INTERNATIONAL STANDARD

ISO 8662-14

First edition
1996-12-01

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

Part 14:
Stone-working tools and needle scalers

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

Partie 14: Machines portatives pour le travail de la pierre et marteaux à aiguilles

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Numéro de référence
ISO 8662-14:1996(E)

Foreword

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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.

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International Standard ISO 8662-14 was prepared by Technical Committee ISO/TC 118, *Compressors, pneumatic tools and pneumatic machines*, Subcommittee SC 3, *Pneumatic tools and machines.*

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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: Grinders*

— *Part 5: Pavement breakers and hammers for construction work*

— *Part 6: Impact drills*

— *Part 7: Wrenches, screwdrivers and nut runners with impact, impulse or ratchet action*

— *Part 8: Polishers and rotary, orbital and random orbital sanders*

— *Part 9: Rammers*

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

Printed in Switzerland

— *Part 10: Nibblers and shears*

— *Part 11: Fastener driving tools (nailers)*

— *Part 12: Saws and files with reciprocating action and saws with oscillating or rotating action*

— *Part 13: Die grinders*

— *Part 14: Stone-working tools and needle scalers*

Annex A of this part of ISO 8662 is for information only.

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Introduction

This part of ISO 8662 specifies how a type test for the measurement of vibrations at the handles of stone-working tools and needle scalers shall be performed. It supplements ISO 8662-1 which gives the general specifications for the measurement of vibrations at the handles of handheld power-driven tools. It specifies the operation of the power tool under type test and other requirements for the performance of the type test.

The type test is made on an artificial load, so designed that measured values correspond to those found in typical work situations. This method is designed to give satisfactory reproducibility.

Stone-working power tools are designed according to one of two basic principles. In the first the driving medium causes a piston to transmit energy periodically to a chisel and in the second the piston and chisel are integrated into one piece.

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Needle scalers work according to the first principle, but the inserted tool consists of a bundle of needles.

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The motion of the piston also generates a reaction force on the housing of the machine, which makes it necessary to apply a certain minimum static force on the tool to produce a stationary operating condition.

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

Part 14:
Stone-working tools and needle scalers

1 Scope

This part of ISO 8662 specifies a laboratory method of measuring the vibrations at the handles of hand-held stone-working power tools and needle scalers. It is a type test procedure for establishing the magnitude of vibrations at the handles of the power tool when operating on the artificial load.

The power tools may be pneumatically or hydraulically driven.

It is intended that the results obtained be used to compare different power tools or different models of the same type power tool. Although the magnitudes measured are obtained in an artificial operation, they will give an indication of the values 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 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.*

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3 Quantities to be measured

Quantities to be measured are:

— acceleration according to ISO 8662-1:1988, 3.1, presented as weighted acceleration according to ISO 8662-1:1988, 3.3 and frequency analysis according to ISO 8662-1:1988, 3.2;

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

— air or hydraulic pressure;

— blow frequency;

— feed force.

4 Instrumentation

4.1 General

For specification of instrumentation, see ISO 8662-1:1988, 4.1 to 4.6.

4.2 Transducer

For specification of the transducer, see ISO 8662-1:1988, 4.1.

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4.3 Mechanical filter

Normally it is necessary to use a mechanical filter for measurements according to this part of ISO 8662 (see ISO 8662-1:1988, 3.2).

4.4 Fastening of transducer

Fastening of transducer and mechanical filter shall be according to ISO 8662-1:1988, 4.2 (see figure 1 and figure 2).

4.5 Calibration

Calibration shall be carried out in accordance with ISO 8662-1:1988, 4.8.

4.6 Auxiliary equipment

The air or hydraulic pressure shall be measured using a manometer of precision class.

The blow frequency of the tool during measurement can be determined using the signal from the vibration transducer, from a narrow-band analysis of the vibration signal or using a frequency counter.

The feed force can be measured with a scale (see 6.3).

5 Measurement direction and measurement location

5.1 Measurement direction

Measurements shall be made in a direction parallel with the percussive direction, the z-direction for pistol grip power tools and the y-direction for straight power tools (see figure 2).

5.2 Measurement location

Measurements shall be made on the main handle, where the operator normally holds the tool and applies the feed force.

The position of the transducer shall be halfway along the length of the handle for pistol-grip power tools, [(see figure 2 b)]. In cases where this location interferes with the trigger, the location shall be chosen as close as possible to the halfway location. For straight power tools, the transducer shall be mounted on a rigid element securely fastened to the handle of the power tool [see figure 2 c)].

