INTERNATIONAL STANDARD

ISO 11200

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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

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

Reference number
ISO 11200:1995(E)

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.

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.

International Standard ISO 11200 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

Annex A forms an integral part of this International Standard. Annex B is for information only.

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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 μPa.

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)

— C-weighted peak emission sound pressure level: $L_{pC,peak}$.

The emission sound pressure level shall be determined at a specified position in accordance with either a test code for a specific family of machines or, if no test code exists, a method that complies with the ISO 11200 series.

3.4 sound power, W: The rate per unit time at which airborne sound energy is radiated by a source. It is expressed in watts.

3.5 sound power level, L_W: Ten times the logarithm to the base 10 of the ratio of the sound power radiated by the source under test to the reference sound power. It is expressed in decibels.

The frequency weighting or the width of the frequency band used shall be indicated. The reference power is 1 pW (1 pW = 10^{-12} W).

NOTE 4 For example, the A-weighted sound power level is L_{WA}.

3.6 time-averaged emission sound pressure level, L_{peqT}: Emission sound pressure level of a continuous steady sound that, within a measurement time interval, T, has the same mean square sound pressure as a sound under consideration which varies with time. It is expressed in decibels.

It is given by the following equation:

$$L_{peqT} = 10 \lg \frac{1}{T} \int_0^T \frac{p^2(t)}{p_0^2} \mathrm{d}t \ \mathrm{dB} \qquad \ldots (1)$$

A-weighted time-averaged emission sound pressure levels are denoted by L_{pAeqT}, which is usually abbreviated to L_{pA}. L_{pAeqT} shall be measured with an instrument which complies with the requirements of IEC 804.

NOTES

5 In general, the subscripts eq and T are omitted since time-averaged emission sound pressure levels are necessarily determined over a certain measurement time interval.

6 Equation (1) is identical to that for the familiar ISO environmental noise descriptor "equivalent continuous sound pressure level" defined in ISO 1996-1. However, the emission quantity defined above is used to characterize the noise emitted by a machine under test and assumes that standardized measurement and operating conditions as well as a controlled acoustical environment are used for the measurements.

3.7 work station; operator's position: Position in the vicinity of the machine under test which is intended for the operator.

3.8 operator: Individual whose work station is in the vicinity of a machine and who is performing a work task associated with that machine.

3.9 specified position: Position defined in relation to a machine, including, but not limited to, an operator's position. The position can be a single, fixed point, or a combination of points along a path or on a surface located at a specified distance from the machine, as described in the relevant noise test code, if any exists.

NOTE 7 Positions located in the vicinity of a work station, or in the vicinity of an unattended machine, may be identified as "bystander positions".

3.10 background noise: The noise from all sources other than the machine under test.

NOTE 8 Background noise may include contributions from airborne sound, structure-borne vibration, and electrical noise in instrumentation.

3.11 background noise level: The sound pressure level measured when the machine under test is not operating. It is expressed in decibels.

3.12 background noise correction, K_1: A correction term to account for the influence of background noise on the emission sound pressure level at the specified positions of the machine under test. K_1 is frequency dependent and is expressed in decibels. The correction in the case of A-weighting, K_{1A}, is to be determined from A-weighted measured values.

3.13 environmental indicator, K_2: A term to account for the influence of reflected or absorbed sound on the surface sound pressure level; K_2 is frequency dependent and is expressed in decibels. In the case of A-weighting, it is denoted K_{2A} (see the ISO 3740 series).

3.14 local environmental correction, K_3: A correction term to account for the influence of reflected sound on the emission sound pressure level at a specified position (e.g. a work station) for the machine under test. K_3 is dependent upon both frequency and position and is expressed in decibels. In the case of A-weighting, it is denoted K_{3A}.

4 Selection of the appropriate International Standard for determination of emission sound pressure levels

4.1 General requirements

The same installation, mounting and operating conditions shall be used for the determination of emission sound pressure levels and sound power levels. The noise test code for the machinery concerned shall describe the installation, mounting and operating conditions in detail.

NOTE 9 The noise test code may make an exception to the requirement on identical installation, mounting and operating conditions for equipment that is used on tables. Such equipment may be mounted on the floor during sound power determinations.

4.2 Quantities to be measured and determined

Methods are specified in ISO 11201 to ISO 11204 for measuring and determining emission sound pressure levels. The levels may be time-averaged, peak, frequency-weighted, frequency-band, or time-weighted, as specified. The preferred frequency weighting is A-weighting, except in the case of peak levels, where C-weighting is preferred.

