INTERNATIONAL STANDARD

ISO 8662-8

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

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

Machines à moteur portatives — Mesurage des vibrations au niveau des poignées —
Partie 8: Polisseuses-lustreuses et ponceuses rotatives, orbitales et orbitales spéciales

Reference number
ISO 8662-8:1997(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 8662-8 was prepared by Technical Committee ISO/TC 118, *Compressors, pneumatic tools and pneumatic machines*, Subcommittee 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: 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*

— *Part 10: Nibblers and shears*

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

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— *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.

Introduction

This part of ISO 8662, which specifies a type test for the measurement of vibrations at the handles of hand-held pneumatic polishers or rotary, orbital or random orbital sanders, 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 tool under the type test and other requirements for the performance of the type test.

Polishers and rotary sanders both have circular flexible abrasive pads, driven in a simple rotating motion. In addition, polishers are generally fitted with a sheepskin or felt pad, whereas rotary sanders generally use a circular abrasive paper. The pad may be coupled to the motor directly, or via a gearbox which may include an angular drive.

The principle of the operation of both orbital and random orbital sanders is that the pad holding the abrasive paper is caused to orbit at a small radius about the axis of the tool. The pads of orbital sanders may be coupled to the motor directly, or via a gearbox. In a random orbital sander, the motor is connected to the pad via a ball bearing, causing it to operate with both rotary and circular movements (dual action). The pads of orbital sanders are generally, but not exclusively, rectangular; those of random orbital sanders are circular.

It has been found that the magnitude of the vibration generated by an orbital or random orbital sander sanding a workpiece varies considerably. The variation is due to many different parameters, for example, the way the operator holds the tool and the precision with which he applies the feed force. In order to provide a method which gives good measurement repeatability, this part of ISO 8662 strictly specifies the working conditions for the test.

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

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

1 Scope

This part of ISO 8662 specifies a laboratory method for measuring the vibrations at the handles of a hand-held pneumatic polisher or rotary, orbital or random orbital sander. It is a type test procedure for establishing the magnitude of vibrations at the handles of the power tool when operating under a specified load.

Four types of power tools are concerned:

a) polisher, with circular polishing pad;

b) vertical rotary sander, with circular sanding pad;

c) orbital sander, with rectangular, circular (or other) sanding pad;

d) random orbital sander (including grinding-type tools fitted with a dual-action orbital hub), with circular sanding pad.

This part of ISO 8662 is not applicable to straight rotary sanders and belt sanders.

It is intended that the results be used to compare different power tools or different models of the same type of power tool. With the operation specified for the power tool, the values obtained will give an indication of those found in real work situations.

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.*

3 Quantities to be measured

The quantities to be measured are:

— the root-mean-square (r.m.s.) acceleration, in accordance with ISO 8662-1:1988, 3.1 presented as a weighted acceleration according to ISO 8662-1:1988, 3.3;

— the air pressure, in accordance with ISO 2787;

— the feed force.

4 Instrumentation

4.1 General

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

4.2 Transducer

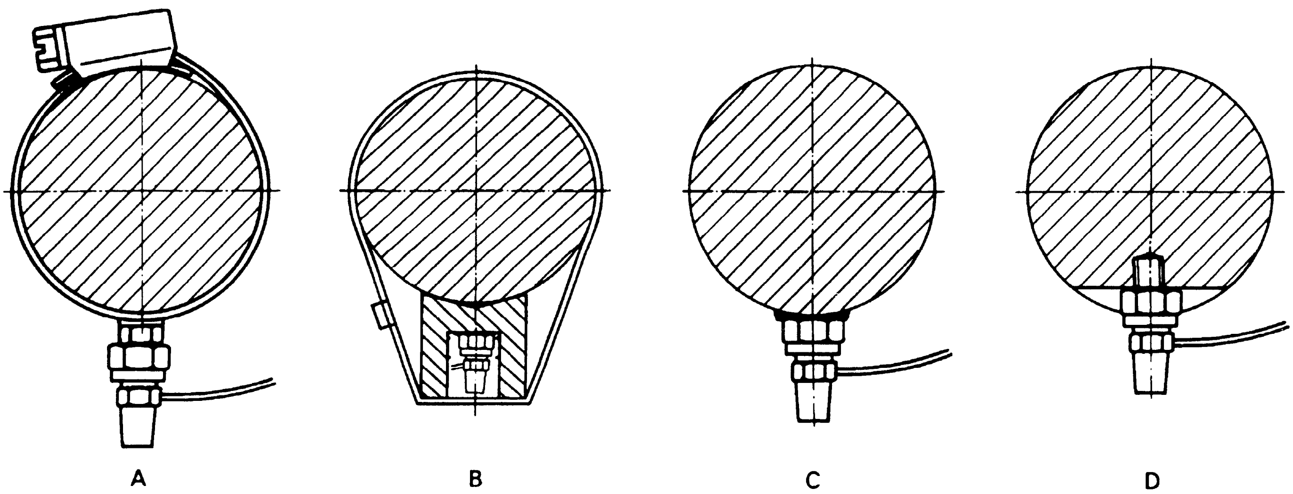
The specification of the transducer given in ISO 8662-1:1988, 4.1, applies.

