

SLOVENSKI STANDARD

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Nadomešča:

SIST EN 14462:2005+A1:2009

Naprave za površinsko obdelavo - Preskusni postopek za merjenje hrupa naprav za površinsko obdelavo, vključno z dodajnimi in odvzemnimi napravami - Razreda točnosti 2 in 3

Surface treatment equipment - Noise test code for surface treatment equipment including its ancillary handling equipment - Accuracy grades 2 and 3

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Oberflächenbehandlungsgeräte - Geräuschemessverfahren für Oberflächenbehandlungsgeräte einschließlich ihrer Be- und Entladeeinrichtungen - Genauigkeitsklassen 2 und 3

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Equipements de traitement de surface - Code d'essai acoustique pour équipements de traitement de surface, y compris les équipements de manutention auxiliaires - Classes de précision 2 et 3

Ta slovenski standard je istoveten z: EN 14462:2015

ICS:

17.140.20	Emisija hrupa naprav in opreme	Noise emitted by machines and equipment
25.220.01	Površinska obdelava in prevleke na splošno	Surface treatment and coating in general

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EUROPEAN STANDARD

EN 14462

NORME EUROPÉENNE

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English Version

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This European Standard was approved by CEN on 29 November 2014.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC 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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 14462:2015) has been prepared by Technical Committee CEN/TC 271 "Surface treatment equipment - Safety", 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 August 2015 and conflicting national standards shall be withdrawn at the latest by August 2015.

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 14462:2005+A1:2009.

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).

For relationship with EU Directive 2006/42/EC, see informative Annex ZA, which is an integral part of this document.

This document includes the following significant technical changes with respect to EN 14462:2005+A1:2009:

- integration of dry ice blasting equipment in A.1.2;
- integration of automatic electrostatic application equipment for flammable flock material (EN 50223) in A.3.1.

It augments the "C"-type safety standards prepared by CEN/TC 271. Its purpose is to provide a means of determination, declaration and verification of noise emission for the equipment within the scope of this document. The determination of noise emission values is a prerequisite for a manufacturer to assess the noise reduction obtained at the design stage.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 14462:2015 (E)**Introduction**

This noise test code gives assistance to carry out noise emission measurements and to determine values for noise declaration purposes under the Machinery Directive 2006/42/EC and provides the means for their verification. Annex D with Figure D.1 and Figure D.2 provides an overview on the noise determination procedure.

Noise emission characteristics include both emission sound pressure levels at workstations and sound power levels. The determination of these characteristics is necessary for

- manufacturers to declare the noise emitted,
- comparing the noise emitted by machines,
- purposes of noise control at the source during the design stage,
- estimation of noise exposure at the workstation(s).

Noise testing of the machinery can be done at the manufacturer's site, at the place of mounting or at any other adequate location.

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1 Scope

This European Standard specifies standardized conditions for the determination, declaration and verification of airborne noise emission of the following surface treatment equipment:

- machinery for cleaning and pre-treatment of industrial item surfaces (see EN 12921-1, EN 12921-2, EN 12921-3, EN 12921-4);
- phosphating machinery;
- plating machinery;
- plasma surface treatment machinery;
- machinery for the supply and/or circulation of coating materials under pressure (see EN 12621, EN 12757-1);
- atomizing and spraying equipment for coating materials (see EN 1953, EN 50050-1, EN 50050-2, EN 50050-3, EN 50059, EN 50176, EN 50177, EN 50348);
- coating plants (see EN 12215, EN 12581, EN 12981, EN 13355, EN 50223);
- dryers, ovens and evaporating equipment (see EN 1539);
- thermal cleaning plants (incinerators) for exhaust gas from surface treatment plants (see EN 12753);
- dry-ice blasting equipment.

For the above surface treatment machinery this European Standard gives provisions for the determination of

- emission sound pressure levels at workstations and/or other specified positions and
- sound power levels.

This European Standard specifies noise emission measurement methods, mounting and operating conditions that shall be used for the test. The use of this document ensures the reproducibility of the determination of the noise emission characteristics within specified limits determined by the grade of accuracy of the basic noise emission measurement method used (see Clause 4 and Clause 5). Noise emission measurement methods allowed by this document are engineering methods (grade 2) and survey methods (grade 3).

