

# INTERNATIONAL STANDARD

**ISO**  
**2631-2**

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## **Evaluation of human exposure to whole-body vibration —**

### **Part 2 :**

**Continuous and shock-induced vibration in buildings  
(1 to 80 Hz)**

*Estimation de l'exposition des individus à des vibrations globales du corps —*

*Partie 2: Vibrations continues et induites par les chocs dans les bâtiments  
(1 à 80 Hz)*



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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 2631-2 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*.

ISO 2631 will consist of the following parts, under the general title *Evaluation of human exposure to whole-body vibration* :

- *Part 1: General requirements*
- *Part 2: Continuous and shock-induced vibration in buildings (1 to 80 Hz)*
- *Part 3: Whole-body z-axis vertical vibration (0,1 to 0,63 Hz)*
- *Part 4: Vibration on board sea-going ships (1 to 80 Hz)*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

# Evaluation of human exposure to whole-body vibration —

## Part 2 :

### Continuous and shock-induced vibration in buildings (1 to 80 Hz)

#### 0 Introduction

Structural vibration in buildings can be detected by and affect the occupants in many ways. The quality of life can be reduced just as can the working efficiency.

This part of ISO 2631 offers guidance on the application of ISO 2631-1 to human response to building vibration. This part of ISO 2631 is also intended to encourage the uniform collection of data on human response to building vibration.

No guidance is given on complaint levels from occupants of buildings subject to vibration or to any acceptable magnitudes or limits of building vibration, but this part of ISO 2631 does contain weighting curves for human response to vibration of buildings.

#### 1 Scope and field of application

Primarily with respect to annoyance of human beings subject to building vibration, this part of ISO 2631 is limited to the following considerations :

- a) continuous vibration;
- b) intermittent vibration.

The state of the art on transient (impulsive) vibration is presented in annexes A and B.

General guidance is given on human response to building vibrations and weighting curves of frequency response for equal annoyance of humans are included together with measurement methods to be used.

Consideration is given to the time of the day and the use made of the occupied space in the building, whether workshop, office, residential, hospital operating-theatre or other critical area.

Acceptable magnitudes of vibration are not stated in this part of ISO 2631 since these cannot be specified rigidly and depend upon specific circumstances. Tentative guidance is given in annex A on the magnitude of vibration at which adverse comment may begin to arise. In cases where sensitive equipment or delicate operations impose more stringent criteria than human comfort, the corresponding more stringent values should be applied.

Adjustments and variances may be allowed for short-term engineering works (for example foundation excavation and tunnelling) where good public relation practices are followed and prior warning is given.

This part of ISO 2631 is not intended to provide guidance as to the likelihood of structural damage to buildings or injury to occupants of buildings subject to vibration, as defined in ISO 2631-1.

This part of ISO 2631 is concerned only with tactile perception and does not take into account auditory perception of re-radiated sound.

#### 2 References

ISO 2041, *Vibration and shock — Vocabulary*.

ISO 2631-1, *Evaluation of human exposure to whole-body vibration — Part 1 : General requirements*.

ISO 5805, *Mechanical vibration and shock affecting man — Vocabulary*.

#### 3 Characteristics of building vibration

##### 3.1 Direction of vibration

As a building may be used for many different human activities, for example standing, sitting, lying or a combination of all three, vertical vibration of the building may enter the body as either *z*-axis, *x*-axis or *y*-axis vibration, as shown in figure 1.

The measured vibration should normally be referred to the appropriate axis. If it is not clear which direction is appropriate, it may be more convenient to consider the combined curve as explained in 4.2.3.

##### 3.2 Multi-frequency vibration

There is evidence from research concerning the building environment to suggest that there are summation effects for vibration at different frequencies. Therefore for the evaluation of building vibration with respect to the annoyance and comfort effects on occupants, overall weighted vibration values are preferred, as described in ISO 2631-1. A suitable weighting curve for investigation is described in 3.5.