



SLOVENSKI STANDARD

SIST ISO 5008:2015

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Nadomešča:
SIST ISO 5008:1995

**Kmetijski kolesni traktorji in poljski stroji - Merjenje tresljajev celega telesa
voznika**

Agricultural wheeled tractors and field machinery - Measurement of whole-body vibration
of the operator

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Tracteurs et matériels agricoles à roues - Mesurage des vibrations globales du corps du
conducteur

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INTERNATIONAL STANDARD

**ISO
5008**

Second edition
2002-07-01

Agricultural wheeled tractors and field machinery — Measurement of whole-body vibration of the operator

*Tracteurs et matériels agricoles à roues — Mesurage des vibrations
globales du corps du conducteur*

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ISO 5008:2002(E)

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ISO 5008:2002(E)**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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 5008 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 2, *Common tests*.

This second edition cancels and replaces the first edition (ISO 5008:1979), which has been technically revised.

Annexes A and B of this International Standard are for information only.

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Introduction

The purpose of this International Standard is to define the specification of instruments, measurement procedures, measurement site characteristics and frequency weighting that will allow the whole body vibration of agricultural wheeled tractors and field machinery to be made and reported with acceptable precision.

The vibration is evaluated in accordance with currently accepted standards including means of weighting the vibration levels at different frequencies to take account of the frequency sensitivity of the human operator to whole body vibration.

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Agricultural wheeled tractors and field machinery — Measurement of whole-body vibration of the operator

1 Scope

- 1.1 This International Standard specifies methods for measuring and reporting the whole body vibration to which the operator of an agricultural wheeled tractor or other field machine is exposed when operating on a standard test track.
- 1.2 The operating conditions of the machine and the ordinates of the artificial test tracks are also included.
- 1.3. This International Standard applies when measurements are made on the artificial test tracks defined herein.
- 1.4. Measurements made under field conditions are covered in annex A.
- 1.5. This International Standard does not include assessment of vibration reaching the operator other than through his/her seat or foot platform (e.g. vibration that is sensed by the feet through the controls or by the hands through the steering wheel is not considered).

2 Normative references

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The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 2041:1990, *Vibration and shock — Vocabulary*

ISO 2631-1:1997, *Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 1: General requirements*

ISO 5007:¹⁾, *Agricultural wheeled tractors — Operator's seat — Laboratory measurement of transmitted vibration*

ISO 5348:1998, *Mechanical vibration and shock — Mechanical mounting of accelerometers*

ISO 8041:1990, *Human response to vibration — Measuring instrumentation*

ISO 10326-1:1992, *Mechanical vibration — Laboratory method for evaluating vehicle seat vibration — Part 1: Basic requirements*

ISO 13090-1:1998, *Mechanical vibration and shock — Guidance on safety aspects of tests and experiments with people — Part 1: Exposure to whole-body mechanical vibration and repeated shock*

1) To be published. (Revision of ISO 5007:1990)

ISO 5008:2002(E)

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 2041 and the following apply.

3.1

whole-body vibration

vibration transmitted to the body as a whole through the buttocks of a seated operator

3.2

operator seat

that portion of the machine provided for the purpose of supporting the buttocks and back of the seated operator, including any suspension system and other mechanisms provided (e.g., for adjusting the seat position)

3.3

frequency analysis

process of arriving at a quantitative description of vibration amplitude as a function of frequency

3.4

measuring period

time duration in which vibration data for analysis is obtained

4 Symbols

$a_{wi}(t)$ frequency weighted acceleration in the direction i ($i = x, y$ or z)

a_{wx} rms value of the frequency weighted acceleration in the x direction

a_{wy} rms value of the frequency weighted acceleration in the y direction

a_{wz} rms value of the frequency weighted acceleration in the z direction

B_e resolution bandwidth of the frequency analysis, in hertz

D distance from start, in metres (see clause 11)

L ordinate of left-hand strip, in millimetres (see clause 11)

rms root-mean-square

R ordinate of right-hand strip, in millimetres (see clause 11)

T_s sampling time, in seconds

5 Vibration measurements

5.1 Location of the measurements

The vibration shall be measured along three mutually perpendicular axes, defined as follows:

x-direction: back to chest

y-direction: right side to left side

z-direction: foot (or buttocks) to head

The vibration shall be determined as close as possible to the point or area through which the vibration is transmitted to the body.

- a) In the case where the operator is normally sitting, transducers mounted in a semirigid disc shall be placed on the surface of the seat such that the transducers are located midway between the ischial tuberosities of the seated person. It is acceptable if the centre of the disc is located slightly in front (up to 5 cm) of the ischial tuberosities or the vertical projection of the Seat Index Point (SIP).
- b) In the case where the operator is normally standing, the transducers shall be located on the platform midway between the arches of the feet.

5.2 Magnitude of vibration

The quantity used to describe the magnitude of vibration shall be the frequency-weighted acceleration in meters per second squared (m/s^2), expressed as a root-mean-square (rms) value.

The frequency weightings to be used are defined in 6.3.

The rms value a_{wi} used in this International Standard is defined as the rms value of the frequency weighted acceleration signal $a_{wi}(t)$ [$i = x, y$ or z]:

$$a_{wi} = \left[\frac{1}{T} \int_0^T a_{wi}^2(t) dt \right]^{1/2}$$

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For tests on a standard track, the integration time shall be the time required to traverse the track.

6 Instrumentation

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6.1 General

Measuring equipment may comprise:

- a) transducers (usually accelerometers);
- b) conditioning amplifiers and filters;
- c) telemetry set;
- d) recorders (digital or analog);
- e) meters.

The dynamic range, sensitivity, accuracy, linearity and overload capacity of the vibration measuring system shall be in accordance with ISO 8041:1990 for type 1 instruments.

6.2 Transducers

Accelerometers shall normally be used for measurement of vibration. The mounting of accelerometers shall be in accordance with ISO 5348 and the transducer manufacturer's instructions. Transducers oriented in different directions at a single measurement location shall be as close together as possible. Care should be taken to ensure, as far as is practical, that neither the mass of the measuring device and its fixture, nor any local resonances, significantly affect the measured value.