

SLOVENSKI STANDARD
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Ročna prenosna električna orodja - Preskusne metode za vrednotenje oddajanja vibracij - 13. del: Orodja za pritrjevanje/zabijanje (ISO/DIS 28927-13:2017)

Hand-held portable power tools - Test methods for evaluation of vibration emission - Part 13: Fastener driving tools (ISO/DIS 28927-13:2017)

Handgehaltene motorbetriebene Maschinen - Messverfahren zur Ermittlung der Schwingungsemission - Teil 13: Eintreibgeräte (ISO/DIS 28927-13:2017)

Machines à moteur portatives - Mesurage des vibrations au niveau des poignées - Partie 13: Machines à enfoncer les fixations (ISO/DIS 28927-13:2017)

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ICS:

13.160	Vpliv vibracij in udarcev na ljudi	Vibration and shock with respect to human beings
25.140.01	Ročna orodja na splošno	Hand-held tools in general

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

Part 13: Fastener driving tools

*Machines à moteur portatives — Mesurage des vibrations au niveau des poignées —
Partie 13: Machines à enfoncer les fixations*

ICS: 13.160; 25.140.10

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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ISO/DIS 28927-13:2016(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.

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 28927-13 was prepared by Technical Committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, Subcommittee SC 3, *Pneumatic tools and machines*.

This first edition of ISO 28927-13 cancels and replaces ISO 8662-11:1999, of which it constitutes a technical revision. The most important changes are

- vibration measurement in three axes and at both hand positions,
- new transducer positions,
- improved definition of transducer positions and orientation
- XXXXX

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*
- Part 3: *Polishers and rotary, orbital and random orbital sanders*²⁾
- Part 4: *Straight grinders*³⁾

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

²⁾ 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*.

³⁾ Together with Part 1, replaces ISO 8662-4, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 4: Grinders*.

- Part 5: Drills and impact drills⁴⁾
- Part 6: Rammers⁵⁾
- Part 7: Nibblers and shears⁶⁾
- Part 8: Saws, polishing and filing machines with reciprocating action and small saws with oscillating or rotating action⁷⁾
- Part 9: Scaling hammers and needle scalers⁸⁾
- Part 10: Percussive drills, hammers and breakers⁹⁾
- Part 11: Stone hammers¹⁰⁾
- Part 12: Die grinders
- Part 13: Fastener driving tools

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

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

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

7) 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*

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

9) Replaces ISO 8662-2, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 2: Chipping hammers and riveting hammers*, ISO 8662-3, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 3: Rock drills and rotary hammers*, and ISO 8662-5, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 5: Pavement breakers and hammers for construction work*. Chipping and riveting hammers, rock drills and rotary hammers all covered.

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

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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 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 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 EN 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.

In order to provide a method that gives good measurement reproducibility, this part of ISO 28927 adopts a procedure for testing impact and impulse machines using a test device based on break blocks acting on the outer diameter of a test socket, and a free running test for other machines. The procedures of ISO 5349 are required whenever exposure at the workplace is to be assessed.

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 will 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 m/s² be used for estimating the vibration magnitude under real working conditions. In such cases, 2,5 m/s² 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) 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.

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

Hand-held portable power tools - Test methods for evaluation of vibration emission - Part 13: Fastener driving tools

1 Scope

This part of ISO 28927 specifies a laboratory method for measuring the vibration at the handle of continuous operating fastener driving tools. It is a type test procedure for establishing the vibration value in the handle of a hand-held power tool operating under a specified load.

Fastening tools without continuous operating modes are very unlikely to contribute significantly to risk of vibration injury. In addition, there are uncertainties regarding the application of vibration measurement based on existing International Standards to low-rate or single impact machines.

For these reasons, this International standard assumes vibration emissions result in a daily dose [A(8)] less than 2.5m/s^2 for low power fastening tools without continuous operating modes. However, if individual tools are likely to emit vibration at levels higher than 2.5m/s^2 (when averaged over periods of typical tool operation according to ISO 5349-2) vibration emission values based on sample work activities should be given for that tool.

NOTE 3 Fastener driving tools are also referred to as nailers, pinners, tackers and staplers.