4.3 Mechanical filter

It is not normally 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 the transducer shall be in accordance with ISO 8662-1:1988, 4.2. Small transducers may be glued to a flat surface using a suitable adhesive. In all cases, the fastening of the transducer shall be in accordance with the transducer manufacturer's instructions (see figure 1).



The transducer may be mounted in one of the following 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 straps.

C: By gluing the transducer on a flat surface.

D: By grinding a flat surface and drilling and tapping a hole into which the transducer is screwed.

Figure 1 — Options for fastening of transducers

If, at the measurement positions, the power tool has a soft resilient cover, this shall be removed, or a clamp, on which the transducer is mounted, tightened securely around the resilient cover. Alternatively, a special adaptor may be used (see ISO 8662-1:1988, 4.2). If the tool has a handle with a resilient cover, the test report should state the action taken, e.g. solid clamping, removal of cover or use of adaptor.

The transducers shall be mounted perpendicularly to the surface, even if the surface is not exactly perpendicular to the ideal axis. Deviations of ± 15° from this theoretical axis are acceptable. If the deviation is more than ± 15°, an appropriate block should be used.

4.5 Auxiliary equipment

The supply air pressure shall be measured using a precision class pressure gauge in accordance with ISO 2787.

The vertical feed force shall be measured with a device having an accuracy of ± 1 N (see 6.4).

4.6 Calibration

Calibration shall be carried out in accordance with ISO 8662-1.

5 Measurement direction and measurement location

5.1 Measurement direction

Measurements shall be made at the locations determined by 5.2, on the housing (or knob-handle), in two directions, as shown in figure 2.

For sanders with handles, measurement(s) shall be made on the handle(s) in a direction parallel to the rotational axis of the pad (see figure 2).

5.2 Measurement location

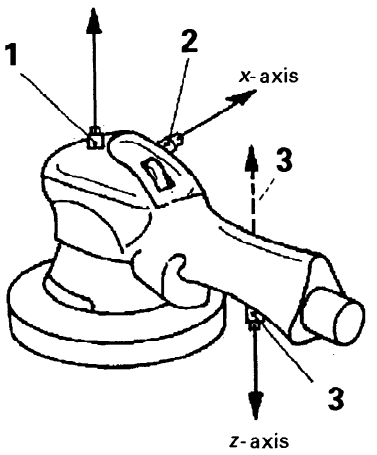
Measurements shall be made on both the housing and the handle (if any) where the operator normally holds the tool and applies the feed force. However, if the machine is designed to be held by a knob-handle on the housing, rather than by the housing itself, measurements shall be made on the knob-handle instead of on the housing.

The two transducers on the machine housing shall be positioned at the front (see figure 2).

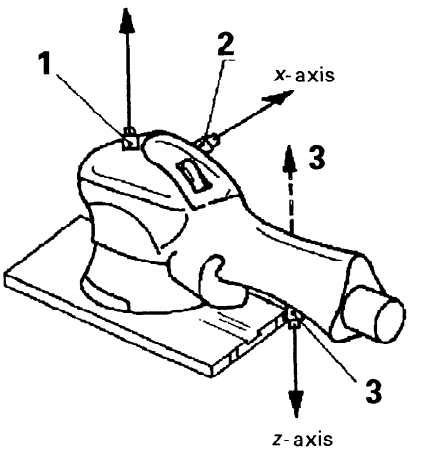
For sanders and polishers with two handles, measurements shall be made on both handles and are not required on the housing. However, in the case of small rotary angle sanders and polishers, where the motor housing is intended to be held, the housing shall be treated as a handle (see figure 2).

The transducer(s) on the handles (if any) shall be positioned halfway along the handle gripping length and, preferably, on the underside (see figure 2).

