SLOVENSKI STANDARD
SIST EN 1547:2001+A1:2009

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Industrijska termoprocesna oprema - Postopek merjenja hrupa industrijske termoprocesne opreme in pripadajoļ e pomoģne opreme

Industrial thermoprocessing equipment - Noise test code for industrial thermoprocessing equipment including its ancillary handling equipment

Industrielle Thermoprozessanlagen - Geräuschmessverfahren für industrielle Thermoprozessanlagen einschließlich ihrer Be- und Entladeeinrichtungen

Equipements thermiques industriels - Code d'essai acoustique pour équipements thermiques industriels, y compris les équipements de manutention auxiliaires

Ta slovenski standard je istoveten z: **EN 1547:2001+A1:2009**

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17.140.20	Emisija hrupa naprav in opreme	Noise emitted by machines and equipment
25.180.01	Industrijske peļ i na sploģno	Industrial furnaces in general

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This European Standard was approved by CEN on 24 January 2001 and includes Amendment 1 approved by CEN on 21 May 2009.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 1547:2001+A1:2009) has been prepared by Technical Committee CEN/TC 186 "Industrial thermoprocessing - 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of an identical text or by endorsement, at the latest by December 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2009-05-21.

This document supersedes EN 1547:2001.

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⟩

This standard forms one part of safety standards covering Industrial Thermoprocessing Equipment. For a full list of parts it is referred to the EN 746 series.

The working group that drafted this Part comprised experts from the following countries: Belgium, Finland, France, Germany, Switzerland and the United Kingdom.

The annexes A and B are informative.

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 standard has been prepared to be a harmonized standard to provide one means of conforming with the essential safety requirements of the Machinery Directive and associated EFTA Regulations.

This European Standard is a type C-Standard as defined in [A1] EN ISO 12100 [A1].

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 verify declared values.

The determination of noise emission requires manufacturers to acquire a basic technical know-how regarding noise emission metrology. This explains the approach taken in the body of the standard for the determination of the sound power level.

1 Scope

[A1] This noise test code specifies all the information necessary to carry out efficiently and under standardized conditions the determination, declaration and verification of the noise emission characteristics of industrial thermoprocessing equipment as described especially in EN 746-1, EN 746-2 and EN 746-3. It also indicates the location of work stations where measurements need to be made. [A1]

Noise emission characteristics 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 noise emission characteristics 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 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] *deleted text* [A1]

EN 746-1, *Industrial thermoprocessing equipment — Part 1: Common safety requirements for industrial thermoprocessing equipment*

EN 746-2, *Industrial thermoprocessing equipment — Part 2: Safety requirements for combustion and fuel handling systems*

EN 746-3, *Industrial thermoprocessing equipment — Part 3: Safety requirements for the generation and use of atmosphere gases*

〉A1〈 prEN ISO 3743-1, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering method for small, movable sources in reverberant fields — Part 1: Comparison method for a hard-walled test room (ISO/DIS 3743-1:2006)* 〉A1〈

〉A1〈 prEN ISO 3744, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO/DIS 3744:2006)* 〉A1〈

〉A1〈 prEN 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/DIS 3746:2005)* 〉A1〈

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

EN ISO 9614-1, *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, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning (ISO 9614-2:1996)*

EN ISO 11201, *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, *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, *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)*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply:

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

3.2
basic noise emission standard
a 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
a 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]
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 and of reflections other than those from the plane or planes permitted for the purpose of the test. It is expressed in pascals.

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_o^2, measured with a particular time weighting and a particular frequency weighting, selected from those defined in [A1] EN 61672-1 and -2 [A1]. The reference sound pressure is 20 µPa.

3.6
sound power, *W*, in watts [see EN ISO 4871:1996]
the 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 (1pW = 10^{-12} W).

3.8
noise emission value [see EN ISO 4871:1996]
a general term by which any one or more of the A-weighted sound power level, L_{WA}, or the A-weighted time-averaged emission sound pressure level, L_{pA}, or the C-weighted peak emission sound pressure level, $L_{pC,\,peak}$, is inferred.

3.9
declared dual-number noise emission value, *L* and *K*
the 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

NOTE (*L* + *K*) indicate the statistical upper limit below which the measured noise emission value of the individual machine or equipment and/or a specified large proportion of the measured noise emission values of a batch of machinery or equipment are projected to lie when the machines are new.

3.10
work station, operator's position [see EN ISO 4871:1996]
a position in the vicinity of the machine under test which is intended for an operator

3.11
operator [see EN ISO 4871:1996]
an 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 [see EN ISO 4871:1996]
A 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.

3.13
manufacturer's rated production
the designed output of the machinery, and any related ancillary equipment which form part of the contract between the manufacturer and the purchaser or is declared by the manufacturer in his technical specification

3.14
industrial thermoprocessing equipment and associated equipment
additionally to the heat treatment equipment itself, charging and discharging devices can form part of the industrial thermoprocessing equipment as well as ancillary devices such as exhaust equipment, weighing equipment or high pressure gas tanks, which can be a noise source

4 Machine family description

This Standard applies to all industrial thermoprocessing equipment detailed in EN 746-1, EN 746-2 and EN 746-3 except when another specific noise test code exists for that particular type of equipment.

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:

[A1] prEN ISO 3743-1 [A1] (grade 2: engineering);

[A1] prEN ISO 3744 [A1] (grade 2: engineering);

[A1] prEN ISO 3746 [A1] (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) methods shall be used whenever possible.

NOTE In case of **very large industrial thermoprocessing equipment** such as in most rolling mills (with one dimension larger than 5 m vertically or 7 m horizontally) [A1] *deleted text* [A1], it is adequate, instead of determining the sound power level, to determine A-weighted emission sound pressure levels at specified points around the equipment located at 1 m from the external surface of the equipment and 1,6 m above the floor or access platform. In this case, information on sound power level is replaced by the values of these A-weighted emission sound pressure levels.

5.2 Measurement procedure

When applicable, sound power level shall be determined at least in accordance with the basic noise emission standards listed in 5.1.

When an enveloping surface method (e. g. [A1] prEN ISO 3744 [A1], [A1] prEN ISO 3746) [A1] is chosen, measurements shall be done on a rectangular parallelepiped surface preferably with a measuring distance of 1 m. Protruding parts, which are noise emitting, such as the combustion airblower, pumps, burners, charging/discharging points shall be taken as an integral part of the equipment when defining the reference box.

NOTE Annex A gives an example of a gas fired heat treatment furnace (continuous type).

The noise measurements shall be made with the equipment (heat treatment furnace and any ancillary devices, if applicable) either in situ in its operating position in the plant or in the manufacturer's works. In either case the equipment shall have been installed in accordance with the manufacturer's instructions before the test commences (see clause 7).