

**Kantavad käeshoitavad ajamiga tööriistad.
Vibratsiooni mõõtmine käepidemel. Osa 3:
Kivipuurid ja puurvasarad**

Hand-held portable power tools - Measurement of vibrations at the handle - Part 3: Rock drills and rotary hammers

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 28662-3:1999 sisaldab Euroopa standardi EN 28662-3:1994+A1:1995 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 23.11.1999 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 28662-3:1999 consists of the English text of the European standard EN 28662-3:1994+A1:1995.

This standard is ratified with the order of Estonian Centre for Standardisation dated 23.11.1999 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

The standard is available from Estonian standardisation organisation.

ICS 13.160, 25.140.01, 25.140.10

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute Estonian Standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: +372 605 5050; E-mail: info@evs.ee

EUROPEAN STANDARD

EN 28662-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 1994

UDC 622.233.4-182.4:534.1.08

Descriptors: Power-operated tools, portable equipment, portable electric machine tool, electric hammers, drill hammers, handles, vibration tests, measurements, vibration

English version

Hand-held portable power tools - Measurement of vibrations at the handle - Part 3: Rock drills and rotary hammers (ISO 8662-3:1992)

Machines à moteur portatives - Mesurage des vibrations au niveau des poignées - Partie 3: Marteaux perforateurs et marteaux rotatifs (ISO 8662-3:1992)

Handgehaltene motorbetriebene Maschinen - Messung mechanischer Schwingungen am Handgriff - Teil 3: Gesteinsbohrmaschinen und Bohrhämmer (ISO 8662-3:1992)

This European Standard was approved by CEN on 1994-05-20. 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

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

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

According to Resolution 13/1992, taken in April 1992 at the third meeting of CEN/TC 231 "Mechanical vibration and shock", the International Standard

ISO 8662-3:1992 Hand-held portable power tools; Measurement of vibrations at the handle;
Part 3: Rock drills and rotary hammers

was submitted under the Unique Acceptance Procedure for approval as European Standard.

The result of the Formal Vote was positive.

This European Standard 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).

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 November 1994, and conflicting national standards shall be withdrawn at the latest by November 1994.

In accordance with the CEN/CENELEC Internal Regulations, following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of the International Standard ISO 8662-3:1992 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in annex ZA (normative).

Annex ZA (normative)

**Normative references to international publications
with their relevant European publications**

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 applies (including amendments).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN</u>	<u>Year</u>
ISO 679	1989	Methods of testing cements - Determination of strength	--	--
ISO 2787	1984	Rotary and percussive pneumatic tools - Performance tests	--	--
ISO 8662-1	1988	Hand-held portable power tools - Measurement of vibrations at the handle - Part 1: General	EN 28662-1	1992

ICS 13.160; 25.140.10

Descriptors: tools, power-operated tools, portable equipment, portable electric machine tools, pneumatic equipment, hydraulic equipment, hand tools, drill hammers, rotary hammers, vibration, tests, vibration tests

English version

**Hand-held portable power tools - Measurement of
vibrations at the handle - Part 3: Rock drills and
rotary hammers (ISO 8662-3:1992)**

Machines à moteur portatives - Mesurage des
vibrations au niveau des poignées - Partie 3:
Marteaux perforateurs et marteaux rotatifs
(ISO 8662-3:1992)

Handgehaltene motorbetriebene Maschinen -
Messung mechanischer Schwingungen am Handgriff
- Teil 3: Gesteinsbohrmaschinen und Bohrhämmer
(ISO 8662-3:1992)

This amendment 1 modifies the European Standard EN 28662-3:1994. This amendment was approved by CEN on 1995-05-18. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

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

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of this Amendment EN 28662-3:1994/A1:1995 to the European Standard EN 28662-2:1994 has been prepared by the Technical Committee CEN/TC 231 "Mechanical vibration and chock" the secretariat of which is held by DIN.

This Amendment to the European Standard EN 28662-3:1994 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).

This Amendment to the European Standard EN 28662-3:1994 shall be given the status of a National Standard, either by publication of an identical text or by endorsement, at the latest by February 1996, and conflicting national standards shall be withdrawn at the latest by February 1996.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Endorsement Notice

The text of the International Standard ISO 8662-3:1992 has been approved by CEN as a European Standard with the following common modifications:

The following common modifications have to be made to EN 28662-3:1994.

- Replace the last paragraph of the scope by the following: *It is intended that the results obtained can be used to compare different power tools or different models of the same type of power tools.*
- Subclause 5.1, delete the 2nd sentence, note 3 and the corresponding annex A.
- Subclause 6.1, modify the 5th paragraph as follows: *The inserted test tool shall rotate during the test*
- Figure 1, modify the title into: *Position and example of fastening of the transducer and measurement direction*
- Subclause 6.2.1, delete the last sentence.
- Subclause 6.2.2, modify the 2nd and 3rd paragraphs and note 4 as follows:
The energy absorber consists of a steel tube which is firmly mounted on a rigid base plate having a minimum mass of 300 kg to prevent the tool from jumping, and filled with balls of hardened steel. At the top of the steel tube, resting on the balls, is inserted a test tool on which the power tool works. The test tool should be preferably made in one part but it is acceptable for vibration measurements to have this tool made of two parts as shown in figure 4. The steel tube shall have a hardness of 60 HRC \pm 2 HRC, the anvil and test tool shall have a hardness of 55 HRC \pm 2 HRC and the steel balls shall have a hardness of 62 HRC \pm 3 HRC.

NOTE 4 — A cooling device may be provided with the energy absorber.