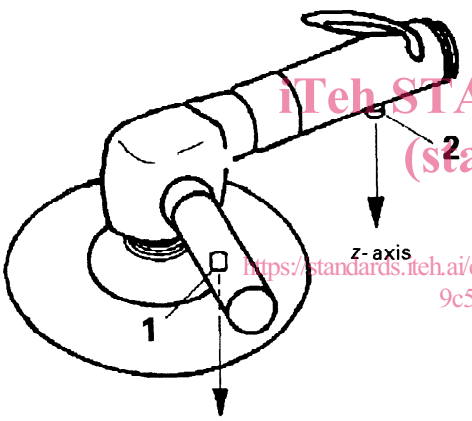
Handles designed as antivibration devices may be elastically mounted on the machine. In such cases, machine and handle may vibrate out of phase, resulting in a motion which cannot be adequately measured using a single transducer. For such handles, measurements shall be made using two transducers mounted symmetrically approximately 100 mm apart about the halfway point described above.



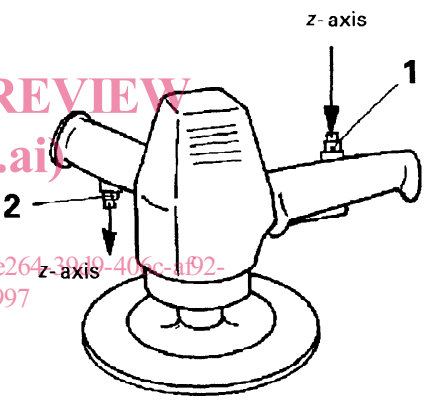
Random orbital sander



Orbital sander



Angle rotary sander/polisher



Vertical rotary sander/polisher

1 , 2 , 3 : Positions of transducers

Figure 2 — Measurement directions and examples of positions of transducers

6 Determination of working procedure

6.1 General

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

During the test, the power tool shall be equipped with accessories which are supplied with it. Power tools designed to be connected to a vacuum system shall be connected to such a system during the test. The flow of the vacuum system shall be in accordance with the manufacturer's recommendations.

6.2 Operation of the power tool

The air shall be supplied by a hose having a length of at least 2 m and which is attached to the power tool via a threaded hose connector and is secured with a hose clip.

During the test, the power tool shall operate at rated air pressure and at maximum speed, and be used according to the manufacturer's instructions.

During the test, the operation shall be stable and the power tool shall be moved at a constant speed over the surface in a figure-of-eight pattern, as described in figure 3. Each figure-of-eight pattern shall take approximately 4 s. The operator must be skilled and experienced. Polishers and sanders with two handles shall be held by both handles; those with one handle shall be held with one hand on the handle and the other hand on the power tool housing (or knob-handle). Polishers and sanders without a handle shall be held by one hand on the power tool housing.

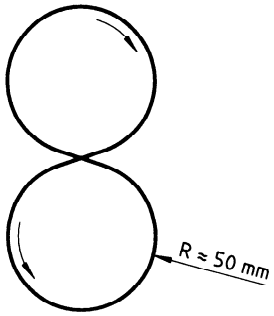


Figure 3 — Figure-of-eight pattern of power tool movements on workpiece

6.3 Workpiece

The workpiece shall be a mild steel plate mounted horizontally on a stable foundation. It is important that the workpiece so mounted does not have any significant resonances in the frequency range at which it could influence the results. The dimensions of the steel plate shall be at least 400 mm × 300 mm × (20 mm to 50 mm). The surface of the plate to which the power tool is to be applied shall have a finish in the range of R_a = 0 to 0,8 µm.

NOTE — This surface will normally be achieved during preliminary testing and will be maintained by the testing procedure.

6.4 Feed force

The vertical feed force, in addition to the weight of the power tool, shall be evenly distributed over the pad to ensure that the power tool operates at its normal level of performance and in a stable manner.

For polishers and sanders with two handles, the feed force shall be applied on the handles, perpendicular to the working surface and parallel to the rotational axis of the pad.

For polishers and sanders with one handle or without a handle, the feed force shall be applied on the housing of the tool, perpendicular to the working surface and at the rotational axis of the pad.

The magnitude of the vertical feed force, in addition to the weight of the power tool, shall be 30 N ± 5 N.

The feed force shall be applied and controlled by the operator, e.g. by standing on a scale during the test, and its value displayed to the operator.

6.5 Polishing pad

Polishers shall be tested with a polishing pad in accordance with the manufacturer's recommendations.