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AS 2670.1—1990
ISO 2631/1—1985

Australian Standard®

# Evaluation of human exposure to whole-body vibration

## Part 1: General requirements

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This Australian Standard was prepared by Committee AV/10, Vibration and Shock — Human Effects. It was approved on behalf of the Council of Standards Australia on 8 May 1989 and published on 10 December 1990.

The following interests are represented on Committee AV/10:

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Australian and New Zealand Environment Council
Australian Coal Association
Confederation of Australian Industry
Construction and Mining Equipment Association of Australia
CSIRO, National Measurement Laboratory
Department of Defence
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AS 2670.1—1990

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# Evaluation of human exposure to whole-body vibration

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# PREFACE

This Standard was prepared by the Standards Australia Committee on Vibration and Shock — Human Effects. It is identical with and has been reproduced from ISO 2631/1—1985, *Evaluation of human exposure to whole-body vibration* — Part 1: *General requirements*.

For the purposes of this Australian Standard, the ISO text should be modified as follows:

(a) Substitute a point (.) for a comma (,) as a decimal marker.

(b) The references to other publications should be replaced by references to Australian Standards:

| *Reference to International Standard* | | *Australian Standard* | |
|---|---|---|---|
| ISO 266 | Acoustics — Preferred frequencies for measurements | AS 2533 | Acoustics — Preferred frequencies for measurements |
| IEC 255 | Octave, half-octave and third-octave band filters intended for the analysis of sounds and vibrations | Z41 | Octave, half-octave and one-third octave band pass filters intended for the analysis of sound and vibrations |

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# Evaluation of human exposure to whole-body vibration

# Part 1: General requirements

## 0 Introduction

Vehicles (air, land and water), as well as machinery (for example, in industry and agriculture), expose man to mechanical vibration which can interfere with comfort, working efficiency and, in some circumstances, health and safety. Various methods of rating the severity of exposure and defining limits of exposure based on laboratory or field data have been developed in the past for specific applications. None of these methods can be considered applicable in all situations and consequently none has been universally accepted.

In view of the complex factors determining the human response to vibrations, and in view of the shortage of consistent quantitative data concerning man's perception of vibration and his reactions to it, this International Standard has been prepared first, to facilitate the evaluation and comparison of data gained from continuing research in this field; and, second, to give provisional guidance as to acceptable human exposure to whole body vibration. The limits proposed in this International Standard seem to be a fair compromise between the available data and should satisfy the need for recommendations which are simple and suitable for general application. These limits are defined explicitly in numerical terms to avoid ambiguity and to encourage precise measurement in practice. However, when using these criteria and limits it is important to bear in mind the restrictions placed upon their application.

Because of the wide variety of possible conditions and effects of human exposure to vibrations, and because of the existing shortage of firm data, more detailed guidance is hardly warranted at the present time. Nevertheless, it is hoped that this International Standard not only proves useful in the assessment of existing or predicted vibration environments but also stimulates the reporting and critical evaluation of new findings about the effects of vibration on man.

There are basically three kinds of human exposure to vibration, namely:

a) Vibrations transmitted simultaneously to the whole body surface or substantial parts of it. This occurs when the body is immersed in a vibrating medium. There are circumstances in which this is of practical concern; for example, when high intensity sound in air or water excites vibrations of the body.

b) Vibrations transmitted to the body as a whole through the supporting surface, namely, the feet of a standing man, the buttocks of a seated man or the supporting area of a reclining man. This kind of vibration is usual in vehicles, in vibrating buildings and in the vicinity of working machinery.

c) Vibrations applied to particular parts of the body such as the head or limbs; for example, by vibrating handles, pedals or head-rests, or by the wide variety of powered tools and appliances held in the hand.

It is also possible to recognize the condition in which an indirect vibration nuisance is caused by the vibration of external objects in the visual field (for example, an instrument panel).

This International Standard, however, applies chiefly to the common condition (b) above; and, in particular, where the vibration is applied through the principal supporting surface to the body of a standing or seated man. In the case of vibrations applied directly to a reclining or recumbent man, insufficient data are available to make a firm recommendation; this is particularly true of vibration transmitted directly to the head, when tolerability is generally reduced. Tolerance may also be reduced when conditions (b) and (c) exist together. Provisionally, however, the limits for the standing or seated man may also be used for the reclining or recumbent man. It shall be appreciated that some circumstances will arise in which the rigorous application of these limits would be inappropriate.

This International Standard comprises the following parts:

Part 1: General requirements.

Part 2: Evaluation of human exposure to vibration and shock in buildings (1 to 80 Hz).[1)]

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

Part 4: Evaluation of crew exposure to vibration on board sea-going ships (1 to 80 Hz).[1)]

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[1)] At present at the stage of draft.

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