



SLOVENSKI STANDARD
SIST ISO 2631-2:2022

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Mehanske vibracije in udarci - Vrednotenje izpostavljenosti človeka vibracijam celotnega telesa - 2. del: Vibracije v zgradbah (1 Hz do 80 Hz)

Mechanical vibration and shock - Evaluation of human exposure to wholebody vibration - Part 2: Vibration in buildings (1 Hz to 80 Hz)

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Vibrations et chocs mécaniques - Évaluation de l'exposition des individus à des vibrations globales du corps - Partie 2: Vibrations dans les bâtiments (1 Hz à 80 Hz)

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ICS:

13.160	Vpliv vibracij in udarcev na ljudi	Vibration and shock with respect to human beings
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INTERNATIONAL STANDARD

ISO
2631-2

Second edition
2003-04-01

Mechanical vibration and shock — Evaluation of human exposure to whole- body vibration —

Part 2:

Vibration in buildings (1 Hz to 80 Hz)

*Vibrations et chocs mécaniques — Évaluation de l'exposition des
individus à des vibrations globales du corps —*

Partie 2: Vibrations dans les bâtiments (1 Hz à 80 Hz)

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ISO 2631-2:2003(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 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.

This second edition cancels and replaces the first edition (ISO 2631-2:1989) which has been technically revised, as follows. The whole text was redrafted in order to harmonize it with ISO 2631-1:1997 and to take account of international practice. The frequency weighting defined in this part of ISO 2631 has not been changed compared to the first edition, except in the method of presentation and designation, i.e. W_m instead of $W.B.$ combined used in previous documents. This is the result of a questionnaire held in 1995. A further reason is the use of this frequency weighting in other fields of application, e.g. evaluation of ship vibration. Consequently an adjustment of the frequency weighting at the lower end has not been made.

Subclause 4.5 "Evaluation of vibration" defines categories of vibration in order to give guidance for the application of this part of ISO 2631. The content of Clause 5 "Human responses to building vibration" was restricted to the first paragraph of the former edition. The rest of the text was deleted because its content is now included in ISO 2631-1.

Guidance values above which adverse comments due to building vibration could occur are not included any more since their possible range is too widespread to be reproduced in an International Standard.

A normative Annex A has been added to define the frequency weighting W_m in a manner compatible with the mathematical definition of frequency weightings in ISO 2631-1.

An informative Annex B has also been added which gives guidelines to consider associated phenomena such as reradiated noise and visual effects. Finally, the Bibliography has been updated.

ISO 2631-2 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, Subcommittee SC 4, *Human exposure to mechanical vibration and shock*.

ISO 2631 consists of the following parts, under the general title *Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration*:

- *Part 1: General requirements*
- *Part 2: Vibration in buildings (1 Hz to 80 Hz)*
- *Part 4: Guidelines for the evaluation of the effects of vibration and rotational motion on passenger and crew comfort in fixed-guideway transport systems*
- *Part 5: Method for evaluation of vibration containing multiple shocks*

Introduction

Structural vibration to which human beings are exposed in buildings can be detected by the occupants and can affect them in many ways. More particularly, their comfort and quality of life may be reduced.

For the evaluation of vibration in buildings with respect to comfort and annoyance, overall weighted values of the vibration are preferred. The value obtained with the appropriate frequency weighting characterizes the place or site within the building where people may be present, by giving an indication of the suitability of that place.

This part of ISO 2631 is also intended to encourage the uniform collection of data on human response to building vibration.

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Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration —

Part 2: Vibration in buildings (1 Hz to 80 Hz)

1 Scope

This part of ISO 2631 concerns human exposure to whole-body vibration and shock in buildings with respect to the comfort and annoyance of the occupants. It specifies a method for measurement and evaluation, comprising the determination of the measurement direction and measurement location. It defines the frequency weighting W_m which is applicable in the frequency range 1 Hz to 80 Hz where the posture of an occupant does not need to be defined.

NOTE 1 The frequency weightings given in ISO 2631-1 can be used if the posture of the occupant is defined.

Whilst it is often the case that a building will be available for experimental investigation, many of the concepts contained within this part of ISO 2631 would apply equally to a building in the design process or where it will not be possible to gain access to an existing building. In these cases, reliance will have to be placed on the prediction of the building response by some means.

This part of ISO 2631 does not provide guidance on the likelihood of structural damage, which is discussed in ISO 4866. Further, it is not applicable to the evaluation of effects on human health and safety.

Acceptable magnitudes of vibration are not stated in this part of ISO 2631-2022

NOTE 2 At present it is not possible to give guidance on acceptable magnitudes of vibration until more information has been collected in accordance with this part of ISO 2631.

The mathematical definition of the frequency weighting W_m is given in Annex A. Guidelines for collecting data concerning complaints about building vibration are given in Annex B.

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 8041, *Human response to vibration — Measuring instrumentation*

IEC 61260:1995, *Electroacoustics — Octave-band and fractional-octave-band filters*

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3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

- 3.1 evaluation**
range of activities which includes survey, measurement, processing, ordering, characterization, rating and presentation of relevant data
- 3.2 building**
static construction used for habitation or allocated to any other human activity, including offices, factories, hospitals, schools, day-care centres
- 3.3 work time**
period of activity, or working hours, of the vibration source defined by the daily start and finish times
- 3.4 exposure time**
period during which exposure to the vibration occurs

4 Measurement of building vibration

4.1 General

The general requirements for signal conditioning and the duration of measurement as specified in 5.4 and 5.5, respectively, of ISO 2631-1:1997 shall be followed.

4.2 Direction of measurement

The vibration shall be measured in all three orthogonal directions simultaneously. For this purpose, the directions of vibration are related to the structure rather than to the human body. The orientations of the structure-related x -, y - and z -axes shall be those for a standing person as given in ISO 2631-1.

4.3 Location of measurement

The evaluation with respect to human response shall be based solely on the expected occupation, the tasks performed by the occupants, and the expected freedom from disturbance. Each relevant place or room shall be assessed with respect to these criteria. The vibration shall be measured at that location in the room where the highest magnitude of the frequency-weighted vibration occurs, or as specifically directed, on a suitable surface of the building structure.

NOTE It may be necessary to take measurements at several locations in the building to determine the local variation of the vibration.

4.4 Frequency weighting

The vibration measured at the relevant location and in the three directions according to 4.2 and 4.3 shall be frequency weighted. This part of ISO 2631 (as well as ISO 2631-1) uses frequency-weighted acceleration to express the vibration magnitude.

It is recommended that the frequency weighting W_m according to Annex A be used irrespective of the measurement direction.

NOTE 1 The frequency weightings given in ISO 2631-1 can be used if the posture of the occupant is defined.