

**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**

The European Standard EN ISO 11201 : 1995 has the status of a
British Standard

ICS 17.140.20

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee EH/1, Acoustics, upon which the following bodies were represented:

- Association of Consulting Engineers
- British Broadcasting Corporation
- British Occupational Hygiene Society
- British Telecommunications plc
- Department of the Environment (Building Research Establishment)
- Department of Health
- Department of Trade and Industry (National Physical Laboratory)
- Health and Safety Executive
- Institute of Acoustics
- Institute of Occupational Hygienists
- Institute of Sound and Vibration Research
- Institution of Electrical Engineers
- Royal Institute of British Architects
- Society of Environmental Engineers

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- Advanced Manufacturing Technology Research Institute
- Agricultural Engineers Association
- British Cement Association
- British Compressed Air Society
- British Industrial Truck Association
- British Iron and Steel Producers Association
- Construction Industry Research and Information Association
- Department of Trade and Industry (National Engineering Laboratory)
- Engineering Industries Association
- Fan Manufacturers Association
- Federation of the Electronics Industry
- Federation of Manufacturers of Construction Equipment and Cranes
- Federation of Piling Specialists
- Hevac Association
- Institution of Engineering Designers
- Institution of Mechanical Engineers
- National Specialist Contractors Council
- Rotating Electrical Machines Association
- University of Liverpool
- University of Manchester

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National foreword

This British Standard has been prepared by Technical Committee EH/1 and is the English language version of EN 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*, published by the European Committee for Standardization (CEN). It is identical with ISO 11201 : 1995 published by the International Organization for Standardization (ISO).

Cross-references

Publication referred to	Corresponding British Standard
ISO 3744 : 1994	BS EN ISO 3744 : 1995 <i>Acoustics. Determination of sound power levels of noise sources using sound pressure. Engineering method in an essentially free field over a reflecting plane</i>
ISO 3745 : 1977	BS 4196 <i>Sound power levels of noise sources</i> Part 5 : 1981 <i>Precision methods for determination of sound power levels for sources in anechoic and semi-anechoic rooms</i>
ISO 3746 : 1995	BS EN ISO 3746 : 1996 <i>Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane</i>
ISO 11200 : 1995	BS EN ISO 11200 : 1996 <i>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</i>
IEC 651 : 1979	BS EN 60651 : 1994 <i>Specification for sound level meters</i>
IEC 804 : 1985	BS EN 60804 : 1994 <i>Specification for integrating-averaging sound level meters</i>
IEC 942 : 1988	BS 7189 : 1989 <i>Specification for sound calibrators</i>

Compliance with a British Standard does not of itself confer immunity from legal obligations.

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Descriptors: Acoustics, operating stations, human factors engineering, noise : sound, engine noise, acoustic measurements, sound pressure, level quantity, testing conditions

English version

**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 11201 : 1995)**

Acoustique - Bruit émis par les machines et
équipements - Mesurage des niveaux de pression
acoustique d'émission au poste de travail et en
d'autres positions spécifiées - Méthode d'expertise
dans des conditions approchant celles du champ
libre sur plan réfléchissant
(ISO 11201 : 1995)

Akustik - Geräuschabstrahlung von Maschinen
und Geräten - Messung von
Emissions-Schalldruckpegeln am Arbeitsplatz und
an anderen festgelegten Orten - Verfahren der
Genauigkeitsklasse 2 für ein im wesentlichen
freies Schallfeld über einer reflektierenden Ebene
(ISO 11201 : 1995)

This European Standard was approved by CEN on 1995-11-21. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

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Foreword

The text of the International Standard ISO 11201 : 1995 has been prepared by the Technical Committee ISO/TC 43, Acoustics, in collaboration with the Technical Committee CEN/TC 211, Acoustics.

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 June 1996, and conflicting national standards shall be withdrawn at the latest by June 1996.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

0.1 This International Standard specifies a method for measuring the emission sound pressure levels at a work station and at other specified positions, in the vicinity of a machine or piece of equipment, in an essentially free field over a reflecting plane. In general, these sound pressure levels will be equal to or lower than those that would occur when the machinery or equipment is operating in its normal surroundings. This is because the sound pressure levels are determined by excluding the effects of background noise, as well as the effects of reflections other than those from the reflecting plane on which the machine under test is placed.

0.2 This International Standard is one of a series (ISO 11200 to ISO 11204) 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). ISO 11200 gives guidance on the choice of the method to be used to determine the emission sound pressure levels of machinery and equipment. It also gives details of International Standards giving methods for the determination of sound power levels.

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

1 Scope

1.1 General

This International Standard specifies a method for measuring the emission sound pressure levels of machinery and equipment, at a work station and at other specified positions nearby, in an essentially free field over a reflecting plane. A work station is occupied by an operator. It may be located in open space in the room where the source operates, or in a cab fixed to the source, or in an enclosure remote from the source. One or more specified positions may be located in the vicinity of a work station, or in the vicinity of an unattended machine. As some of these positions may be occupied occasionally or regularly, they are sometimes referred to as bystander positions.

Emission sound pressure levels are measured as A-weighted and, if required, C-weighted peak, and in frequency bands.

NOTE 1 The contents of this and related International Standards are summarized in table 1 of ISO 11200:1995.

This International Standard specifies requirements for the engineering grade of accuracy on the test environment and instrumentation. Corrections are applied for background noise, but not for the acoustic environment. Instructions are given for the installation and operation of the machine under test and for the choice of microphone positions for the work station and for other specified positions. The purpose of the measurements is to permit comparison of the per-

formance of different units of a given family of machinery or equipment, under defined environmental conditions and standardized mounting and operating conditions. The data obtained may also be used for the declaration and verification of emission sound pressure levels as specified in ISO 4871.

NOTE 2 At any given position in relation to a particular machine, and for given mounting and operating conditions, the emission sound pressure levels determined by the method of this International Standard 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.

1.2 Types of noise and noise sources

The method specified in this International Standard is applicable to all types of machinery, both moving and stationary, for indoor or outdoor use.

The method is applicable to machines of all sizes, and to all types of noise as defined in ISO 2204 and ISO 12001.

1.3 Test environment

The type of test environment influences the accuracy of the determination of emission sound pressure levels. An essentially free field over a reflecting plane (indoors or outdoors) is required.

1.4 Specified positions

This International Standard is applicable to work stations and other specified positions where emission sound pressure levels are to be measured.

Examples of appropriate positions where measurements may be made include the following:

- a) work station located in the vicinity of the machine under test; this is the case for many industrial machines and domestic appliances;
- b) work station within a cab which is an integral part of the machine under test; this is the case for many industrial trucks and earth-moving machines;
- c) work station within a partial or total enclosure (or behind a screen) supplied by the manufacturer as an integral part of the machinery or equipment;
- d) work station partially or totally enclosed by the machine under test; this situation may be encountered with some large industrial machines;
- e) bystander positions occupied by individuals not responsible for the operation of the machine under test, but who may be in its immediate vicinity, either occasionally or continuously;
- f) other specified positions, not necessarily work stations or bystander positions.

The work station may also lie on a specified path along which an operator moves (see 11.4).

1.5 Measurement uncertainty

While it is not possible to give universal values for the standard deviation of reproducibility of emission sound pressure levels at work stations, guidance is given in clause 4.

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.

1) To be published.

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

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 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 11200:1995, *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 12001:—¹⁾, *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 3 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