4.3 Considerations affecting choice of method

Factors to be considered when selecting a standard from this series of International Standards include:

a) the size and transportability of the machinery or equipment, affecting the practicability of setting it up in an acoustical test laboratory for the purpose of the noise measurements;

b) whether or not particular work stations can be identified in relation to the machine;

c) the test environment available for the measurements;

d) the grade of accuracy required.

NOTE 10 The preferred grade of accuracy for purposes of noise declaration is grade 2 (engineering methods).

4.4 Synopses

Synopses of ISO 11201 to ISO 11204 are to be found in annex A. Table 1 gives an overview of International Standards for determining emission sound pressure levels at work stations and at other specified positions.

4.5 Procedure for selection

In principle, each of the methods of determining emission sound pressure levels described in ISO 11201 to ISO 11204 is applicable to all kinds of machinery and equipment. The choice of method is governed by technical and practical limitations, the broad principles of which are given below. A very general and very rapid guide to the choice between the different methods is illustrated by the flowchart of figure 1. The limitations of the several methods are shown graphically in figure 2.

4.5.1 ISO 11201

This specifies an engineering method of measurement and is applicable to machines for which the following requirements [a), b) and c)] apply:

a) machines that are normally operated in conditions of an essentially free field near one or more reflecting planes, so that noise testing can be carried out *in situ*, or machines that are movable to the extent that they can be installed under such conditions for the purpose of noise testing;

b) machines installed under conditions such that stated requirements concerning background noise and test environment are met for which no environmental correction is applied;

c) machines for which one or more work stations or other specified positions can be defined.

4.5.2 ISO 11202

This specifies a survey method of measurement which is applicable to machines for which the following requirements [a), b) and c)] apply:

a) machines that cannot be installed in an essentially free field over a reflecting plane for the purposes of the measurements;

b) machines installed under conditions such that stated requirements concerning background noise and test environment are met and a simplified environmental correction can be applied;

c) machines for which one or more work stations or other specified positions can be defined.

4.5.3 ISO 11203

This specifies methods for determining the emission sound pressure levels from the sound power level. These methods yield the same accuracy as that of the method used for determining sound power levels, and are applicable to machines for which the following requirements [a) to d)] apply:

a) machines for which sound power level data are available, under the appropriate mounting and operating conditions;

b) machines for which work stations are not defined;

c) machines for which either

   1) a close correlation between the sound power level and emission sound pressure levels at certain defined positions has been established by experiment, or

   2) work stations can be represented as points or paths on a defined surface enveloping the machine (e.g. the measurement surface used in the determination of the sound power level);

d) machines which either radiate sound omnidirectionally or are normally located close to a wall.

4.5.4 ISO 11204

This specifies a method of measurement that yields an accuracy which, depending on the measurement environment, is either of engineering or survey grade, and is applicable to machines for which the following requirements [a), b) and c)] apply:

a) machines that cannot be installed in an essentially free field over a reflecting plane for the purposes of the measurements;

b) machines installed under conditions such that stated requirements concerning background noise and test environment are met and an environmental correction more accurate than that determined in ISO 11202 can be made;

c) machines for which one or more work stations or other specified positions can be defined.

5 Selection of specified positions

5.1 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 of ISO 11201:1995).

5.2 Microphone positions for bystanders and for unattended machines

If no operator's position can be identified, a "conventional" work station (e.g. for maintenance, servicing or repair) or one or more bystander positions shall be defined and stated in the noise test code.

Alternatively, if no noise test code exists, measurements shall be made at four or more microphone positions located 1 m away from each side of the reference box defined in ISO 3744 or ISO 3746 at a height of 1,55 m $\pm$ 0,075 m above the ground plane. The value of the highest emission sound pressure level shall be recorded as the emission sound pressure level of the machine under test. The position where this value is measured shall be recorded.

NOTES

11 Instead of using discrete positions, it may be satisfactory to use the surface sound pressure level calculated from the sound power level according to ISO 11203.

12 A noise test code may require that the average of the levels from the four or more positions is recorded as the emission sound pressure level of the machine under test, for example, as in ISO 7779.

