

**Akustika. Mehhanismide ja seadmete müra. Juhised
üldstandardite kasutamiseks helirõhutaseme
määramisel töö- ja muudes piiritletud kohtades**

Acoustics - Noise emitted by machinery and equipment -
Guidelines for the use of basic standards for the
determination of emission sound pressure levels at a work
station and at other specified positions

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 11200:2009 sisaldab Euroopa standardi EN ISO 11200:2009 ingliskeelset teksti.

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This Estonian standard EVS-EN ISO 11200:2009 consists of the English text of the European standard EN ISO 11200:2009.

This standard is ratified with the order of Estonian Centre for Standardisation dated 30.10.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

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English Version

Acoustics - Noise emitted by machinery and equipment -
Guidelines for the use of basic standards for the determination
of emission sound pressure levels at a work station and at other
specified positions (ISO 11200:1995, including Cor 1:1997)

Acoustique - Bruit émis par les machines et équipements -
Guide d'utilisation des normes de base pour la
détermination des niveaux de pression acoustique
d'émission au poste de travail et en d'autres positions
spécifiées (ISO 11200:1995, Cor 1:1997 inclus)

Akustik - Geräuschabstrahlung von Maschinen und
Geräten - Leitlinien zur Anwendung der Grundnormen zur
Bestimmung von Emissions-Schalldruckpegeln am
Arbeitsplatz und an anderen festgelegten Orten (ISO
11200:1995, einschließlich Cor 1:1997)

This European Standard was approved by CEN on 27 July 2009.

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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

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Foreword

The text of ISO 11200:1995, including Cor 1:1997 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 11200:2009 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 February 2010, and conflicting national standards shall be withdrawn at the latest by February 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 11200:1995.

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 11200:1995, including Cor 1:1997 has been approved by CEN as a EN ISO 11200:2009 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 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 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 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 product(s) falling within the scope of this standard.

Introduction

0.1 Control of noise from machinery or equipment requires effective exchange of acoustical information among the several parties concerned. These include the manufacturer, installer and user of the machinery or equipment. This acoustical information is obtained from measurements. These measurements are useful only if the conditions under which they are carried out are specified, if they yield defined acoustical quantities, and if they are made using standardized instruments.

Two quantities which complement one another can be used to describe the sound emission of machinery or equipment. One of them is the sound power level and the other is the emission sound pressure level at a specified position. The International Standards which describe the basic methods of determining the sound power level are ISO 3740 to ISO 3747 and ISO 9614-1 and ISO 9614-2. This International Standard introduces a series of four International Standards describing various methods for determining emission sound pressure levels of machinery and equipment. Emission sound pressure levels are sound pressure levels at one or more positions located in the vicinity of an item of machinery or equipment, which arise solely from the noise emitted by that machinery or equipment when it performs a specified function under given operating conditions, on a particular mounting in a defined acoustic environment. The operating and mounting conditions are the same as those used in the determination of sound power levels. The positions with which this series of International Standards is concerned include work stations, normally specified in a noise test code (if one exists), occupied by one or more operators of the machinery, and other positions which may be occupied from time to time by other persons. The positions may be located in the vicinity of the machinery, or in a cab, or in some other enclosure more or less remote from the machinery. Emission sound pressure levels may arise from continuous, steady operational machinery or they may be averages for a defined work cycle; they are not averages over a total working day during which the machinery might perform different functions, operate at different control settings, or undergo changes of work load.

Emission sound pressure levels in conjunction with sound power levels are used for declaration of the noise emitted under the 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 reduce the noise emission of machinery, and prediction of noise exposure at the specified positions.

For many products, the sound power level is the primary metric for comparison of noise emissions. Noise test codes and specific declaration codes should state the primary metric for comparison.

It is not the intent of this series of International Standards to describe procedures for measuring the occupational noise exposure of workers.

Included in this series of International Standards are three which describe procedures for measuring emission sound pressure levels directly, in different test environments (ISO 11201, ISO 11202 and ISO 11204), and a fourth (ISO 11203) which gives procedures for determining emission sound pressure levels from the sound power level. When applying these standards to sound measurements on specific machinery, it is necessary to decide which is the most appropriate for the particular type of machinery or equipment and for the purpose of the test. Guidelines for making this decision are provided in this International Standard.

0.2 The series of International Standards for which this International Standard serves as the introduction comprises ISO 11201, ISO 11202, ISO 11203 and ISO 11204. In principle, the methods of determining emission sound pressure levels described in ISO 11201 to ISO 11204 cover all types of machinery and equipment. For noise measurements on a particular kind and size of machinery or equipment, or when there are certain practical limitations, only one of these International Standards may be applicable.

ISO 11201 to ISO 11204 make up a set of basic International Standards which specify the acoustical conditions and instrumentation to be used, describe the procedures to be followed, and give general information on the installation and operation of the machine under test, when determining emission sound pressure levels. In general, these sound pressure levels are different from those that would occur if the machinery or equipment were operating in its normal surroundings, where the environment may influence the emission sound pressure level. The selection of standards for the determination of the sound power level can, for practical reasons, have consequences on the selection of standards for the determination of the emission sound pressure level. It is preferable to make the choice of standards concurrently with respect to the two noise emission quantities.