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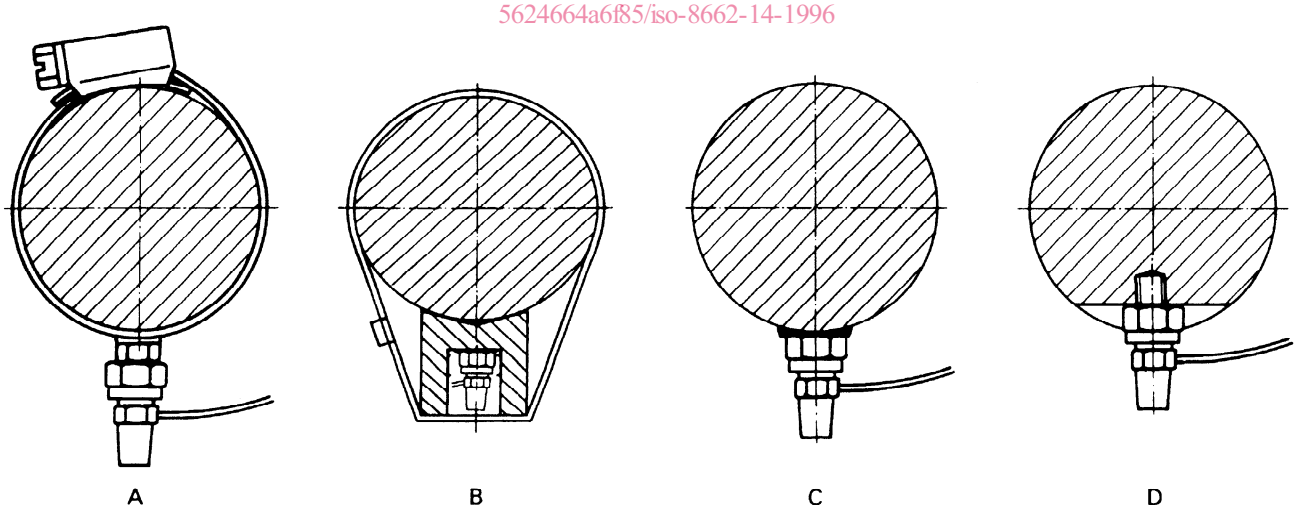
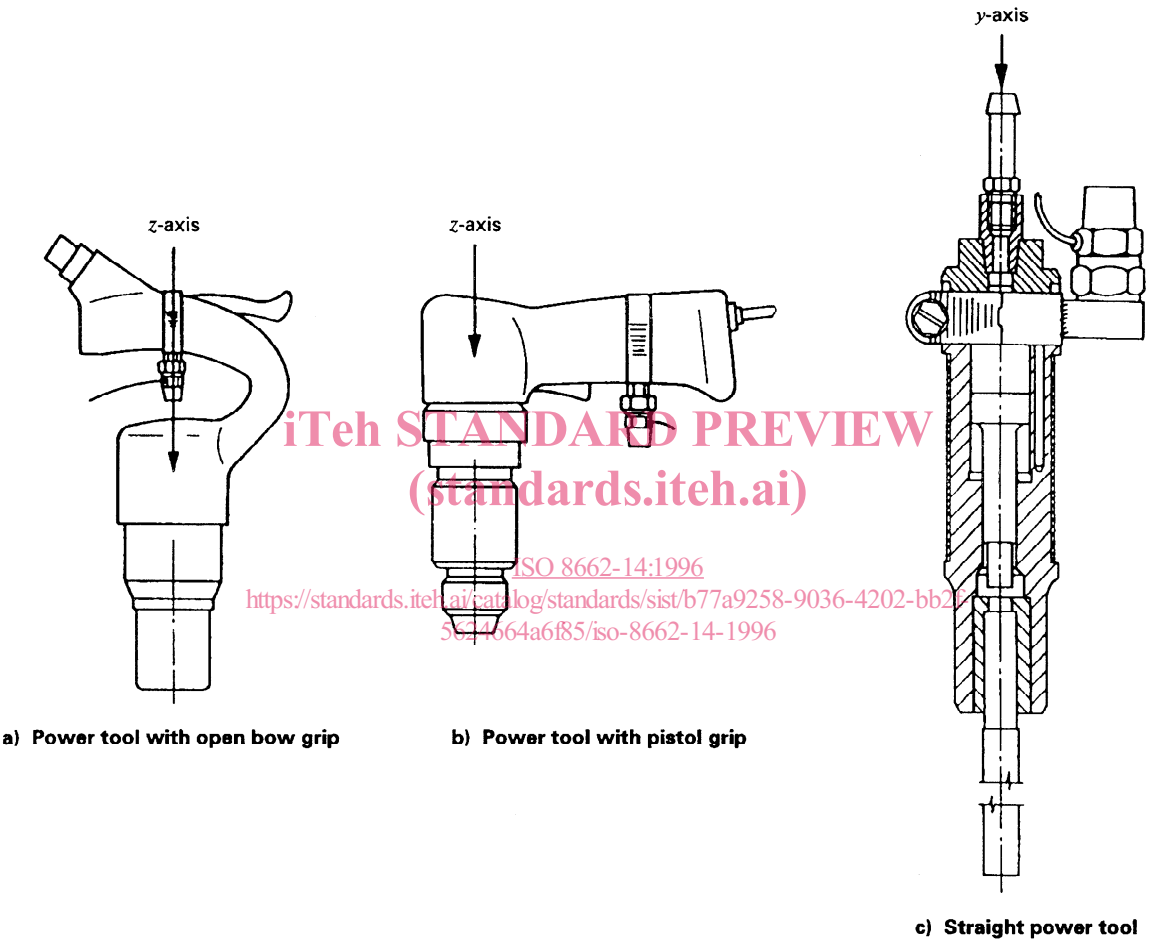