5.3 Work stations inside cabs

If the work station or bystander's position of the machine is located inside a cab or cabin, an additional "conventional" work station or bystander's position outside the cab or cabin (e.g. for maintenance) in the vicinity of the machine under test shall be specified in the noise test code.

Table 1 — Overview of International Standards for determination of emission sound pressure levels at the work station and at other specified positions

Parameter	ISO 11201 Measurement method Grade 2	ISO 11202 Measurement method Grade 3	ISO 11203 Derivation from sound power level Grade 2 or 3	ISO 11204 Measurement method Grade 2 or 3
Test environment	Outdoors or indoors	Outdoors or indoors	In accordance with sound power level standard	Outdoors or indoors
Criterion for suitability of test environment	$K_{2A} \leqslant 2$ dB	$K_{2A} \leqslant 7$ dB	In accordance with sound power level standard	$K_{2A} \leqslant 7$ dB
Limitation of environmental correction	No correction	$K_{3A} \leqslant 2{,}5$ dB (simplified method)	In accordance with sound power level standard	$K_{3A} \leqslant 2$ dB (grade 2) $K_{3A} \leqslant 7$ dB (grade 3)
Size of sound source	No restriction; limited only by available test environment	No restriction; limited only by available test environment	Particularly appropriate for small mass-produced machines	No restriction; limited only by available test environment
Character of noise	Any (broad-band, narrow-band, discrete-frequency, steady, non-steady, impulsive)		In accordance with sound power level standard	Any
Limitation for background noise[1]	$\Delta L \geqslant 6$ dB (if possible, exceeding 15 dB) $K_{1A} \leqslant 1{,}3$ dB for each specified position	$\Delta L \geqslant 3$ dB $K_{1A} \leqslant 3$ dB	In accordance with sound power level standard	$\Delta L \geqslant 6$ dB (if possible exceeding 15 dB) $K_{1A} \leqslant 1{,}3$ dB for each specified position
Points for which emission sound pressure levels are to be determined	Work stations and other specified positions		Work stations and other specified positions (but not in cabins or similar)	Work stations and other specified positions
Instrumentation:				
a) Sound level meter	at least complying with: a) type 1 per IEC 651	a) type 2	In accordance with sound power level standard	a) type 1
b) Integrating sound level meter	b) type 1 per IEC 804	b) type 2		b) type 1
c) Frequency band filter set	c) class 1 per IEC 1260	c) class 1		c) class 1
d) Calibrator	d) class 1 per IEC 942	d) class 1		d) class 1
Quantities to be obtained	A, C_{peak}; optional frequency bands	A, C_{peak}	In accordance with sound power level standard	A, C_{peak}; optional frequency bands
Precision of method for determining L_{pA} expressed as reproducibility standard deviation	Equal to or less than approximately 2,5 dB [2]	Equal to or less than approximately 5 dB [2]	Equal to that associated with the sound power level determination method used	Equal to or less than approximately 2,5 dB (grade 2) or 5 dB (grade 3)[2]
Related sound power level standards	ISO 3744	ISO 3746	ISO 3740 series and ISO 9614 series	ISO 3744 (grade 2) ISO 3746 (grade 3)

1) ΔL is the difference between the sound pressure level measured with the source under test in operation and the level of the background noise.

2) In view of the wide variation of equipment for which the standards may be applied, the values given are only tentative.

