ISO 3743 are significantly more restrictive than those placed on the hard-walled test room by the comparison method of ISO 3743-1.

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

| International Standard | Classification of method <sup>1)</sup> | 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.       |                                        |                                                            |                                                             |                                                        |                                                    |                                                                                                            |

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

## Part 2:

## Methods for special reverberation 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 specially designed room having a specified reverberation time over the frequency range of interest. The A-weighted sound power level of the source under test is determined 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. Guidelines for the design of special reverberation rooms are given in annex B.

In addition to the direct method, a comparison method is also described (see 8.3). However, since

the requirements on the test room for the comparison method of ISO 3743-1 are considerably less restrictive, it is recommended that the comparison method of ISO 3743-1 be used if a special reverberation test room is not available.

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

#### 1.2 Types of noise

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

#### NOTES

2 A classification of different types of noise is given in ISO 12001.

3 For sources of impulsive 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.