SLOVENSKI STANDARD
SIST EN 1265:2000+A1:2009

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Varnost strojev - Postopki za merjenje hrupa livarskih strojev in opreme

Safety of machinery - Noise test code for foundry machines and equipment

Sicherheit von Maschinen - Geräuschmessverfahren für Gießereimaschinen und -anlagen

Sécurité des machines - Code d'essai acoustique pour machines et équipements de fonderie

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25.120.30	Livarska oprema	Moulding equipment

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Safety of machinery - Noise test code for foundry machines and equipment

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This European Standard was approved by CEN on 2 July 1999 and includes Amendment 1 approved by CEN on 5 October 2008.

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Foreword

This document (EN 1265:1999+A1:2008) has been prepared by Technical Committee CEN/TC 202 "Foundry machinery", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2008-10-05.

This document supersedes EN 1265:1999.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

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 EU Directive(s).

⟨A1⟩ For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document ⟨A1⟩.

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 United Kingdom.

Introduction

This noise test code provides manufacturers and third parties with the means to carry out noise emission measurements, determine values for noise declaration purposes and provide the means for their verification. This document follows the rules of EN ISO 12001.

The complexity, variety and nature of foundry equipment makes the measurement of sound power level very complicated. This explains the approach taken in the body of the standard for the determination of the sound power level.

1 Scope

[A1] This [A1] noise test code specifies all the information necessary to carry out efficiently and under standardized conditions the determination, declaration and verification of the [A1] noise emission values [A1] of several groups of foundry machinery. It specifies noise measurement methods that are available and operating and mounting conditions that shall be used for the test.

[A1] Noise emission values [A1] include emission sound pressure levels at work stations and the sound power level. The determination of these quantities is necessary for:

— manufacturers to declare the noise emitted;

— comparing the noise emitted by machines in the group concerned;

— purposes of noise control at the source at the design stage.

The use of this standard ensures the reproducibility of the determination of the [A1] noise emission values [A1] within specified limits determined by the grade of accuracy of the basic noise measurement method used. Noise measurement methods allowed by this standard are engineering methods (grade 2) and survey methods (grade 3).

This standard has a main body giving general requirements common to the foundry machines family. Six normative Annexes give requirements specific to the groups of foundry machinery listed below:

— core making machines (EN 710);

— moulding machines (EN 710);

— knock-out grids and knock-out trays (EN 710);

— dry abrasive blasting equipment (not restricted to foundry application) ([A1] EN 1248 [A1]);

— air blasting equipment ([A1] EN 1248 [A1]);

— diecasting machines (EN 869);

and six informative Annexes giving guidance for the definition of specific operating conditions.

The main body of this standard also gives guidance for the measurement of the noise emission of foundry machines not dealt with in the Annexes.

This standard does not cover the computation of personnel daily noise exposure.

2 Normative references

[A1] The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. [A1]

[A1] EN 710:1997, *Safety requirements for foundry moulding and coremaking machinery and plant and associated equipment*

EN 869:2006, *Safety of machinery — Safety requirements for pressure metal diecasting units*

EN 1248:2001, *Foundry Machinery — Safety requirements for abrasive blasting equipment*

EN 61672-1:2003, *Electroacoustics — Sound level meters — Part 1: Specifications (IEC 61672-1:2002)*

EN ISO 3743-1:1995, *Acoustics — Determination of sound power levels of noise sources — Engineering methods for small, movable sources in reverberant fields — Part 1: Comparison method in hard-walled test rooms (ISO 3743-1:1994)*

EN ISO 3744:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)*

EN 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 3746:1995)*

EN ISO 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 9614-1:1995, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points (ISO 9614-1:1993)*

EN ISO 9614-2:1996, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning (ISO 9614-2:1996)*

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 (ISO 11201:1995)*

EN 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 11202:1995)*

EN 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 11204:1995)*

EN ISO 12001:1996, *Acoustics — Noise emitted by machinery and equipment — Rules for the drafting and presentation of a noise test code (ISO 12001:1996)*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)* [A1]

3 [A1⟩ Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003 and the following apply. ⟨A1]

[A1⟩ **3.1**
noise emission
airborne sound radiated by a well-defined noise source (e.g. the machine under test)

3.2
basic noise emission standard
standard for determining the noise emission of machinery and equipment in such a way as to obtain reliable, reproducible results with a specified grade of accuracy

