

# **SLOVENSKI STANDARD**

## **SIST-TS CEN/TS 15730:2008**

**01-november-2008**

---

**Stroji za zemeljska dela - Smernice za ocenjevanje izpostavljenosti (celotnega) telesa vibracijam - Uporaba harmoniziranih podatkov, ki so jih izmerili mednarodni inštituti, organizacije in proizvajalci (ISO/TR 25398:2006)**

Earth-moving machinery - Guidelines for assessment of exposure to whole-body vibration of ride-on machines - Use of harmonized data measured by international institutes, organizations and manufacturers (ISO/TR 25398:2006)

**iTeh STANDARD PREVIEW**  
(standards.iTeh.si)  
Mechanische Schwingungen - Anleitung zur Beurteilung der Belastung durch Ganzkörpervibrationen auf Erdbaummaschinen mit aufsitzendem Maschinenführer - Unter der Verwendung hamonisierter Daten gemessen von internationalen Instituten und Herstellern (ISO/TR 25398:2006) [SIST-TS CEN/TS 15730:2008](https://standards.iTeh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becd-c4fe8b561e62/sist-ts-cen-ts-15730-2008)

<https://standards.iTeh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becd-c4fe8b561e62/sist-ts-cen-ts-15730-2008>

Engins de terrassement - Lignes directrices pour l'évaluation de l'exposition des vibrations à l'ensemble du corps sur les machines à conducteur porté - Utilisation des données harmonisées mesurées par des instituts internationaux, des organisations et des fabricants (ISO/TR 25398:2006)

**Ta slovenski standard je istoveten z: CEN/TS 15730:2008**

---

**ICS:**

13.160	Vpliv vibracij in udarcev na ljudi	Vibration and shock with respect to human beings
53.100	Stroji za zemeljska dela	Earth-moving machinery

**SIST-TS CEN/TS 15730:2008**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST-TS CEN/TS 15730:2008

<https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becc-dc4fe8b561e62/sist-ts-cen-ts-15730-2008>

TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
TECHNISCHE SPEZIFIKATION

**CEN/TS 15730**

August 2008

ICS 13.160; 53.100

English Version

**Earth-moving machinery - Guidelines for assessment of  
exposure to whole-body vibration of ride-on machines - Use of  
harmonized data measured by international institutes,  
organizations and manufacturers (ISO/TR 25398:2006)**

Engins de terrassement - Lignes directrices pour  
l'évaluation de l'exposition des vibrations à l'ensemble du  
corps sur les machines à conducteur porté - Utilisation des  
données harmonisées mesurées par des instituts  
internationaux, des organisations et des fabricants (ISO/TR  
25398:2006)

Mechanische Schwingungen - Anleitung zur Beurteilung der  
Belastung durch Ganzkörpervibrationen auf  
Erdbaumaschinen mit aufsitzendem Maschinenführer -  
Unter der Verwendung harmonisierter Daten gemessen von  
internationalen Instituten und Herstellern (ISO/TR  
25398:2006)

This Technical Specification (CEN/TS) was approved by CEN on 18 April 2008 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of 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.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

## Contents

Page

Foreword.....	3
---------------	---

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST-TS CEN/TS 15730:2008](https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becc-c4fe8b561e62/sist-ts-cen-ts-15730-2008)

<https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becc-c4fe8b561e62/sist-ts-cen-ts-15730-2008>

## Foreword

The text of ISO/TR 25398:2006 has been prepared by Technical Committee ISO/TC 127 “Earth-moving machinery” of the International Organization for Standardization (ISO) and has been taken over as CEN/TS 15730:2008 by Technical Committee CEN/TC 151 “Construction equipment and building material machines - Safety” the secretariat of which is held by DIN.

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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: 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 the United Kingdom.

### Endorsement notice

The text of ISO/TR 25398:2006 has been approved by CEN as a CEN/TS 15730:2008 without any modification.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST-TS CEN/TS 15730:2008](https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becc-c4fe8b561e62/sist-ts-cen-ts-15730-2008)

<https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becc-c4fe8b561e62/sist-ts-cen-ts-15730-2008>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST-TS CEN/TS 15730:2008

<https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becc-dc4fe8b561e62/sist-ts-cen-ts-15730-2008>

TECHNICAL  
REPORTISO/TR  
25398First edition  
2006-10-01

---

---

**Earth-moving machinery — Guidelines  
for assessment of exposure to  
whole-body vibration of ride-on  
machines — Use of harmonized data  
measured by international institutes,  
organizations and manufacturers**

iTeh STANDARD PREVIEW

(standards.iteh.ai)

*Engins de terrassement — Lignes directrices pour l'évaluation de  
l'exposition des vibrations à l'ensemble du corps sur les machines à  
conducteur porté — Utilisation des données harmonisées mesurées par  
des instituts internationaux, des organisations et des fabricants*

<https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becd-c4fe8b561e62/sist-ts-cen-ts-15730-2008>

Reference number  
ISO/TR 25398:2006(E)

© ISO 2006

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST-TS CEN/TS 15730:2008

<https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becc-dc4fe8b561e62/sist-ts-cen-ts-15730-2008>

