

**Mehaaniline vibratsioon. Liikuvate
masinate testimine tekitatava
vibratsiooni taseme määramiseks**

Mechanical vibration - Testing of mobile machinery
in order to determine the vibration emission

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 1032:2003 sisaldab Euroopa standardi EN 1032:2003 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 06.06.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 1032:2003 consists of the English text of the European standard EN 1032:2003.</p> <p>This document is endorsed on 06.06.2003 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala:</p> <p>This European Standard specifies the determination of whole-body and hand-arm vibration emissions at operator position(s) during testing of mobile machinery. The purpose of this European Standard is to assist technical standardization committees responsible for specific types of machinery in preparing vibration test codes to ensure that such vibration test codes are as homogeneous as possible with each individual test code having the same basic structure; are in full accordance with basic standards on measurement of vibration emission</p>	<p>Scope:</p> <p>This European Standard specifies the determination of whole-body and hand-arm vibration emissions at operator position(s) during testing of mobile machinery. The purpose of this European Standard is to assist technical standardization committees responsible for specific types of machinery in preparing vibration test codes to ensure that such vibration test codes are as homogeneous as possible with each individual test code having the same basic structure; are in full accordance with basic standards on measurement of vibration emission</p>
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English version

Mechanical vibration - Testing of mobile machinery in order to determine the vibration emission value

Vibrations mécaniques - Essai des machines mobiles dans le but de déterminer la valeur d'émission vibratoire

Mechanische Schwingungen - Prüfverfahren für bewegliche Maschinen zum Zwecke der Bestimmung des Schwingungsemissionswertes

This European Standard was approved by CEN on 28 February 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

This document (EN 1032:2003) has been prepared by Technical Committee CEN/TC 231 "Mechanical vibration and shock", the secretariat of which is held by DIN.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

This document supersedes EN 1032:1996.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

For relationship with EC Directive(s), see informative annex ZA, which is an integral part of this document.

Annexes A to F are informative.

This document includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Exposure to mechanical vibration from mobile machinery can interfere with comfort, working efficiency and, in some circumstances, health and safety. The EC Machinery Directive, supported by the basic safety standards EN 292, requires that machinery is designed and constructed so that the risks resulting from vibration emissions are minimized and that where risks remain, despite such measures, the manufacturer shall supply warnings. It also states that the magnitudes of vibration generated by mobile machinery shall be noted in the relevant instruction handbook in terms of root-mean-square (r.m.s.) value of frequency-weighted acceleration. This European Standard is limited to test methods and measurements related to fulfilment of the second statement. Knowledge of whole-body and hand-transmitted vibration emission values will aid the selection of low-vibration machinery.

The vibration emission determined by a test code should be in proportion to the magnitude of the vibration hazard. In some cases (for example, where the vibration emission at the seat contains shocks) the r.m.s. values determined by the test code cannot adequately represent the vibration hazard. Test codes should provide guidance on how to warn of vibration risk (residual risk) in these cases.

However, the EC Machinery Directive does not require specific declaration of the magnitude of shocks. Therefore in this European Standard, only requirements for evaluation of r.m.s. values are given, together with general requirements for testing and evaluating whole-body and hand-transmitted vibration emissions of mobile machinery as a basis for technical committees responsible for the preparation of vibration test codes.

Standardized vibration test codes are required for many purposes, e.g. to fulfil legal requirements, as well as for trade agreements, aspects of work environment, vibration control, planning of process and work.

In order to prepare a vibration test code for a specific family of machinery it is essential to establish additional requirements for that family, e.g. installation and mounting conditions, operating conditions, measurement positions, measurement directions, vibration declaration, information to be reported.

It is essential when developing a test code for declaration of vibration emission to define a procedure to collect representative vibration values for the machine, to identify causes of variability, to validate the test method and to evaluate the reproducibility of results.