The transducer may be mounted in four ways:
A: by using a hose clip to which a block is brazed or welded;
B: by using an adaptor to which the transducer is screwed. The adaptor is mounted with the use of plastic strips;
C: by glueing the transducer;
D: by grinding a flat surface.

Figure 1 — Options for the fastening of transducers



a) Power tool with open bow grip

b) Power tool with pistol grip

c) Straight power tool

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Figure 2 — Measuring direction and example of position of transducer

6 Determination of working procedure

6.1 General

Measurements shall be carried out on a new, properly serviced and lubricated power tool.

For hydraulic tools, a warm-up time of about 10 min should be allowed before measurements are undertaken. For pneumatic tools, no such warm-up time is necessary.

During the test, the power tool shall operate at rated pressure and be used according to the manufacturer's specifications. The operation shall be stable and smooth (see 6.3).

During the test, the energy absorber shall be arranged so that the operator can have an upright posture and work the power tool vertically downwards while performing the test (see figure 3).

6.2 Energy absorber

6.2.1 Power tools with piston and inserted tool separate

The load to be used is a steel ball energy-absorbing device which gives an appropriate absorption of the shock wave and consistent reflexions back to the power tool in the order of 15 % to 20 % as is normal in a working situation.

The energy absorber consists of a steel tube which is firmly mounted on a rigid base plate having a mass according to table 1 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 figures 4 and 5. The steel tube shall have a hardness of 60 HRC ± 2 HRC, the anvil and test tool shall have a hardness of 55 HRC ± 2 HRC and the steel balls shall have a hardness of 62 HRC ± 3 HRC.

NOTE 2 HRC denotes Rockwell hardness C.

The energy absorber can be water-cooled to extend its life. The energy absorber is shown in figures 4 and 5 and its dimensions should be chosen according to table 1.

The length of the test tool should be chosen to correspond to the shortest tool normally used. The energy absorbing device for needle scalers is shown in figure 4.

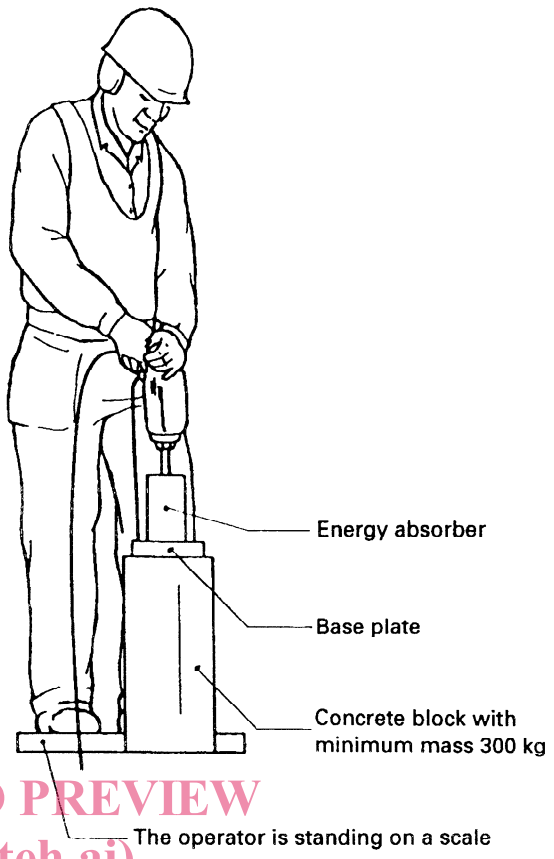

Figure 3 — Working position of operator

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6.2.2 Power tools with piston and inserted tool integrated

These power tools shall be operated on a 10 mm thick rubber sheet with a hardness value of 70 Shore A, resting on a rigid, heavy baseplate.