© ISO 2006

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland



## Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Estimation of vibration magnitude</b> .....	<b>5</b>
<b>5 Estimation of daily exposure duration</b> .....	<b>5</b>
<b>6 Consideration of uncertainties</b> .....	<b>6</b>
<b>7 Determination and assessment of vibration exposure</b> .....	<b>7</b>
<b>8 Documentation</b> .....	<b>16</b>
<b>Annex A</b> (informative) <b>Machine types and their typical operating conditions</b> .....	<b>17</b>
<b>Annex B</b> (informative) <b>Equivalent vibration values of whole-body vibration emission of earth-moving machinery</b> .....	<b>21</b>
<b>Annex C</b> (informative) <b>Calculation form for total vibration exposure points</b> .....	<b>23</b>
<b>Annex D</b> (informative) <b>Example documentation form for whole-body vibration exposure</b> .....	<b>24</b>
<b>Annex E</b> (informative) <b>Guidelines for use and working conditions of earth-moving machinery to reduce vibration levels</b> .....	<b>25</b>
<b>Annex F</b> (informative) <b>Guidelines for establishing and reporting vibration reduction of earth-moving machinery</b> .....	<b>27</b>
<b>Bibliography</b> .....	<b>28</b>

## 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.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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/TR 25398 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety requirements and human factors*.

<https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becc-dc4fe8b561e62/sist-ts-cen-ts-15730-2008>

## Introduction

This Technical Report provides information on how to assess the whole-body vibration exposure of operators of earth-moving machines. The method is based on measured vibration emission under real working conditions. It needs to be noted that vibration emissions are influenced by many different parameters, originating from

- operator (e.g. training, behaviour, mode, stress),
- jobsite (e.g. organization, preparation, environment, weather, material), and
- machine (e.g. type, quality of seat and suspension system, attachment, equipment, condition).

It is therefore not possible to obtain precise exposure figures. The values given in this Technical Report need to be used with great care since they were measured for a limited number of operators, defined work situations, and machine types.

On the one hand, the actual work situation for a specific machine operator can be very different, thus creating different vibration. On the other hand, values from real work that can be found in the literature are only correct for the specific work situation and time when they were measured. The user of this Technical Report needs to be aware that the exposure to vibration depends not only on the machine used but also to a large extent on the operator, jobsite and machine, and other factors. All these factors need to be taken into account in order to make a practical assessment of vibration magnitude.

There are typical operating conditions for machine types in accordance to ISO 6165 identified and listed in Annex A. This list may not be complete, but it represents most of the real working conditions.

Properly adjusting and maintaining machines, operating machines smoothly, and maintaining the terrain conditions can reduce whole-body vibrations. The guidelines given in Annex E can help users of earth-moving machines reduce the whole-body vibration levels.

The daily vibration exposure to be assessed depends on both the magnitude of vibration at the surface in contact with the whole body and the total daily duration for which an employee is in contact with that vibration.

The vibration levels for the same type of machine are assumed to be the same. If a vibration-reduction feature is added to the machine, then a lower vibration level can be used. In order to determine the reduction in vibration levels for a machine vibration-reduction feature, the appropriate vibration measurements must be made. Annex F provides guidelines for vibration measurements.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST-TS CEN/TS 15730:2008

<https://standards.iteh.ai/catalog/standards/sist/dd15f359-d92f-4f38-becc-dc4fe8b561e62/sist-ts-cen-ts-15730-2008>

# Earth-moving machinery — Guidelines for assessment of exposure to whole-body vibration of ride-on machines — Use of harmonized data measured by international institutes, organizations and manufacturers

## 1 Scope

This Technical Report provides guidelines for those such as employers, national authorities and manufacturers of earth-moving machinery who are required to determine, assess and document the daily whole-body vibration exposure for ride-on machines as defined in ISO 6165. It also provides guidelines for reducing vibration levels on machines and for determining the vibration reduction from machine improvements to reduce vibration levels. It is intended to assist in establishing documentation for specific earth-moving machinery under typical operating conditions.

It gives guidance on determining the daily vibration exposure A(8), in accordance with ISO 2631 and EN 14253, offering a simple method for determining the daily vibration exposure by means of a table which indicates the daily exposure as a function of the equivalent vibration total value and the associated exposure duration. Both methods can be used even in cases of multiple exposures on the same day.

Methods are provided for calculating exposure using reported emission values, valid for machines equipped with a seat in accordance to ISO 7096.

NOTE Additional information is given in the EN 474 and EN 500 series of standards.

Workplace measurements are required where suitable data are unavailable to represent the vibration under the specific working conditions, or if the calculation results are not useful for determining whether or not the vibration exposure limit value or exposure action value is likely to be exceeded.

It is important that the vibration values used in the exposure assessment are representative of those in the specific use of the machines.

This Technical Report does not deal with assessments of exposure to shock.

NOTE The guidelines for determining, assessing and documenting the daily vibration exposure from use of ride-on operated earth-moving machinery also cover the requirements of the European Physical Agents Directive (Vibration) 2002/44/EC.

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

ISO 6165: 2001, *Earth-moving machinery — Basic types — Vocabulary*