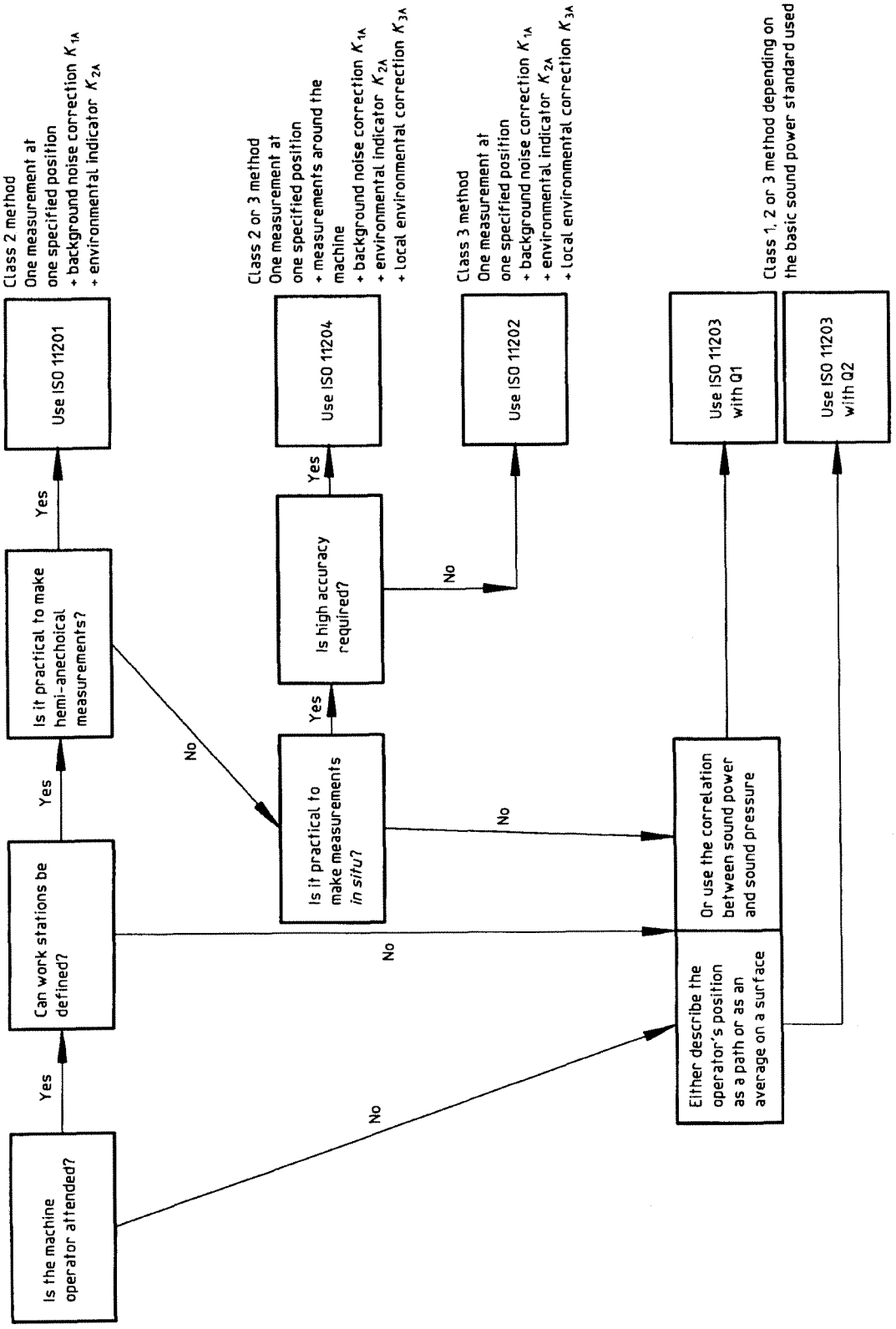

Figure 1 — Flowchart guiding the choice of appropriate International Standard for determining emission sound pressure levels of machinery and equipment