1 Scope

This European Standard specifies the determination of whole-body and hand-arm vibration emissions at operator position(s) during testing of mobile machinery. The purpose of this European Standard is to assist technical standardization committees responsible for specific types of machinery in preparing vibration test codes to ensure that such vibration test codes

- are as homogeneous as possible with each individual test code having the same basic structure;
- are in full accordance with basic standards on measurement of vibration emission;
- reflect the latest technical knowledge of methods of determining the vibration emission from the specific family of machinery under consideration;
- provide manufacturers with a standardized method for the determination and declaration of the vibration emission value(s) of their machinery;
- enable the user of the machinery or the member of an inspection body to compare the vibration emission values of different machinery and to verify the vibration emission values provided by the manufacturer.

This European Standard provides requirements for the preparation of vibration test codes, including guidelines for the conditions under which the measurements shall be made (e.g. operating conditions). Information to be included in a typical vibration test code is summarized in annex A.

Vibration test codes based on this European Standard should define measuring procedures which provide accurate and reproducible results which are as far as possible in agreement with values measured under real working conditions. For determination of the magnitude of the vibration to be noted in the instruction handbook, this European Standard requires operating conditions enabling the determination of the 75-percentile of the vibration experienced at the operator's position during the mode of operation causing the highest vibration.

This European Standard applies to sitting and standing positions. It is applicable to all mobile machinery producing periodic or random vibration with or without transients. Rotational vibration is not dealt with in this European Standard.

This European Standard contains sufficient guidance for designing an appropriate test for machinery for which no vibration test codes exist. It can also be used for the determination of vibration emission values of individual machines.

This European Standard does not present limits or recommended vibration values.

In general, the emission values should not be used for assessment of the health risk. This European Standard does not give any guidance or recommendations for determination of human exposure to vibration and shock.

NOTE For such information, reference is made to ISO 2631-1 and EN ISO 5349-1.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to apply (including amendments).

EN 12096, *Mechanical vibration — Declaration and verification of vibration emission values*.

ENV 28041, *Human response to vibration — Measuring instrumentation (ISO 8041:1990)*.

EN 30326-1, *Mechanical vibration — Laboratory method for evaluating vehicle seat vibration — Part 1: Basic requirements (ISO 10326-1:1992)*.

ISO 2041:1990, *Vibration and shock — Vocabulary*.

ISO 5347 (all parts), *Methods for the calibration of vibration and shock pick-ups*.

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

ISO 5805:1997, *Mechanical vibration and shock — Human exposure — Vocabulary*.

ISO 16063 (all parts), *Methods for the calibration of vibration and shock transducers*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in ISO 2041:1990 and ISO 5805:1997 and the following apply.

3.1

vibration test code

type-C standard relative to a specified family or sub-family or type of machinery, which gives all the information necessary to carry out efficiently the determination, declaration and verification of the vibration emission values, with the purpose of ensuring compatibility and allowing comparison of test results.

NOTE Data produced using a vibration test code may be used as a means of warning of residual risk from vibration.

3.2

mode of operation

task performed by a mobile machine, for which a vibration emission value is determined

EXAMPLE travelling, towing, lifting, excavating

3.3

operating conditions

parameters which affect the vibration emission of a mobile machine for a particular mode of operation

EXAMPLE travelling speed, travelling surface, weight of load, material being excavated

4 Basic standards

This European Standard together with EN 12096 shall be considered as basic standards when preparing a vibration test code for mobile machinery.

EN 12096 gives guidance on how to declare the vibration emission values of machinery, and specifies requirements for verification of declared values.

Those responsible for preparing a vibration test code for a specific family of mobile machinery shall follow the requirements of these two European Standards.

5 Description of a family of machines

The family or type of machinery covered by the vibration test code shall be described unambiguously and in detail. In describing the configuration of the machinery, a vibration test code shall

- identify any additional equipment, e.g. tools, used in the operation of the machine under test and which may influence the vibration emission;
- specify the selection of optional components, devices or sub-assemblies, e.g. tyres or seats, which may influence the vibration emission and which shall be used during the determination of vibration emission values.

It may be appropriate to divide a family of machinery into sub-families requiring different conditions of testing.