This European Standard does not apply to machines not explicitly listed in the scope:

- printing, paper converting and paper making machinery and auxiliary equipment (see EN 13023);
- abrasive blasting machinery see EN 1265.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1539, *Dryers and ovens, in which flammable substances are released — Safety requirements*

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EN 1953, *Atomising and spraying equipment for coating materials — Safety requirements*

EN 12215, *Coating plants — Spray booths for application of organic liquid coating materials — Safety requirements*

EN 12581, *Coating plants — Machinery for dip coating and electrodeposition of organic liquid coating materials — Safety requirements*

EN 12621, *Machinery for the supply and circulation of coating materials under pressure — Safety requirements*

EN 12753, *Thermal cleaning systems for exhaust gas from surface treatment equipment — Safety requirements*

EN 12757-1, *Mixing machinery for coating materials — Safety requirements — Part 1: Mixing machinery for use in vehicle refinishing*

EN 12921-1, *Machines for surface cleaning and pre-treatment of industrial items using liquids or vapours — Part 1: Common safety requirements*

EN 12921-2, *Machines for surface cleaning and pre-treatment of industrial items using liquids or vapours — Part 2: Safety of machines using water based cleaning liquids*

EN 12921-3, *Machines for surface cleaning and pre-treatment of industrial items using liquids or vapours — Part 3: Safety of machines using flammable cleaning liquids*

EN 12921-4, *Machines for surface cleaning and pre-treatment of industrial items using liquids and vapours — Part 4: Safety of machines using halogenated solvents*

EN 12981, *Coating plants — Spray booths for application of organic powder coating material — Safety requirements*

EN 13355, *Coating plants — Combined booths — Safety requirements*

EN 50223, *Stationary electrostatic application equipment for ignitable flock material — Safety requirements*

EN ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 3746, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746)*

EN ISO 3747, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering/survey methods for use in situ in a reverberant environment (ISO 3747)*

EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

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

EN ISO 11201:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*

EN ISO 11202, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202)*

EN ISO 11204, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections (ISO 11204)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 emission sound pressure

p

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

Note 1 to entry: Emission sound pressure is expressed in pascals.

[SOURCE: EN ISO 11201:2010, 3.2, modified]

3.2 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 (the reference sound pressure is 20 μ Pa), measured with a particular time weighting and a particular frequency weighting, selected from those defined in EN 61672-1

Note 1 to entry: Emission sound pressure level is expressed in decibels.

Note 2 to entry: The emission sound pressure level of surface treatment equipment is determined at specified positions in accordance with this document.

[SOURCE: EN ISO 11201:2010, 3.3, modified]

3.3 average emission sound pressure level

\bar{L}_p

energy-average of the emission sound pressure levels L_p at several microphone positions around the machine

3.4 sound power

W

rate per unit time at which airborne sound energy is radiated by a source

Note 1 to entry: Sound power is expressed in watts.

[SOURCE: EN ISO 3744:2010, 3.20, modified]

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, which is 1 pW (10^{-12} W)

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Note 1 to entry: Sound power level is expressed in decibels.

Note 2 to entry: The frequency weighting or the width of the frequency band used is indicated, for example, A-weighted sound power level (L_{WA}).

[SOURCE: EN ISO 3744:2010, 3.21, modified]

3.6**work station****operator's position**

position in the vicinity of the machine under test which is intended for an operator

Note 1 to entry: The work station represents the occasional or permanent intervention position designed for operators and situated inside or in the vicinity of the machine under test.

[SOURCE: EN ISO 11201:2010, 3.11, modified]

3.7**specified position**

position defined in relation to a machine including, but not limited to, an operator's position

Note 1 to entry: 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.

[SOURCE: EN ISO 11201:2010, 3.13, modified]

3.8**reference box**

hypothetical surface which is the smallest rectangular parallelepiped that just encloses the source and terminates on the reflecting plane or planes

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[SOURCE: EN ISO 3744:2010, 3.10, modified]

3.9**measurement surface**

hypothetical surface of area S , enveloping the source, on which the measurement positions are located and terminating on one or more reflecting planes

[SOURCE: EN ISO 3744:2010, 3.14, modified]

3.10**very large machine**

machine with dimensions of 7 m in length or more or 4 m in height or more

Note 1 to entry: Machines extending over several floors are regarded as very large machines, in every case.

3.11**work cycle**

operation of a machine producing a periodic fluctuation of noise emission or a series of working processes with different noise emissions that repeats itself

Note 1 to entry: One characteristic work cycle can be defined as the operating conditions for the machine under test.