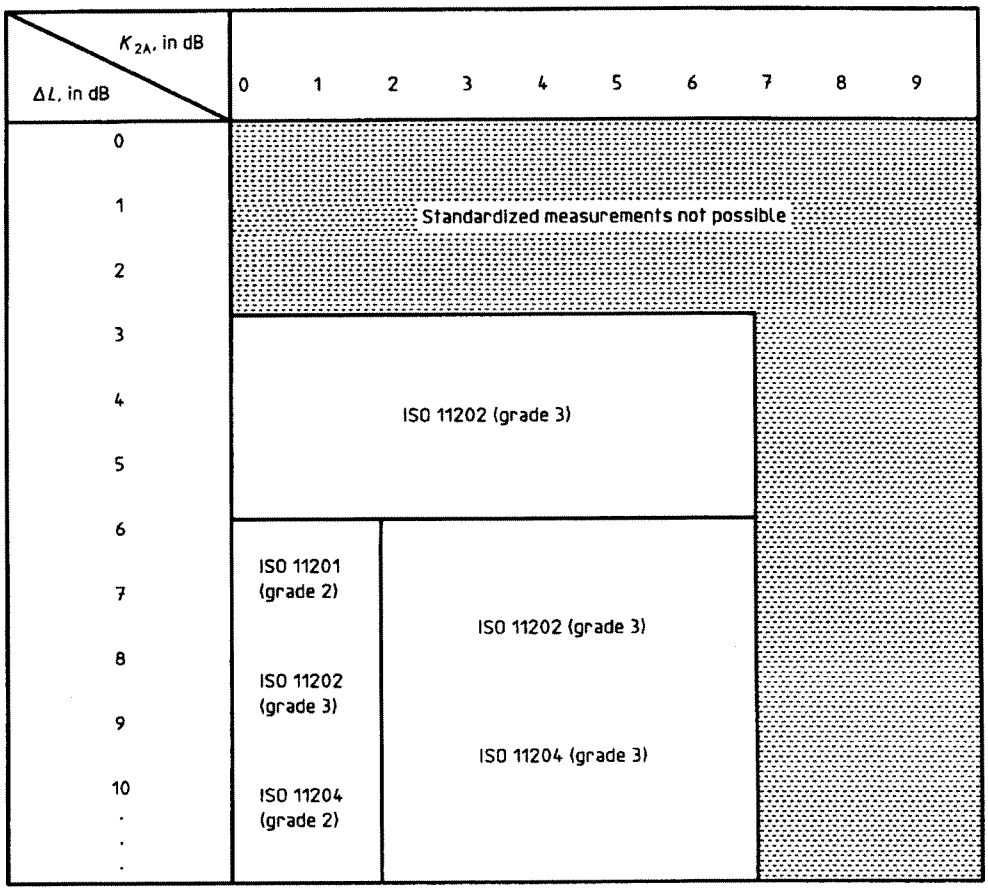

Figure 2 — Scope of ISO 11201, ISO 11202 and ISO 11204, depending on the difference between the sound pressure level measured and the level of the background noise (ΔL), the environmental correction (K_{2A}) and the local environmental correction (K_{3A})

Annex A
(normative)

Synopses of basic International Standards on determination of emission sound pressure levels

A.1 ISO 11201: Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method

A.1.1 Applicability

a) **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.

b) **Type of noise source**: Any stationary or moving source for indoor or outdoor use.

c) **Size of noise source**: No restrictions.

d) **Character of noise radiated by the source**: All types of noise as defined in ISO 2204 and ISO 12001.

A.1.2 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 of ISO 11201:1995.

A.1.3 Quantities to be measured

Emission sound pressure levels (A-weighted and, if required, C-weighted peak, and in frequency bands).

A.2 ISO 11202: Measurement of emission sound pressure levels at a work station and at other specified positions — Survey method

A.2.1 Applicability

a) **Test environment**: Indoors or outdoors with one or more reflecting planes present, meeting specified requirements.

b) **Type of noise source**: Any stationary or moving source for indoor or outdoor use.

c) **Size of noise source**: No restrictions.

d) **Character of noise radiated by the source**: All types of noise defined in ISO 2204 and ISO 12001.

A.2.2 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 of ISO 11202:1995.

A.2.3 Quantities to be measured

Emission sound pressure levels (A-weighted and, if required, C-weighted peak).

A.3 ISO 11203: Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level

A.3.1 Applicability

a) **Test environment**: The environment used in the determination of the sound power level in accordance with one of the standards in the ISO 3740 or ISO 9614 series.

b) **Type of noise source**: Any stationary or moving source for indoor or outdoor use, preferably mass-produced.

c) **Size of noise source**: Preferably small sources.

d) **Character of noise radiated by the source**: All types of noise as defined in ISO 2204 and ISO 12001 that are compatible with the method used for the determination of the sound power level.

A.3.2 Measurement uncertainty

Equal to that which is specified for the method used for the determination of the sound power level.

A.3.3 Quantities to be determined

Emission sound pressure levels with the same frequency weighting and time weighting, or in the same frequency bands, as those for which sound power levels have been determined.

A.4 ISO 11204: Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering/survey method requiring environmental corrections

A.4.1 Applicability

a) **Test environment**: Indoors or outdoors with one or more reflecting planes present, meeting specified requirements.

b) **Type of noise source**: Any stationary or moving source for indoor or outdoor use.

c) **Size of noise source**: No restrictions.

d) **Character of noise radiated by the source**: All types of noise as defined in ISO 2204 and ISO 12001.

A.4.2 Measurement uncertainty

While 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 of ISO 11204:1995.

A.4.3 Quantities to be measured

Emission sound pressure levels (A-weighted and, if required, C-weighted peak and in frequency bands).