NOTE 3 In the case of multihead machines, the rubber sheet shall be sized accordingly.

6.3 Feed force

The feed force to be applied, in addition to the weight of the power tool, shall ensure that it operates at its normal level of performance. This means a stable operation where the piston does not hit the front end of the power tool causing excessive vibration shocks.

This is generally achieved by a feed force, F_A, which, expressed in newtons, can be in the region of 20 times the value of the mass, in kilograms, of the power tool. The chosen feed force shall be maintained within the range of ± 10 %.

The feed force, F_A, can be monitored and controlled during the test by letting the operator stand on a scale.

The feed force is then the operator's own mass minus the reading on the scale.

For vibration-controlled power tools, the manufacturer shall state the range of optimal feed force. The measurements shall be made with a feed force in the middle of the range.

Table 1 — Design criteria for the energy absorber

Nominal shank diameter, d mm	Steel tube diameter, D mm	Nominal steel ball diameter mm	Ball column height, H mm	Minimum mass of the base plate kg
$d \leqslant 13$	20 ± 1	3,96 or 4	50 ± 4	100
$d > 13$	40 ± 1	3,96 or 4	100 ± 4	200

Dimensions in millimetres

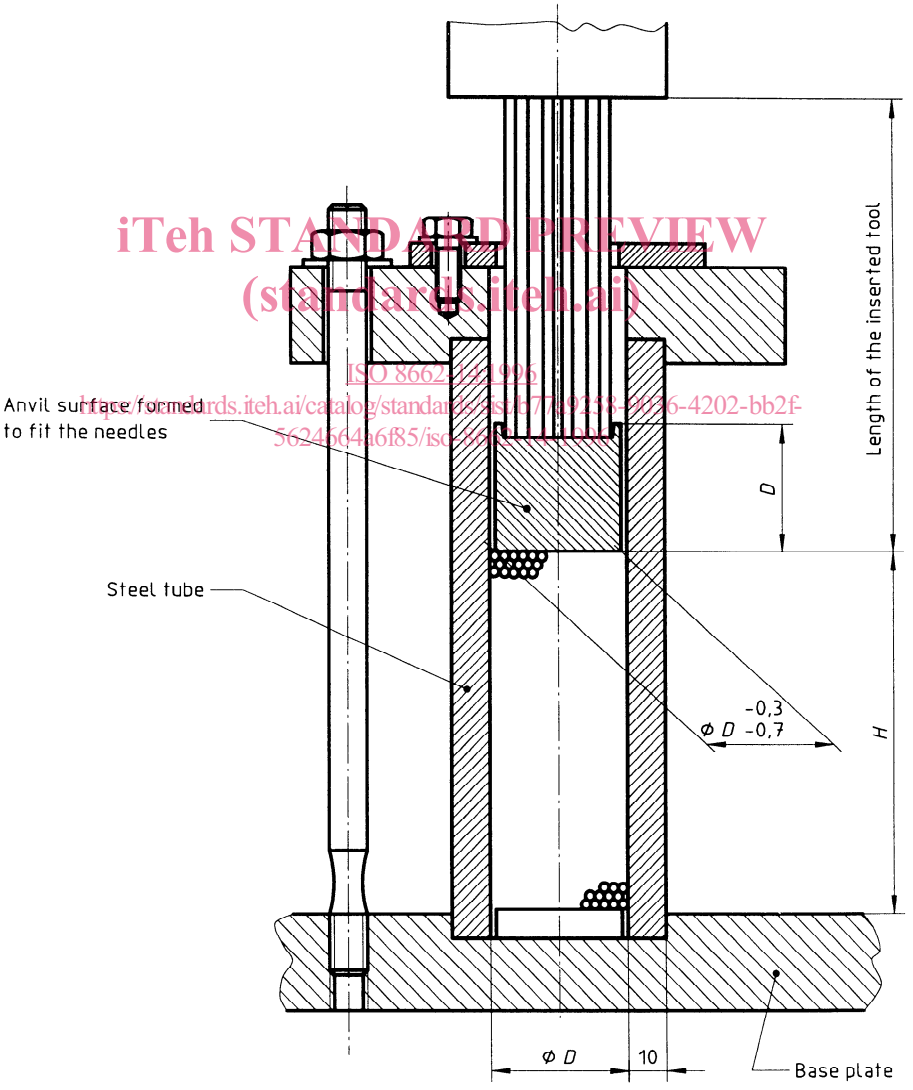

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Figure 4 — Needle scaler — Steel ball energy absorber