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Anläggningsmaskiner – Bestämning av ljudeffektnivå – Provning av maskin i arbete (ISO 6395:2008, IDT)

Earth-moving machinery – Determination of sound power level – Dynamic test conditions (ISO 6395:2008, IDT)

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Den internationella standarden ISO 6395:2008 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 6395:2008.

Denna standard ersätter SS-ISO 6395, utgåva 2.

The International Standard ISO 6395:2008 has the status of a Swedish Standard. This document contains the official English version of ISO 6395:2008.

This standard supersedes the Swedish Standard SS-ISO 6395, edition 2.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00.
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 6395 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety requirements and human factors* in collaboration with Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

This second edition cancels and replaces the first edition (ISO 6395:1988), which has been technically revised. It also incorporates the Amendment ISO 6395:1988/Amd. 1:1996.

Introduction

This International Standard is a specific test code for earth-moving machinery as defined in ISO 6165.

A simulated dynamic test condition, rather than an actual work cycle, is used. Simulated dynamic test conditions provide noise emission data which are repeatable and representative. Actual work cycle tests are complex and repeatability can be a problem.

Specific procedures are described in this International Standard to enable the sound power emission in dynamic test conditions to be determined in a manner which is repeatable. Attachments (bucket, dozer, etc.) for the manufacturer's production version are intended to be fitted since this is the configuration most likely to exist when the machine is in actual use.

This International Standard enables compliance with noise limits to be determined, if applicable. It can also be used for evaluation purposes in noise reduction investigations.

A complementary test code is given in ISO 6396. This other specific test code is intended to be used to determine the noise emitted by earth-moving machinery, measured at the operator's position in terms of the A-weighted sound pressure level with the machine under dynamic test conditions.

Corresponding measurements of noise emitted to the environment and noise at the operator's position under stationary test conditions are described in ISO 6393 and ISO 6394, respectively.

Earth-moving machinery — Determination of sound power level — Dynamic test conditions

1 Scope

This International Standard specifies a method for determining the noise emitted to the environment by earth-moving machinery, measured in terms of the A-weighted sound power level while the machine is operating under dynamic test conditions.

It is applicable to earth-moving machinery as specified in Annex A and as defined in ISO 6165.

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.

ISO 3744:—[1)], *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering method for an essentially free field over a reflecting plane*

ISO 6165, *Earth-moving machinery — Basic types — Identification and terms and definitions*

ISO 6393:2008, *Earth-moving machinery — Determination of sound power level — Stationary test conditions*

ISO 9249, *Earth-moving machinery — Engine test code — Net power*

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3744, ISO 6165 and the following apply.

3.1
time-averaged A-weighted sound pressure level
$L_{p\mathrm{A},T}$
A-weighted sound pressure level averaged on an energy basis over the whole measurement period, T

3.2
A-weighted sound power level
$L_{W\mathrm{A}}$
quantity obtained from the time-averaged A-weighted sound pressure levels averaged over the measurement surface on an energy basis

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1) To be published. (Revision of ISO 3744:1994.)

3.3
basic length
l
length used to define the radius of the measurement hemisphere

NOTE The dimension of the basic length, l, is determined in Annex A.

3.4 Machine centre point

3.4.1
machine centre point
⟨all machines, except those with slewing upper structure⟩ midpoint of the basic length, l, at the machine longitudinal centre line

3.4.2
machine centre point
⟨machines with slewing upper structure⟩ centre of rotation of the upper structure

3.5 Fan speed

3.5.1
maximum working speed of the fan
fan speed at which the fan provides maximum cooling performance for the machine under the most severe operating conditions

3.5.2
fan drive with continuous variable fan speed
fan drive that varies the fan speed continuously throughout a variable range to minimize its speed for the needed cooling performance in relation to the heat load

4 Instrumentation

The instrumentation shall be capable of carrying out the measurements according to Clause 8. The preferred instrumentation system for acquiring the data is an integrating-averaging sound level meter complying with the requirements of IEC 61672-1 for a class 1 instrument.

5 Test environment

5.1 General

For the purposes of this International Standard, the test environment specified in ISO 3744:—, Clause 4 and Annex A, apply. Additional requirements are given in 5.2 to 5.5.

Humidity, air temperature, barometric pressure, vibration and stray magnetic fields shall be within the limits specified by the manufacturer of the instrumentation.

5.2 Test site and environmental correction, K_{2A}

For test-site measurement ground surfaces consisting of a hard reflecting plane — such as concrete or non-porous asphalt [(5.3.1 a) and b)] — and having negligible sound-reflecting obstacles within a distance from the source equal to three times the measurement hemisphere radius, it may be assumed that the absolute value of environmental correction, K_{2A}, is less than or equal to 0,5 dB, and can therefore be disregarded. In this case, K_{2A} shall be equal to 0 dB.

For the all-sand test site [5.3.1 c)], the value of environmental correction, K_{2A}, shall be determined and used in the sound power calculation.

5.3 Test site

5.3.1 General

The following three types of test-site measurement ground surface, described in 5.3.2, 5.3.3 and 5.3.4, are allowed:

a) hard reflecting plane (concrete or non-porous asphalt);

b) combination of hard reflecting plane and sand;

c) all-sand plane.

The hard reflecting plane, as described in 5.3.2, shall be used for testing the following:

— rubber-tyred machines, all modes of operation;

— excavators, all modes of operation;

— crawler loaders, stationary hydraulic mode of operation;

— rollers, all modes of operation.

The combination of hard reflecting plane and sand, as described in 5.3.3, may be used for rollers with raised pads and landfill compactors.

The combination of hard reflecting plane and sand, as described in 5.3.3, or the all-sand plane, as described in 5.3.4, shall be used for crawler-type machines (e.g. crawler dozers, crawler loaders, crawler dumpers, etc.) in travel and stationary hydraulic modes, provided that

— the environmental correction, K_{2A}, determined in accordance with ISO 3744:—, Annex A, is less than 2,0 dB, and

— for the all-sand plane, as described in 5.3.4, and where K_{2A} is greater than 0,5 dB, the correction is accounted for in the calculation of the sound power level.

5.3.2 Hard reflecting plane

The test area bordered by the vertical projection of the microphones to the ground shall consist of concrete or non-porous asphalt.

5.3.3 Combination of hard reflecting plane and sand

The travel path of the machine shall consist of humid sand of grain size up to 2 mm. The minimum depth of the sand shall be 0,3 m. If 0,3 m is not deep enough for track penetration, the depth shall be increased accordingly. The ground surface between the machine and the microphones shall be a hard reflecting plane, as described in 5.3.2.

It is possible to use a combination site of minimum size comprising only a single reflecting plane with a sand path along the side. In this case, the machine shall be operated in a forward travel mode twice, each time in the opposite direction, for each of the three microphone positions. The reverse travel mode shall be carried out in the same manner.

5.3.4 All-sand plane

The sand shall be as specified in 5.3.3.