Annex B
(informative)

Bibliography

[1] ISO 1996-1:1982, *Acoustics — Description and measurement of environmental noise — Part 1: Basic quantities and procedures.*

[2] ISO 4871:—[3], *Acoustics — Declaration and verification of noise emission values of machinery and equipment.*

[3] ISO 7779:1988, *Acoustics — Measurement of airborne noise emitted by computer and business equipment.*

[4] ISO 11690-3:—[4], *Acoustics — Recommended practice for the design of low-noise workplaces containing machinery — Part 3: Sound propagation and noise prediction in workrooms.*

3) To be published. (Revision of ISO 4871:1984)

4) To be published.

ICS 17.140.20

Descriptors: acoustics, machinery, equipment, noise (sound), engine noise, airborne sound, workplaces, operating stations, tests, acoustic tests, determination, sound pressure, acoustic measurements, general conditions.

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INTERNATIONAL STANDARD ISO 11200:1995
TECHNICAL CORRIGENDUM 1

Published 1997-02-01

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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

TECHNICAL CORRIGENDUM 1

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

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to International Standard ISO 11200:1995 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

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Figure 2

Replace the existing figure 2 with the following figure 2.

ICS 17.140.20 **Ref. No. ISO 11200:1995/Cor.1:1997(E)**

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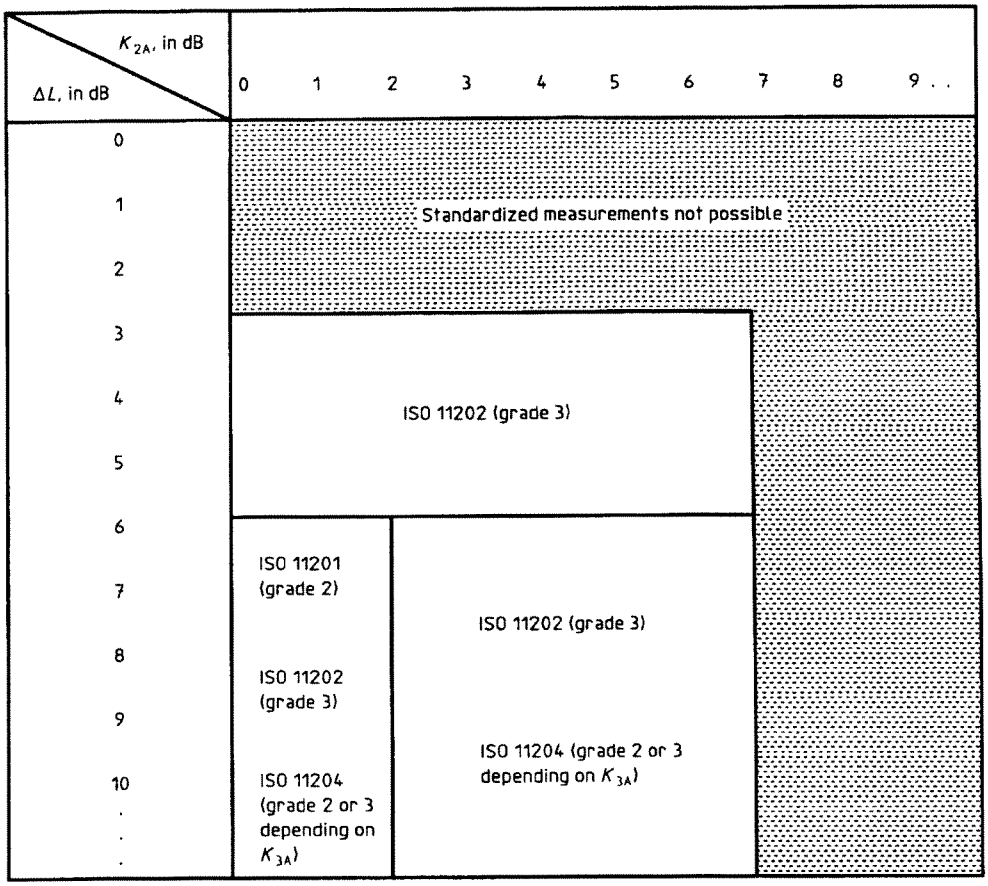

NOTE — K_{3A} is the local environmental correction.

Figure 2 — Scope of ISO 11201, ISO 11202 and ISO 11204, depending on the difference between the sound pressure level measured and the level of the background noise (ΔL), and on the environmental correction (K_{2A})