



**International
Standard**

ISO 2631-2

**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)

**Third edition
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 108, *Mechanical vibration, shock and condition monitoring*, Subcommittee SC 4, *Human exposure to mechanical vibration and shock*.

This third edition cancels and replaces the second edition (ISO 2631-2:2003), which has been technically revised.

The main changes are as follows:

- inclusion of blasting as one of the sources of vibration being considered as part of this document;
- inclusion of a new [Annex C](#) presenting some exposure-response relationships representing estimates of community annoyance applicable for sources of vibration including railway-, construction- and blast-induced vibration.

A list of all parts in the ISO 2631 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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 can be reduced^{[1][2]}.

For the evaluation of vibration in buildings with respect to comfort and annoyance, frequency weighted values of the vibration are preferred, except when blasting is involved. The values obtained characterize the place or site within the building where people may be present, by giving an indication of the suitability of that place.

This document is 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 document concerns human exposure to whole-body vibration and shock in buildings with respect to the comfort and annoyance of the occupants based on both measurements and simulations. 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, see [Annex A](#).

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 document 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 document does not provide guidance on the likelihood of structural damage, which is discussed in ISO 4866 [\[3\]](#). Further, it is not applicable to the evaluation of effects on human health and safety.

Acceptable magnitudes of vibration are not stated in this document, but guidance is provided in [Annex C](#) in the form of exposure-response curves for the estimation of annoyance when vibration originates from various sources, including railway, construction activities and blasting.

NOTE 2 The exposure-response curves are based on the most recent evidence which suggests that human response to vibration in buildings is dependent on the magnitude, frequency, duration and temporal characteristics of the vibration [\[4\]](#). In addition, it is known that other factors not directly related to the vibration characteristics have a significant influence on the annoyance response. These are identified in [Annex B](#) and include consideration of some parallel effects, subjective impressions and socio-demographic factors which need to be accounted for when collecting vibration data.

NOTE 3 Several national standards have been proposed to define methods for assessing exposure to vibration in buildings as well as reference values for judging the annoyance resulting from exposure. These standards generally present significant differences in terms of metrics and methods used to quantify exposure as well as on the guideline values to prevent adverse effects. Some standards define limit values that are based on experimental field data leading to exposure-response relationships such as those proposed in [Annex C](#). Other standards base their limit values on estimations that take into account vibration perception thresholds and situational factors. Some standards also consider the magnitude of vibration that can present a risk of damage to the buildings, particularly when blasting is involved.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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, *Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 1: General requirements*