3.3
noise test code [see EN ISO 12001:1997]
standard that is applicable to a particular class, family or type of machinery or equipment which specifies all the information necessary to carry out efficiently the determination, declaration and verification of the noise emission characteristics under standardized conditions

3.4
emission sound pressure, *p*, in pascals [see EN ISO 4871:1996]
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, in the absence of background noise and of reflections from room surfaces other than the plane on which the machine under test is placed

3.5
emission sound pressure level, L_p, in decibels [see EN ISO 4871:1996]
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 EN 61672-1. The reference sound pressure is 20 µPa

3.6
sound power, *W*, in watts [see EN ISO 4871:1996]
rate per unit time at which airborne sound energy is radiated by a source

3.7
sound power level, L_W, in decibels [see EN ISO 4871:1996]
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, determined with a particular frequency weighting or in a particular frequency band. The reference sound power is 1 pW (1 pW = 10^{-12} W)

3.8
noise emission value [see EN ISO 4871:1996]
value of the sound power level, L_W, or the emission sound pressure level, L_p, determined from measurements

3.9
declared dual-number noise emission value, *L* and *K*
value of the measured A-weighted sound power level, L_{WA}, the A-weighted time-averaged emission sound pressure level, L_{pA}, or the C-weighted peak emission sound pressure level, L_{pCpeak}, and *K*, the related uncertainty. (L + K) indicate the statistical upper limit below which the measured noise emission value of the individual machine or equipment are projected to lie when the machines are new. The declared value, L_d, is rounded to the nearest decibel

3.10
work station, operator's position
position in the vicinity of the machine under test which is intended for an operator

3.11
operator
individual whose work station is in the vicinity of a machine who is performing a work task associated with that machine

3.12
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 ⟨A1⟩

4 Description of machinery family

This noise test code applies to the machine families, specified in EN 710, EN 869 and ⟨A1⟩ EN 1248 ⟨A1⟩.

Further information describing the machinery families is given in clause 1 and normative Annexes A to F.

5 Sound power level determination

5.1 Basic international standards to be used

A-weighted sound power levels shall be determined in accordance with one of the following basic noise emission standards

EN ISO 3743-1 (grade 2: engineering);

EN ISO 3744 (grade 2: engineering);

EN ISO 3746 (grade 3: survey);

EN ISO 9614-1 (grade 2 and grade 3, discrete points);

EN ISO 9614-2 (grade 2 and grade 3, scanning).

Grade 2 (engineering) shall be used whenever possible.

When an enveloping surface method (e. g. EN ISO 3744, EN ISO 3746) is chosen, measurements shall be ⟨A1⟩ carried out ⟨A1⟩ on a rectangular parallelepiped surface preferably with a measuring distance of 1 m.

NOTE Sound power levels in frequency bands may also be determined.

5.2 Measurement uncertainty

For measurement uncertainties see clause 9.

5.3 Measurement procedure

Details of the measurement procedure for specific groups of foundry machinery are given in the relevant Annexes A to F.

6 Emission sound pressure level determination

6.1 Basic international standards to be used

A-weighted emission sound pressure levels and - if required in the relevant Annex - C-weighted peak emission sound pressure levels shall be determined in accordance to one of the basic noise emission standards

EN ISO 11201 (grade 2: engineering);

EN ISO 11202 (grade 3: survey);

EN ISO 11204 (grade 2 or grade 3; with environmental corrections).

Grade 2 (engineering) shall be used whenever possible.

6.2 Selection of relevant work stations

The work stations, where A-weighted emission sound pressure levels and C-weighted peak emission sound pressure levels are to be determined, are specified in the relevant Annexes for particular machine groups.

For machines not covered in the Annexes the position of the work station shall be recorded and reported in quantitative terms.

If fixed work stations other than those specified in the Annexes exist, the manufacturer shall measure and report A-weighted emission sound pressure levels in addition at these work stations.

When the work station is undefined, sound pressure levels shall be measured at a distance of 1 m from the surface of the machinery and a height of 1,6 m above the floor or access platform. The position and value of the maximum sound pressure level shall be indicated.

6.3 Measurement uncertainty

For measurement uncertainties see clause 9.

6.4 Measurement procedure

Details of the measurement procedure for specific groups of foundry machinery are given in the relevant Annexes A to F.

7 Installation and mounting conditions

The installation and mounting conditions shall be those recommended by the manufacturer.

