SLOVENSKI STANDARD
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Podporna oprema na tleh za letalski promet - Splošne zahteve - 4. del: Metode merjenja in zmanjševanje hrupa

Aircraft ground support equipment - General requirements - Part 4: Noise measurement methods and reduction

Luftfahrt-Bodengeräte - Allgemeine Anforderungen - Teil 4: Lärmmessverfahren und -minderung

Matériel au sol pour aéronefs - Exigences générales - Partie 4: Bruit, réduction et méthodes de mesure

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49.100	Oprema za servis in vzdrževanje na tleh	Ground service and maintenance equipment

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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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Foreword

This document (EN 1915-4:2004+A1:2009) has been prepared by Technical Committee CEN/TC 274 “Aircraft ground support equipment”, 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of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2009-02-22.

This document supersedes EN 1915-4:2004.

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 Directives, see informative Annexes ZA and ZB, which are integral parts of this document. [A1]

EN 1915 “Aircraft ground support equipment — General requirements” consists of:

Part 1: Basic safety requirements
Part 2: Stability and strength requirements, calculations and test methods
Part 3: Vibration measurement methods and reduction
Part 4: Noise measurement methods and reduction

A further European Standard (EN 12312) in several parts covering specific requirements for different aircraft ground support equipment is in preparation.

The parts of EN 12312 “Aircraft ground support equipment — Specific requirements” are:

Part 1: Passenger stairs
Part 2: Catering vehicles
Part 3: Conveyor belt vehicles
Part 4: Passenger boarding bridges
Part 5: Aircraft fuelling equipment
Part 6: Deicers and deicing/antiicing equipment
Part 7: Aircraft movement equipment
Part 8: Maintenance stairs and platforms
Part 9: Container/Pallet loaders
Part 10: Container/Pallet transfer transporters
Part 11: Container/Pallet dollies and loose load trailers
Part 12: Potable water service equipment
Part 13: Lavatory service equipment
Part 14: Disabled/Incapacitated passenger boarding equipment
Part 15: Baggage and equipment tractors
Part 16: Air start equipment
Part 17: Air conditioning equipment
Part 18: Nitrogen or Oxygen units
Part 19: Aircraft jacks, axle jacks and hydraulic tail stanchions
Part 20: Ground power equipment

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

The aim of this European Standard is to deal with noise as a hazard and to provide methods for the measurement and reduction of noise emission of GSE. A further aim of this European Standard is, despite the variety of GSE, to obtain representative and comparable information on the noise emissions of this category of equipment. It should be possible to determine and verify this information with justifiable effort.

General standards for the determination of the noise emissions at the operator's position and of the sound power levels of machines already exist. Because of specific applications these existing standards cannot be applied directly to GSE without supplement of specific machinery and operating conditions as given in this European Standard.

The idle condition is included for some machines because it is representative of those conditions in which the GSE has low noise emission as well as waiting between tasks.

This European Standard is a Type C standard as stated in [A1] EN ISO 12100 [A1].

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

1 Scope

This document deals with noise reduction as a safety requirement. It also specifies the methods for determining the sound pressure level at workstations, other specified positions and the sound power level of GSE during intended use.

The test results are not applicable to the determination of daily exposure to noise for the operator.

[A1] This part of EN 1915 is intended to be used in conjunction with the other parts of EN 1915, and with the relevant part of EN 12312. [A1]

2 Normative references

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] *deleted text* [A1]

EN 1915-1:2001, *Aircraft ground support equipment — General requirements — Part 1: Basic safety requirements.*

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

EN ISO 11201:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a workstation and at other specified positions — Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995).*

[A1] 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 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in [A1] EN ISO 12100-1:2003, EN ISO 12100-2:2003 [A1], EN 1915-1:2001, EN ISO 3744:1995, EN ISO 4871:1996, and EN ISO 11201:1995 and the following apply.

3.1
operator's position
area where operators stay during normal operation, e.g. driver/co-driver seats, control panels, walkways, stairs, ladders, platforms

3.2
exterior position
position for measurements located in the vicinity of the GSE

4 Noise reduction

Noise emission is in general a significant hazard, which shall be reduced to the lowest level taking into account the technical progress and the available technical measures for noise control.

GSE can contain many components emitting noise. Typical noise sources are:

— propulsion- and auxiliary engines, their cooling (fans) and exhaust systems;

— hydraulic systems with pumps, motors, relief valves, etc.;

— heaters with their fans and exhaust systems;

— rolling noise due to wheels/ground contact;

— vibration and shocks between mobile mechanical parts.

Likewise, components in the fluid systems (such as pumps and relief valves) and mechanical drive systems (gears, brakes, etc.) can add to the total noise emission.

There is a variety of measures to reduce noise emission from the noise sources mentioned above, e.g.:

— engines can be suspended in appropriate vibration dampers, their exhaust systems can be equipped with suitable silencers and fan and intake air can be adequately ducted;

— hydraulic components can, first of all, be chosen and dimensioned with this aspect in mind and the layout be made in such a way that noise emission is limited;

— fan and exhaust ducts of heaters can be so designed that noise is kept to a minimum level;

— reduction of operating clearances and the possibilities of shocks between elements.

In addition to these measures, further noise reduction can be achieved by casing the noise emitting components with appropriate materials.