0.3 This International Standard is one of a series which specifies various methods for determining the noise emissions of a piece of machinery or equipment, or a sub-assembly of such equipment (machine under test). Standards in this series are grouped in three categories, as follows.

a) **Methods for the determination of emission sound pressure levels at work stations and at other specified positions**

In addition to this International Standard, this category includes the following standards (see table 1):

- ISO 11201 gives an engineering method for measuring emission sound pressure levels of machinery and equipment, in an essentially free field over a reflecting plane, with no environmental correction;
- ISO 11202 gives a survey method for measuring emission sound pressure levels of machinery and equipment *in situ* with an environmental correction using a simplified method;

- ISO 11203 gives two alternative methods for determining the emission sound pressure levels of machinery and equipment from the sound power levels;
- ISO 11204 gives a method for measuring the emission sound pressure levels of machinery and equipment yielding engineering grade or survey grade results.

b) **Methods for the determination of sound power levels**

- ISO 3740 gives guidelines for the choice of the method to be used for determining the sound power emitted by machinery and equipment;
- ISO 3741 to ISO 3747 give methods for determining the sound power levels of machinery and equipment via sound pressure measurements;
- parts 1 and 2 of ISO 9614 describe methods for determining the sound power levels of machinery and equipment via sound intensity measurements.

c) **Noise tests codes**

For a particular family of machinery or equipment, noise test codes specify:

- the method to be used for the determination of the sound power level;
- the method to be used for the determination of emission sound pressure levels at work stations, and at other specified positions;
- the positions of the work stations;
- the mounting and operating conditions of the machine under test for the purpose of determining the noise emission quantities;
- the method to be used for verifying declared noise emission quantities.

Acoustics — Noise emitted by machinery and equipment — Guidelines for the use of basic standards for the determination of emission sound pressure levels at a work station and at other specified positions

1 Scope

This International Standard provides brief summaries of the basic International Standards for determining emission sound pressure levels from all types of machinery and equipment, at work stations and at other specified positions, and gives guidance on the process of selection of which is appropriate to any particular type. The guidance given applies only to airborne sound, and is for use in the preparation of noise test codes, and also for use in noise testing where no noise test code exists.

It is important that specific noise test codes for various types of machinery and equipment be established and used in accordance with the requirements of these basic International Standards. Such standardized noise test codes will give detailed requirements on mounting and operating conditions for the particular family to which the machine under test belongs, as well as the location of the work station(s) and other specified positions as prescribed in these International Standards. The data so obtained may also be used for the declaration and verification of emission sound pressure levels as specified in ISO 4871.

NOTE 1 At any given position in relation to a particular machine, and for given mounting and operating conditions, the emission sound pressure levels determined by any of the methods given in ISO 11201 to ISO 11204 will in general be lower than the directly measured sound pressure levels for the same machine in the typical workroom where it is used. This is due to reverberation and the contributions of other machines. A method of calculating the sound pressure levels in the vicinity of a machine operating alone in a workroom is given in ISO 11690-3. Commonly observed differences are 1 dB to 5 dB, but in extreme cases the difference may be even greater.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2204:1979, *Acoustics — Guide to International Standards on the measurement of airborne acoustical noise and evaluation of its effects on human beings*.

ISO 3740:1980, *Acoustics — Determination of sound power levels of noise sources — Guidelines for the use of basic standards and for the preparation of noise test codes*.

ISO 3741:1988, *Acoustics — Determination of sound power levels of noise sources — Precision methods for broad-band sources in reverberation rooms*.

ISO 3742:1988, *Acoustics — Determination of sound power levels of noise sources — Precision methods for discrete-frequency and narrow-band sources in reverberation rooms*.

ISO 3743-1:1994, *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 3743-2:1994, *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 3744:1994, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane.*

ISO 3745:1977, *Acoustics — Determination of sound power levels of noise sources — Precision methods for anechoic and semi-anechoic rooms.*

ISO 3746:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane.*

ISO 3747:1987, *Acoustics — Determination of sound power levels of noise sources — Survey method using a reference sound source.*

ISO 9614-1:1993, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points.*

ISO 9614-2:—¹⁾, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning.*

ISO 11201:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane.*

ISO 11202:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Survey method in situ.*

ISO 11203:1995, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level.*

ISO 11204:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Method requiring environmental corrections.*

ISO 12001:1995, *Acoustics — Noise emitted by machinery and equipment — Rules for the drafting and presentation of a noise test code.*

IEC 651:1979, *Sound level meters.*

IEC 804:1985, *Integrating-averaging sound level meters.*

IEC 942:1988, *Sound calibrators.*

IEC 1260:—²⁾, *Electroacoustics — Octave-band and fractional-octave-band filters.*

3 Definitions

For the purposes of this International Standard, the following definitions apply. More detailed definitions may be found in noise test codes for specific types of machinery and equipment.

3.1 emission: Airborne sound radiated by a well-defined noise source (e.g. the machine under test).

NOTE 2 Noise emission descriptors may be incorporated in a product label and/or product specification. The basic noise emission descriptors are the sound power level of the source itself and the emission sound pressure levels at a work station and/or at other specified positions (if any) in the vicinity of the source.

3.2 emission sound pressure, p : The sound pressure, at a specified position near a noise source, when the source is in operation under specified operating and mounting conditions on a reflecting plane surface, excluding the effects of background noise as well as the effects of reflections other than those from the plane or planes permitted for the purpose of the test. It is expressed in pascals.

3.3 emission sound pressure level, L_p : Ten times the logarithm to the base 10 of the ratio of the square of the emission sound pressure, $p^2(t)$, to the square of the reference sound pressure, p_0^2 , measured with a particular time weighting and a particular frequency weighting, selected from those defined in IEC 651. It is expressed in decibels. The reference sound pressure is 20 μ Pa.

NOTE 3 Examples include:

— maximum A-weighted emission sound pressure level with time-weighting F: L_{pAFmax} ;

1) To be published.

2) To be published. (Revision of IEC 225:1966)