For fastener driving tools to which this part of ISO 28927 is applicable, the power required for operation can be supplied by pneumatic or hydraulic pressure, combustible gases in an internal combustion engine or from spring tension. This part of ISO 28927 is applicable to fasteners comprising nails, staples and pins.

2 Normative references

The following referenced documents are indispensable for the application 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 5349:2001 (all parts), *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration*

ISO 5391:2003, *Pneumatic tools and machines — Vocabulary*

ISO 17066:2007, *Hydraulic tools — Vocabulary*

ISO 20643:2005, *Mechanical vibration — Hand-held or hand guided machinery — Principles for evaluation of vibration emission*

ISO 792-13, *Hand-held non-electric power tools — Safety requirements — Part 13: Fastener driving tools*

EN 12096:1997, *Mechanical vibration — Declaration and verification of vibration emission values*

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3 Terms, definitions and symbols

For the purposes of this document, the terms and definitions given in ISO 5391, ISO 17066 and ISO 20643, and the following terms, definitions and symbols, apply.

3.1 Terms and definitions

3.1.1 fastener driving tool/stapler

power tool for driving nails/staples with one or more strokes

3.2 Symbols

Symbol	Description	Unit
a_{hw}	root-mean-square (r.m.s.) single-axis acceleration value of the frequency-weighted hand-transmitted vibration	m/s ²
a_{hv}	vibration total value of frequency-weighted r.m.s. acceleration; root sum of squares of a_{hw} values for the three measured axes of vibration	m/s ²
\bar{a}_{hv}	arithmetic mean value of a_{hv} values of runs for one operator for one hand position	m/s ²
a_h	arithmetic mean value of a_{hv} values for all operators for one hand position	m/s ²
\bar{a}_h	arithmetic mean value of a_h values for one hand position on several machines	m/s ²
a_{hd}	declared vibration emission value	m/s ²
s_{n-1}	standard deviation for a test series (for a sample, s)	m/s ²
σ_R	standard deviation of reproducibility (for a population, σ)	m/s ²
C_v	coefficient of variation for a test series	
K	Uncertainty	m/s ²

4 Basic standards and vibration test code

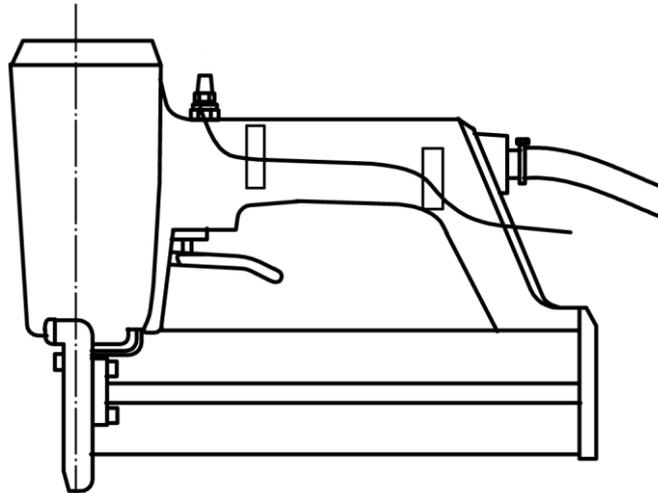
This part of ISO 28297 is based on the requirements of ISO 20643 and corresponds to its structure in respect of clause subjects and numbering except for the annexes.

Annex A presents a model test report and Annex B the means for determining the uncertainty, K .

5 Description of the family of machines

This part of ISO 29827 applies to hand-held machines intended for fastener driving tools.

Figures 1 show an example of a typical fastener driving tool covered by this part of ISO 29827.



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Figure 1 – Fastener driving tool

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6 Characterization of vibration

6.1 Direction of measurement

The vibration transmitted to the hand shall be measured and reported for three directions of an orthogonal coordinate system. At each hand position, the vibration shall be measured simultaneously in the three directions shown in Figure 2.

6.2 Location of measurements

Measurements shall be made at the gripping zones, where the operator normally holds the machine and applies the feed force. For machines intended for one-handed operation, it is only necessary to measure at a single point.

The prescribed transducer location shall be as close as possible to the hand between the thumb and index finger. This shall apply to both hand positions, with the machine held as in normal operation. Whenever possible, measurements shall be made at the prescribed locations.