Figure 4 illustrates an energy absorber (loading device) and a test tool. The diameter, D , of the steel tube shall be $60 \text{ mm} \pm 1 \text{ mm}$, the nominal diameter of the steel balls $3,96 \text{ mm}$ or 4 mm and the height, H , of the steel ball column $150 \text{ mm} \pm 4 \text{ mm}$.

- Figure 4, replace the text *Concrete block having a minimum mass of 300 kg* by *Heavy block having a minimum mass of 300 kg* and, on the drawing, enlarge the height of the anvil up to D .
- Subclause 6.3, replace the 2nd sentence of the 2nd paragraph by the following: *The feed force should be chosen within the range 80 N to 200 N, and shall be maintained within a tolerance of $\pm 10 \%$ of the chosen value.*
- Table 1, delete the limitation of the shank diameter of 20 mm.
- Add a new subclause 7.5 as follows:

7.5 Evaluation of results

The base for declaration is the arithmetic mean of the mean value obtained for each of the three operators.

Annex ZA (normative)

Normative references to international publications with their relevant European publications

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 applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN</u>	<u>Year</u>
ISO 8662-1	1988	Hand-held portable power tools — Measurement of vibrations at the handle — Part 1: General	EN 28662-1	1992

Annex ZB (informative)

Bibliography

ENV 25349	Mechanical vibration — Guidelines for the measurement and the assessment of human exposure to hand-transmitted vibration (ISO 5349:1986)
-----------	--

INTERNATIONAL STANDARD

ISO
8662-3

First edition
1992-07-01

This document is a preview generated by EVS

**Hand-held portable power tools — Measurement
of vibrations at the handle —**

Part 3:
Rock drills and rotary hammers

*Machines à moteur portatives — Mesurage des vibrations au niveau des
poignées —*

Partie 3: Marteaux perforateurs et marteaux rotatifs



Reference number
ISO 8662-3:1992(E)

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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 8662-3 was prepared by Technical Committee ISO/TC 118, *Compressors, pneumatic tools and pneumatic machines*, Sub-Committee SC 3, *Pneumatic tools and machines*.

ISO 8662 consists of the following parts, under the general title *Hand-held portable power tools — Measurement of vibrations at the handle*:

- Part 1: General
- Part 2: Chipping hammers and riveting hammers
- Part 3: Rock drills and rotary hammers
- Part 4: Grinding machines
- Part 5: Pavement breakers and hammers for construction work
- Part 6: Impact drills
- Part 7: Impact wrenches
- Part 8: Orbital sanders

Annex A forms an integral part of this part of ISO 8662. Annexes B and C are for information only.

© ISO 1992

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Introduction

This part of ISO 8662 specifies how a type test for the measurement of vibrations at the handles of rock drills and rotary hammers shall be performed. It supplements ISO 8662-1 which gives the general specifications for the measurement of vibrations at the handles of hand-held portable power tools. It specifies the operation of the power tool under type test and other requirements for the performance of the type test.

The principle of operation of these power tools is that a drill bit is made to rotate while at the same time energy is converted into periodic impacts which are transmitted to the connection end of the drill bit.

For light rock drills, having a mass (without the drill bit) below 15 kg, and rotary hammers, testing is carried out in a way which closely resembles a typical work situation. Heavy rock drills with a mass above 15 kg have a high penetration rate and the loading device used for the light machines would not be economical. Another type of loading device, a steel ball energy absorber, is used. The method gives an operation similar to that in a real work situation, and since the loading device can be used for a large number of tests the method is economical.

The reproducibility of measurements has been found to be satisfactory for the methods specified in this part of ISO 8662.

In rotary hammers and rock drills the magnitude of the impact energy is determined by the internal design of the tool and is not influenced by external forces. A prerequisite for a stationary operating condition is that a certain minimum static force is applied.

This document is a preview generated by EVS

This page intentionally left blank

Hand-held portable power tools — Measurement of vibrations at the handle —

Part 3:

Rock drills and rotary hammers

1 Scope

This part of ISO 8662 specifies a laboratory method of measuring the vibrations at the handles of hand-held power driven rock drills and rotary hammers. It is a type test procedure for establishing the magnitude of vibration in the handle of a power tool operating under a specified load.

The power tools covered by this part of ISO 8662 may be electrically, pneumatically or hydraulically driven, or driven by means of an internal combustion engine.

It is intended that the results obtained can be used to compare different power tools or different models of the same power tool. Although for heavy rock drills the levels measured are obtained in a simulated work operation they give an estimation of the levels that would be found in a real work situation.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8662. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8662 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 679:1989, *Methods of testing cements — Determination of strength*.

ISO 2787:1984, *Rotary and percussive pneumatic tools — Performance tests*.

ISO 8662-1:1988, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 1: General*.

3 Quantities to be measured

The quantities to be measured are as follows:

- a) the root-mean-square (r.m.s.) acceleration in accordance with ISO 8662-1:1988, subclause 3.1, presented as a weighted acceleration in accordance with ISO 8662-1:1988, subclause 3.3, and as a frequency analysis in accordance with ISO 8662-1:1988, subclause 3.2;

NOTE 1. The frequency analysis may be omitted if the absence of d.c.-shift can be proved by other means.

- b) the supply voltage, and the air or hydraulic pressure;
- c) the blow frequency;
- d) the feed force.

4 Instrumentation

4.1 General

The specifications for the instrumentation given in ISO 8662-1:1988, subclauses 4.1 to 4.6, apply.

4.2 Transducer

The specification for the transducer given in ISO 8662-1:1988, subclause 4.1, applies.