

First edition
2011-04-15

Hand-held portable power tools — Test methods for evaluation of vibration emission —

Part 10: Percussive drills, hammers and breakers

Machines à moteur portatives — Méthodes d'essai pour l'évaluation de l'émission de vibrations —

Partie 10: Marteaux à percussion, perforateurs et brise-béton



Reference number
ISO 28927-10:2011(E)

© ISO 2011

This is a preview of "ISO 28927-10:2011". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2011

All rights reserved. Unless otherwise specified, 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 either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO 28927-10:2011". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword	iv
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms, definitions and symbols	2
3.1 Terms and definitions	2
3.2 Symbols.....	3
4 Basic standards and vibration test codes	3
5 Description of the family of machines	3
6 Characterization of vibration.....	7
6.1 Direction of measurement	7
6.2 Location of measurements.....	7
6.3 Magnitude of vibration	11
6.4 Combination of vibration directions.....	12
7 Instrumentation requirements	12
7.1 General	12
7.2 Mounting of transducers	12
7.3 Frequency weighting filter.....	12
7.4 Integration time.....	12
7.5 Auxiliary equipment	13
7.6 Calibration.....	13
8 Testing and operating conditions of the machinery.....	13
8.1 General	13
8.2 Operating conditions	13
8.3 Other quantities to be specified.....	14
8.4 Attached equipment, workpiece and task.....	14
8.5 Operator	19
9 Measurement procedure and validity.....	19
9.1 Reported vibration values	19
9.2 Declaration and verification of the vibration emission value	19
10 Measurement report.....	20
Annex A (informative) Model test report for percussive drills, hammers and breakers	21
Annex B (normative) Determination of uncertainty	23
Annex C (normative) Design of steel ball absorber	26
Bibliography.....	27

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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

ISO 28927-10 was prepared by Technical Committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, Subcommittee SC 3, *Pneumatic tools and machines*.

ISO 28927-10 cancels and replaces ISO 8662-2:1992, ISO 8662-3:1992 and ISO 8662-5:1992, which have been technically revised. It also incorporates the Amendments ISO 8662-2:1992/Amd.1:1999, ISO 8662-3:1992/Amd.1:1999 and ISO 8662-5:1992/Amd.1:1999. The most important changes are

- vibration measurement in three axes and at both hand positions,
- new transducer positions,
- improved definition of the transducer positions and orientation,
- rock drills from ISO 8662-3, chipping hammers and riveting hammers from ISO 8662-2 are included, and
- amended description of the energy absorber.

ISO 28927 consists of the following parts, under the general title *Hand-held portable power tools — Test methods for evaluation of vibration emission*:

- *Part 1: Angle and vertical grinders*¹⁾
- *Part 2: Wrenches, nutrunners and screwdrivers*²⁾
- *Part 3: Polishers and rotary, orbital and random orbital sanders*³⁾

1) Together with ISO 28927-4, replaces ISO 8662-4, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 4: Grinders*.

2) Replaces ISO 8662-7, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 7: Wrenches, screwdrivers and nut runners with impact, impulse or ratchet action*. All screwdrivers and nutrunners except for one-shot tools now covered.

3) Replaces ISO 8662-8, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 8: Polishers and rotary, orbital and random orbital sanders*.

This is a preview of "ISO 28927-10:2011". Click here to purchase the full version from the ANSI store.

- *Part 4: Straight grinders⁴⁾*
- *Part 5: Drills and impact drills⁵⁾*
- *Part 6: Rammers⁶⁾*
- *Part 7: Nibblers and shears⁷⁾*
- *Part 8: Saws, polishing and filing machines with reciprocating action and small saws with oscillating or rotating action⁸⁾*
- *Part 9: Scaling hammers and needle scalers⁹⁾*
- *Part 10: Percussive drills, hammers and breakers*
- *Part 11: Stone hammers¹⁰⁾*
- *Part 12: Die grinders¹¹⁾*

4) Together with ISO 28927-1, replaces ISO 8662-4, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 4: Grinders*.

5) Replaces ISO 8662-6, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 6: Impact drills*. Non-impacting drills now covered.

6) Replaces ISO 8662-9, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 9: Rammers*.

7) Replaces ISO 8662-10, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 10: Nibblers and shears*.

8) Replaces ISO 8662-12, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 12: Saws and files with reciprocating action and saws with oscillating or rotating action*.

9) Together with ISO 28927-11, replaces ISO 8662-14, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 14: Stone-working tools and needle scalers*.

10) Together with ISO 28927-9, replaces ISO 8662-14, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 14: Stone-working tools and needle scalers*.

11) Under preparation. Replaces ISO 8662-13, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 13: Die grinders*. It also incorporates the Technical Corrigendum ISO 8662-13:1997/Cor.1:1998.

Introduction

This document is a type-C standard as stated in ISO 12100.

When requirements of this type-C standard are different from those which are stated in type-A or -B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

The vibration test codes for portable hand-held machines given in ISO 28927 (all parts) are based on ISO 20643, which gives general specifications for the measurement of the vibration emission of hand-held and hand-guided machinery. ISO 28927 (all parts) specifies the operation of the machines under type-test conditions and other requirements for the performance of type tests. The structure/numbering of its clauses follows that of ISO 20643.

The basic principle for transducer positioning first introduced in the IEC 60745 series of European standards is followed, representing a deviation from ISO 20643 for reasons of consistency. The transducers are primarily positioned next to the hand in the area between the thumb and the index finger, where they give the least disturbance to the operator gripping the machine.

It has been found that vibrations generated by percussive machines vary considerably in typical use. For percussive machines, the impacting action is the dominating source of vibration and the variation in the result is affected by the quality of the working/inserted tool, the worked material and the skill of the operator.

The values obtained are type-test values intended to be representative of the average of the upper quartile of typical vibration magnitudes in real-world use of the machines. However, the actual magnitudes vary considerably from time to time and depend on many factors, including the operator, the task and the inserted tool or consumable. The state of maintenance of the machine itself might also be of importance. Under real working conditions the influences of the operator and process can be particularly important at low magnitudes. It is therefore not recommended that emission values below $2,5 \text{ m/s}^2$ be used for estimating the vibration magnitude under real working conditions. In such cases, $2,5 \text{ m/s}^2$ is the recommended vibration magnitude for estimating the machine vibration.

If accurate values for a specific work place are required, then measurements [according to ISO 5349 (all parts)] in that work situation could be necessary. Vibration values measured in real working conditions can be either higher or lower than the values obtained using this part of ISO 28927.

Higher vibration magnitudes can easily occur in real work situations, caused by the use of excessively worn or bent inserted tools.

The vibration test codes given in ISO 28927 (all parts) supersede those given in ISO 8662 (all parts) , which has been replaced by the corresponding parts of ISO 28927 (see Foreword).

NOTE ISO 8662-11, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 11: Fastener driving tools*, could be replaced by a future part of ISO 28927.