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Human response to vibration — Measuring instrumentation

Réponse des individus aux vibrations — Appareillage de mesure



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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 8041 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*.

Annexes A to D form an integral part of this International Standard.

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International Organization for Standardization

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Introduction

Owing to the complexity of the human sensation of vibration it is not possible at present to design an objective vibration-measuring apparatus to give results which are absolutely comparable, for all types of vibration, with those observed by human beings. It is, however, considered essential to standardize instrumentation by which vibration can be measured under closely defined conditions so that results obtained by users of such instrumentation are always the same within stated tolerances. The instrumentation specified in this International Standard covers the need for at least one of the methods of measurement according to ISO 2631 and ISO 5349.

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Human response to vibration — Measuring instrumentation

1 Scope

This International Standard specifies instrumentation for a method of measurement of vibration in a given frequency range, given in ISO 2631-1 for assessing the vibration as perceived by human beings. It applies to instrumentation for the measurement of hand-arm vibration and/or whole-body vibration. For other methods of measurement, ISO 2631 and ISO 5349 should be consulted.

This International Standard specifies electrical, vibration and environmental tests to verify compliance with the characteristics specified (see clause 4). It also determines the method for sensitivity calibration.

The purpose of this International Standard is to ensure consistency and compatibility of results and reproducibility of measurements realized with different measuring instrumentation using this method of measurement.

An instrument or an instrument collection may be realized which fulfils only the necessary requirements for measurement of hand-arm or whole-body vibrations under certain conditions, for example in the *z* direction, provided that the purpose is clearly stated and pertinent requirements of this International Standard are fulfilled.

In conjunction with spectral analysis, proper filter characteristics shall be applied (see clause 4).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 266 : 1975, *Acoustics — Preferred frequencies for measurements*.

ISO 1683 : 1983, *Acoustics — Preferred reference quantities for acoustic levels*.

ISO 2041 : — ¹⁾, *Vibration and shock — Vocabulary*.

ISO 2631-1 : 1985, *Evaluation of human exposure to whole-body vibration — Part 1: General requirements*.

ISO 2631-2 : 1989, *Evaluation of human exposure to whole-body vibration — Part 2: Continuous and shock-induced vibrations in buildings (1 to 80 Hz)*.

ISO 2631-3 : 1985, *Evaluation of human exposure to whole-body vibration — Part 3: Evaluation of exposure to whole-body *z*-axis vertical vibration in the frequency range 0,1 to 0,63 Hz*.

ISO 5347-0 : 1987, *Methods for the calibration of vibration and shock pick-ups — Part 0: Basic concepts*.

ISO 5348 : 1987, *Mechanical vibration and shock — Mechanical mounting of accelerometers*.

ISO 5349 : 1986, *Mechanical vibration — Guidelines for the measurement and the assessment of human exposure to hand-transmitted vibration*.

ISO 5805 : 1981, *Mechanical vibration and shock affecting man — Vocabulary*.

ISO 8042 : 1988, *Shock and vibration measurements — Characteristics to be specified for seismic pick-ups*.

IEC 225 : 1966, *Octave, half-octave and third-octave band filters intended for the analysis of sounds and vibrations*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 2041 and ISO 5805, together with the following, apply.

3.1 weighted vibration: Frequency-weighted overall r.m.s. acceleration. It is expressed in metres per second squared. Alternatively, instrumentation may express results in metres per second squared and as a level in decibels. The level in decibels is 20 times the logarithm to the base 10 of the ratio of a weighted acceleration, expressed in metres per second squared, to the reference acceleration.

1) To be published. (Revision of ISO 2041 : 1975.)