Mechanical vibration - Measurement and evaluation of human exposure to hand-transmitted vibration - Part 3: Isolated and repeated shocks using the frequency range of ISO 5349-1 (ISO 5349-3:2025)

EESTI STANDARDIMIS- JA AKREDITEERIMISKESKUS
ESTONIAN CENTRE FOR STANDARDISATION AND ACCREDITATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 5349-3:2025 sisaldab Euroopa standardi EN ISO 5349-3:2025 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 5349-3:2025 consists of the English text of the European standard EN ISO 5349-3:2025.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 24.12.2025.	Date of Availability of the European standard is 24.12.2025.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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Mechanical vibration - Measurement and evaluation of human exposure to hand-transmitted vibration - Part 3: Isolated and repeated shocks using the frequency range of ISO 5349-1 (ISO 5349-3:2025)

Vibrations mécaniques - Mesurage et évaluation de l'exposition des individus aux vibrations transmises à la main - Partie 3: Évaluation de chocs isolés ou répétés en utilisant la gamme de fréquences couverte par l'ISO 5349-1 (ISO 5349-3:2025)

Mechanische Schwingungen - Messung und Bewertung der Einwirkung von Schwingungen auf das Hand-Arm-System des Menschen - Teil 3: Isolierte und wiederholte Stöße im Frequenzbereich der ISO 5349-1 (ISO 5349-3:2025)

This European Standard was approved by CEN on 14 December 2025.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 5349-3:2025 E

European foreword

This document (EN ISO 5349-3:2025) has been prepared by Technical Committee ISO/TC 108 "Mechanical vibration, shock and condition monitoring" in collaboration with Technical Committee CEN/TC 231 “Mechanical vibration and shock” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2026, and conflicting national standards shall be withdrawn at the latest by June 2026.

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.

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

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO 5349-3:2025 has been approved by CEN as EN ISO 5349-3:2025 without any modification.

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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,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 231, *Mechanical vibration and shock*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 5349 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

The risk estimation for hand-arm vibration injury is based on ISO 5349-1. The scope of the 2001 revision of that International Standard notes that "the time dependency for human response to repeated shock vibrations is not fully known" and the application of ISO 5349-1 to such vibration is to be "made with caution".

Despite the lack of knowledge in this field, it is desirable to standardise methods for evaluating exposures of the hand and arm to isolated and repeated shocks (referred to here as hand-transmitted shock vibrations or HTS) from hand-held and hand-guided machinery and specifically provide a metric suitable for evaluating the peak amplitude of acceleration signals. This document gives guidance for evaluating HTS in the frequency range covered by ISO 5349-1.

NOTE European union regulations relating to machinery safety require (from 2027) manufacturers or suppliers to provide values for the "mean of the peak amplitude of the acceleration" from repeated HTS.

The objective for this document is to

— provide machine manufactures and users a method for evaluating HTS,

— support research on health effects from HTS, and

— encourage and enable

  — machine manufacturers to reduce HTS,

  — the development of mitigation measures on existing tools, and

  — the reduction of HTS exposures in the workplace.

The use of this document will contribute to the gathering of consistent HTS data to improve occupational safety. There is currently no clear evidence that HTS produces specific health effects beyond those associated with hand-transmitted vibration or presents an increased risk of developing other musculoskeletal injuries to the hand and arm such as repetitive strain injury and carpal tunnel syndrome. The systematic measurement and reporting of parameters relating to HTS may provide evidence of associations with individual health effects.

This document specifies the general requirements for the measurement and evaluation of human exposure to HTS. It builds on the requirements of ISO 5349-1 and measurement guidance in ISO 5349-2. It uses instrumentation that conforms to the requirements of ISO 8041-1. The current version ISO 8041-1:2017 does not require measurement of the peak value of acceleration for hand-transmitted vibration, however, the instrumentation conforming to ISO 8041-1, should provide some confidence in measurements of the metrics specified here.

This document is based on measurements in the frequency range covered by ISO 5349-1. It is recognised that the limited frequency range of ISO 5349-1 does not fully account for all the high-frequency components of HTS, particularly when the HTS is generated by percussive machinery. For this reason, an additional Technical Specification is being prepared that enables both hand-transmitted vibration (HTV) and HTS evaluations to include vibration frequencies higher than the upper frequency limit of ISO 5349-1[10].

Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration —

Part 3: Isolated and repeated shocks using the frequency range of ISO 5349-1

1 Scope

This document specifies the general requirements for the measurement and evaluation of human exposure to hand-transmitted shock vibrations. For the purposes of this document, hand-transmitted shock vibration is any impactive or impulsive vibration that the machine or tool produces as a sequence of single events (isolated shock vibrations) linked by periods of no, or lower vibration.

This document specifies parameters for the evaluation of machinery emissions of hand-transmitted shocks in the frequency range covered by ISO 5349-1 (nominally the frequency range covered by the octave bands from 8 Hz to 1 000 Hz).

NOTE It is recognised that shock vibration often includes substantial high-frequency vibration energy. Therefore, reporting of information on hand-transmitted shock at higher frequencies that those specified in this document can be valuable.

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 2041, *Mechanical vibration, shock and condition monitoring — Vocabulary*

ISO 5349-1:2001, *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration — Part 1: General requirements*

ISO 5349-2, *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration — Part 2: Practical guidance for measurement at the workplace*

ISO 8041-1:2017, *Human response to vibration — Measuring instrumentation — Part 1: General purpose vibration meters*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5349-1, ISO 5349-2, ISO 8041-1, ISO 2041 and the following apply.

ISO and IEC maintain terminology 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/