The installation and mounting conditions shall be the same for the determination of both sound power level and emission sound pressure level at specified positions and for declaration purposes.

The machine shall be placed if possible on a reflecting floor as far as possible from any other reflecting surface or object.

NOTE Care should be taken to ensure that any electrical conduits, piping or air ducts connected to the machinery do not radiate significant amounts of sound into the test environment, if they are not part of the machine.

The determination of sound power levels with the machine mounted on a reflecting floor and close to a wall is not recommended but permitted if there is no other way to carry out the measurement and if the wall is acoustically reflective. In this case, requirements given in EN ISO 3744 regarding sound power determination in the presence of two reflective planes shall be applied.

8 Operating conditions

The measuring object is the machine in a normal nominal operating condition with the product to be produced, processed or machined. Auxiliary devices which are integrated in the machine and are essential for its operation such as hydraulic or vacuum devices are considered to be part of the machine.

The operating condition is selected in such a way that in the course of the measurement all characteristic noises that are emitted during the operation of the machine and that can be assigned to it are detected.

In case of different working processes that together constitute a characteristic working cycle, it is this cycle that is defined as the operating condition.

Operating conditions shall be the same for the determination of both sound power level and emission sound pressure level at work stations (see also Annexes A to F).

Noise reduction [A1] devices [A1], which are part of the machine, shall be in place during the measurement.

9 Measurement uncertainties

The standard deviation of reproducibility is the one specified in the basic noise emission standard used. It is equal to 1,5 dB for A-weighted sound power levels and 2,5 dB for the A-weighted emission sound pressure levels determined with a method of grade 2 of accuracy (engineering method).

10 Information to be recorded

The information to be recorded includes all the information required by the relevant basic noise emission standards used for the sound source under test: acoustic environment, instrumentation, acoustical data.

11 Information to be reported

The information to be reported shall include all the information required by the relevant noise emission standards used for the sound source under test e. g.

— machine characteristics;

— reference to this noise test code and to the basic noise emission standards that have been used;

— measured noise emission values;

— location of the work stations and other specified positions;

— description of mounting and operating conditions;

— if appropriate, it shall be confirmed that all specifications given in this noise test code and in the basic noise emission standards used have been strictly fulfilled.

Examples of machine data sheets are given in the Annexes G to L for the machines referred to in clause 1.

12 Declaration and verification of noise emission values

[A1] The declaration shall be made as dual-number noise emission values (measured value and associated uncertainty given separately). The noise declaration shall be made in such a way that the values can be verified according to 6.2 of EN ISO 4871:1996. [A1]

The A-weighted emission sound pressure level and the A-weighted sound power level and - if relevant - the C-weighted peak emission sound pressure levels L_{pCpeak} at the work stations shall be declared.

The noise declaration shall explicitly mention the fact that the noise emission values have been obtained according to this noise test code and indicate which basic standards have been used. If this statement is not true, the noise declaration shall indicate clearly what the deviations are from this noise test code and/or from the basic standards.

If undertaken, a verification shall be conducted by using the same mounting, installation and operating conditions as those used for the initial determination of noise emission values.

Additional noise emission quantities such as sound power levels in octave bands etc. may also be given in the noise declaration. In this case, care shall be taken to avoid confusion between these additional noise emission data and the declared dual-number noise emission values.

〚A1〛 Table 1 〚A1〛 shows an example of a dual-number noise declaration. The given values are only for illustration.

〚A1〛 *deleted text* 〚A1〛

〚A1〛 Table 1 — Example of declared dual-number noise values

Identifying information, e.g. machine type, model number, date of readings
DECLARED DUAL-NUMBER NOISE EMISSION VALUES **MEASURED A-WEIGHTED EMISSION SOUND PRESSURE LEVEL AT THE WORK STATION:** L_{pA} (re 20 µPa) in decibels ____ Uncertainty K_{pA} in decibels ____ **MEASURED A-WEIGHTED SOUND POWER LEVEL:** L_{WA} (re 1 pW) in decibels ____ Uncertainty K_{WA} in decibels ____ **Values determined according to noise test code EN 1265, Annex xx and noise measurement standards EN xxxxx and EN xxxxx**

NOTE The sum of a measured noise emission value and its associated uncertainty factor represents an upper bound of the range of values which can occur in the measurements. 〚A1〛