NOTE The measures listed are not exhaustive, and alternative technical measures for noise control with identical or greater efficiency can be used by the manufacturer. EN ISO 11688-1 and EN ISO 11688-2 give recommended practice for the design of low noise machinery and equipment.

After taking at design and manufacturing all possible general technical measures for noise reduction the instruction handbook shall, when appropriate, identify any additional noise reduction measures which can be taken by the user, and recommend organisational measures such as the use of low-noise operating modes, and/or limited time of operation.

5 Test conditions

5.1 Tests to be made

Sound pressure levels shall be measured for all GSE under the common test conditions given in 5.2, the specific operating test conditions for particular types of GSE given in 5.3 and in accordance with the specifications for acoustic measurements given in Clauses 6 and 7.

Where there is more than one driver or operator position, e.g. on conveyor belt vehicles and aircraft movement equipment, the measurements for the operator position shall also be carried out at this additional position.

If the A-weighted emission sound pressure level exceeds 〚A1〛 80 dB 〈A1〉, then additionally the sound power level has to be determined in accordance with the specifications given in Clause 8.

Measurements under driving conditions shall be performed only for self-propelled GSE.

If, for practical reasons, it is not possible to use real driving conditions, simulated driving conditions are allowed provided that it can be shown by comparison that the results are the same as those obtained with the real driving procedure and the uncertainty remains within the requirements of 6.6, 7.6 and 8.7. If simulated driving conditions are used, the documentation shall be part of the test report.

NOTE 1 Tests on self-propelled GSE should be performed only for vehicles which are not approved as a standard vehicle for driving on public roads according to EC Directive 92/97/EEC.

NOTE 2 Where a standard automotive chassis is used for the GSE, and declaration data for noise at the driver's or operator's position are given by the manufacturer, these values may form the basis for the noise declaration for the GSE provided that the application of the standard automotive chassis to the use as GSE does not imply changes in design or construction which affect the noise characteristics.

For guidance, an overview of typical requirements for measurement of sound pressure levels for various types of GSE and for different modes of operation is given in Annex A.

5.2 Common test conditions

5.2.1 Test track

Measurements shall be made on a level (± 2 % deviation), hard and reflective surface, e.g. tarmac, concrete at a site complying with the test environment described in EN ISO 3744 and EN ISO 11201.

5.2.2 Equipment and condition of GSE

Measurements shall be made on GSE with noise emission characteristics that are representative for the specific type of GSE.

The GSE selected for the noise measurement shall be equipped in the same way as typically supplied for that type of GSE.

Measurements shall be made on GSE with standard equipment and with the operator present.

For individual measurements and special equipment, the specific equipment shall be listed.

All components of the GSE shall be at the temperature for normal operating conditions for the prevailing ambient temperature.

For GSE with a driver's cabin, measurements shall be carried out with doors and windows closed.

Any deviations from these conditions shall be recorded in the test report.

5.2.3 Operation of GSE

The measurements shall be carried out under operating conditions corresponding to maximum sound generation representative of intended use as well as under idle conditions, if the A-weighted sound pressure level corresponding to idle condition exceeds 70 dB. The operating conditions used during the test shall be recorded in detail in the test report.

Safety requirements and the manufacturer's information shall be observed.

5.2.4 Air conditioning and/or ventilating system(s)

If more than two operating speeds are available, the air conditioning and/or ventilating system(s) shall be operated at mid-range speed or above. If only two operating speeds are available, the higher speed shall be used. If the air conditioning and/or ventilating system(s) has (have) a recirculation and outside air position, the control shall be set for outside air.

Care shall be taken to ensure that airflow from the ventilating system does not produce any wind effects on the microphone.

5.3 Specific operating conditions for particular types of GSE

5.3.1 Aircraft movement equipment according to prEN 12312-7

Measurements during standstill operation at operator and exterior work positions shall be performed and declared under idle conditions.

Measurements during driving conditions at operator positions shall be performed and declared at full throttle or at full speed without load, whichever gives the highest noise emission value.

Measurements during driving at exterior work positions shall be performed and declared without load.

5.3.2 Container/Pallet loaders according to prEN 12312-9

Measurements shall be performed and declared for the following conditions:

— with maximum load; the measurement cycle shall consist of one lift from the lowest to the highest position and reverse;

— idle.

5.3.3 Container/Pallet transporters according to prEN 12312-10

Measurements shall be performed and declared for the following conditions:

— at full throttle or at full speed without load, whichever gives the highest noise emission value;

— idle.

5.3.4 Baggage and equipment tractors according to prEN 12312-15

Measurements shall be performed and declared for the following conditions:

— at full throttle or at speed without load, whichever gives the highest noise emission value;

— idle.

5.3.5 Air start equipment according to prEN 12312-16

Measurements shall be performed and declared for the following two conditions:

— idle;

— maximum performance.

6 Emission sound pressure level — Operation during standstill test

6.1 Measurements at operator's positions

6.1.1 Quantities to be determined

A-weighted emission sound pressure levels shall be determined according to [A1) EN ISO 11201 (A1].

If the noise is impulsive (see EN ISO 11201:1995, 10.2.3 and Annex A) C-weighted peak emission sound pressure levels exceeding 130 dB shall be reported.

6.1.2 Microphone positions

The microphone positions shall be in accordance with EN ISO 11201:1995, 11.2 and 11.3.