4 Determination of A-weighted emission sound pressure level at workstations and other specified positions

4.1 General

A-weighted emission sound pressure levels L_{pA} shall be determined according to one of the following basic standards:

- EN ISO 11201 (grade 2) for machinery which can be tested in an essentially free field over a reflecting plane (e.g. outdoor test location or adequate test room);
- EN ISO 11202 (grade 2 or grade 3) or EN ISO 11204 (grade 2 or grade 3), for machinery which cannot be tested in an essentially free field over a reflecting plane:
 - where ever possible, grade 2 methods shall be used;
 - if grade 3 methods are used, a justification shall be recorded and reported.

NOTE For the purpose of reducing noise at source at the design stage, it is useful to determine emission sound pressure levels at workstations in frequency bands. These levels can be obtained using these basic standards.

4.2 Measurement positions

If workstations are defined, the A-weighted emission sound pressure shall be determined at the workstations.

Annex A specifies the measurement positions for particular surface treatment machines.

If no workstation is defined, or Annex A does not specify measurement positions, the measurement positions shall be located on a path at 1,6 m above the floor and 1 m from the external surface of the machine. The location of these points and the sound pressure levels measured shall be indicated in the test report and in the noise declaration. The maximum distance between two consecutive points shall be 2 m. In this case, the highest value measured shall be taken as the A-weighted emission sound pressure level for the machine.

The following additional requirements apply:

- if the application of the provisions leads to measurement positions that are not practical and/or dangerous, closest positions that are practical and/or not dangerous shall be chosen. For a machine comprising several floors, individual measurement positions shall be defined on each floor;
- for machines placed at a distance of less than 2 m from a boundary surface, there shall be no measurement positions on the side facing the boundary;
- for installations consisting of several machines, individual measurement positions shall be defined
 - for any individual machine of the installation, if the distance to all neighbouring machines exceeds 2 m;
 - for parts of the installation, for which the distances between neighbouring machines do not exceed 2 m;
 - for the complete installation, if all distances between neighbouring machines do not exceed 2 m.

Installations consisting of several machines shall always be considered as very large machines (see 5.2).

See Annex C, Figure C.1 and Figure C.2, for examples of the arrangement of measurement positions.

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5 Determination of A-weighted sound power level

5.1 General

A-weighted sound power levels L_{WA} shall be determined according to one of the following basic standards:

- EN ISO 3744 (grade 2);
- EN ISO 3746 (grade 3);
- EN ISO 3747 (grade 2 and grade 3);
- EN ISO 9614-2 (grades 2 and grade 3).

Where ever possible, grade 2 methods shall be used. If grade 3 methods are used, a justification shall be recorded and reported.

When EN ISO 3744 or EN ISO 3746 is used the measurement surface shall be the parallelepiped one.

NOTE EN ISO 3744 (grade 2) or EN ISO 3746 (grade 3) are appropriate methods for many applications when machines can be measured outdoors or indoors in an adequate environment. In an approximately reverberant field EN ISO 3747 allows the determination of sound power levels with grade 2 by using a reference sound source (comparison method). In cases of extremely bad environmental conditions (reverberant field and/or high levels of extraneous noise) intensity methods according to EN ISO 9614-2 (scanning method) can be the only applicable method.

5.2 Measurement positions for very large machines

For machines longer than 7 m, instead of the A-weighted sound power level, A-weighted emission sound pressure levels shall be determined at points located around the machine.

NOTE Compared to the determination of sound power levels this procedure requires less time and effort.

The measurement positions shall be located on a path at 1,6 m above the floor and 1 m from the external surface of the machine. The maximum distance between two consecutive points shall be 2 m.

For machines longer than 6 m, in areas far from dominant sound sources the maximum distance between two consecutive points may be 2 m.

The energy-average \bar{L}_{pA} of the emission sound pressure levels L_{pA} at all measurement positions, shall be the characteristic value for the description of noise emission.

The location of these points and the sound pressure levels measured shall be indicated in the test report and in the noise declaration.

6 Measurement uncertainties

The total measurement uncertainty of the noise emission values determined according to this European Standard is depending on the standard deviation of reproducibility of the measurement $\sigma_{R_0}^2$ given by the applied noise emission measurement method and the uncertainty associated with the instability of the operating and mounting conditions for the machine σ_{omc}^2 . The resulting total standard deviation σ_{tot} is then calculated as: