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BSI Standards Publication

Mechanical vibration — Guide to the health effects of vibration on the human body

bsi.

National foreword

This Published Document is the UK implementation of CEN/TR 12349:2023. It supersedes PD 12349:1997, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GME/21/6, Human exposure to mechanical vibration and shock.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

Mechanical vibration - Guide to the health effects of vibration on the human body

Vibrations mécaniques - Guide concernant les effets des vibrations sur la santé du corps humain

Mechanische Schwingungen - Leitfaden über die Wirkung von Schwingungen auf die Gesundheit des Menschen

This Technical Report was approved by CEN on 9 July 2023. It has been drawn up by the Technical Committee CEN/TC 231.

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European foreword

This document (CEN/TR 12349:2023) has been prepared by Technical Committee CEN/TC 231 “Mechanical vibration and shock”, the secretariat of which is held by DIN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes CR 12349:1996.

The main changes compared to the previous edition are as follows:

- general information about foot transmitted vibration included;
- subclauses on “Prevention” moved to new informative Annex A;
- glossary moved to Annex B;
- editorial revision to comply with CEN Internal Regulations.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

Introduction

This document is an update of the 1st version from 1996 and it provides a short overview of the knowledge of the possible effects of vibration on the human body at work. It is an informative document which presents general background information for the user of the different European Standards on vibration. Information about existing approaches for prevention is provided in the informative Annex A. A glossary with important terms is listed in Annex B.

Mechanical vibration arises from a wide variety of processes and operations performed in industry, craft, forestry and agriculture, and public utilities. Vibrations are mainly caused by powered processes, hand-held and hand-guided tools, workpieces, or by vehicles. Occupational exposure to vibration can lead to health risks including occupational diseases. Exposure to harmful vibration can induce several complaints and health disorders, mainly at the upper limbs and the lower back. A comprehensive knowledge of effects of vibration on the body with risks for safety and health at work is essential to implement appropriate technical, administrative/organisational, personal protective measures and medical preventive measures.

This knowledge forms the basis for the EU Vibration Directive 2002/44/EC, its national implementation at EU Member States and the continuous updating of this regulatory framework by new scientific knowledge including the technical and medical guides to avoid or minimize occupational risks by vibration exposure at work.

1 Scope

The aim of this document is to provide information on the possible adverse health effects caused by exposure to vibration at work. The report addresses manufacturers, companies which introduce machinery on the EU market as well as employers and employees using vibrating machinery in order to improve their understanding of the possible health problems arising from occupational exposure to vibration.

This document is limited to the effects on health and does not cover the potential effects of vibration on comfort, human performance, or vibration perception. Most of the information on whole-body vibration in this document is based upon data available from research on human response to vibration of seated persons. There are only few data on the effects of vibration on persons in standing, reclining or recumbent positions.

The information on both hand-transmitted vibration and whole-body vibration is based upon data from laboratory research on acute effects as well as upon data from epidemiologic field-studies at workplaces.

Additional information can be obtained from the scientific literature.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at https://www.iso.org/obp
- IEC Electropedia: available at https://www.electropedia.org/

4 Hand-transmitted vibration

4.1 General

Powered processes and tools which expose operators' hands to vibration are widespread in several industrial and craft activities. Occupational exposure to hand-transmitted vibration can arise from rotating and percussive hand-held power tools used in the manufacturing industry, craft, quarrying, mining and construction, forestry and agriculture, and public utilities. Exposure to hand-transmitted vibration can also occur from vibrating workpieces held in the hands of the operator, and from hand-held vibrating controls such as motorcycle bars or vehicle steering wheels.

It has been estimated that 1,7 % to 3,6 % of the workers in the European countries are exposed to potentially harmful hand-transmitted vibration.

The term *hand-arm vibration (HAV) syndrome* is commonly used to refer to the complex of peripheral vascular, neurological and musculoskeletal disorders associated with exposure to hand-transmitted vibration. Workers exposed to hand-transmitted vibration can be affected with neurological and/or vascular disorders separately or simultaneously. Excessive exposure to hand-transmitted vibration can include disturbances in finger blood flow, and in neurological and locomotor functions of the hand and arm. Vascular disorders and bone and joints abnormalities caused by hand-transmitted vibration are compensated occupational diseases in several countries. These disorders are also included in a European schedule of recognized occupational diseases.

The vibration related diseases as listed at the European schedule of occupational diseases.