INTERNATIONAL STANDARD

ISO 8662-2

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

Part 2:
Chipping hammers and riveting hammers

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

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Partie 2: Marteaux burineurs et marteaux riveurs

INTERNATIONAL ISO

Reference number
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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.

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International Standard ISO 8662-2 was prepared by Technical Committee ISO/TC 118, *Compressors, pneumatic tools and pneumatic machines*, Sub-Committee 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: 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.

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Introduction

This part of ISO 8662 specifies how a type test for the measurement of vibrations at the handles of chipping hammers and riveting 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 tool under type test and other requirements for the performance of the type test.

The principle of the operation of these power tools is that a driving medium causes a piston to transmit energy periodically to a chisel or a die. The piston also generates a reaction force on the housing of the power tool, which makes it necessary to apply a certain minimum static force on the tool to produce a stationary operating condition.

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The reproducibility determined from a great number of tests in which these tools were operated in typical work situations (i.e. chipping steel and riveting) was found to be poor and the possibility of improving it is small. It was therefore concluded that the type test must be carried out using a dummy load, so chosen that the values measured correspond to those found in typical work situations. The reproducibility of the proposed method has been found to be good.

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

Part 2:
Chipping hammers and riveting hammers

1 Scope

This part of ISO 8662 specifies a laboratory method for measuring the vibrations at the handles of hand-held power driven chipping hammers and riveting 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.

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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 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 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.

NOTE 2 For light handles, for example made of plastic, care must be taken not to load the handle with too large

a mass when mounting the transducer. If the handle acts as a mechanical filter, then a light transducer may be glued to the surface; in this case the mass of the transducer should be less than 5 g.

4.3 Fastening of the transducer

Fastening of the transducer and mechanical filter shall be in accordance with ISO 8662-1:1988, subclause 4.2 (see figure 1).

For plastic handles, a mechanical filter may not be necessary (see ISO 8662-1:1988, subclause 4.3).

4.4 Auxiliary equipment

The supply voltage of electrically powered tools shall be measured using instruments measuring r.m.s. values.

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

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

4.5 Calibration

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

5 Measurement direction and measurement location

5.1 Measurement direction

Measurements shall be made in a direction parallel with the percussive direction, i.e. in the z-direction (see figure 1). The directions in a machine-related coordinate system are defined in annex A.

NOTE 3 For vibration exposure measurements in accordance with ISO 5349, it may be necessary to measure in all three directions defined in annex A.

5.2 Measurement location

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

The position of the transducer shall be halfway along the length of the handle (see figure 1).

6 Determination of working procedure

6.1 General

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

For electric and hydraulic tools and for tools powered by an internal combustion engine, a warming up time of about 10 min should be allowed before starting the measurements. For pneumatic tools, no such warming up time is necessary.

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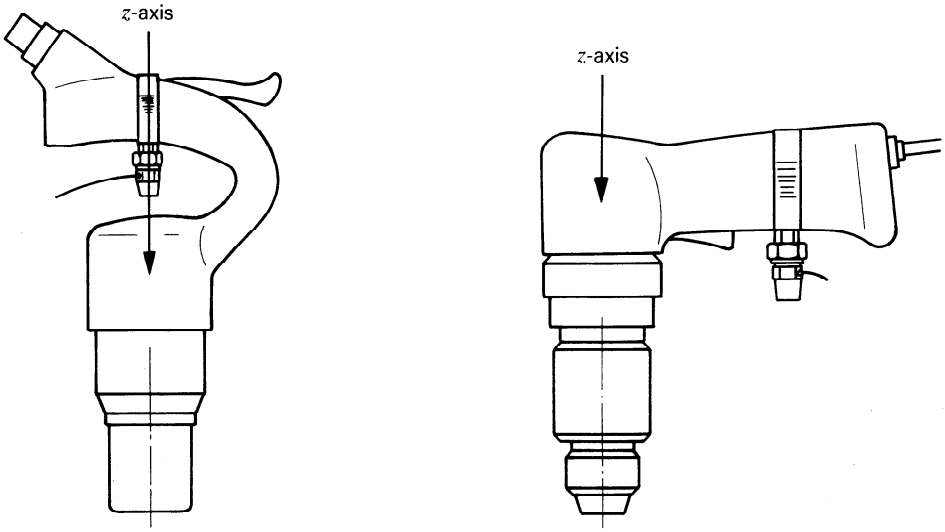
During the test the tool shall operate at the rated power supply, i.e. the rated voltage or pressure, and shall be used in accordance with the manufacturer's specifications. The operation of the power tool shall be stable and smooth (see 6.3).

During the test the energy absorber shall be positioned so that the operator can have an upright posture and work the power tool vertically downwards while performing the test (see figure 2).



Power tool with open or closed bow grip

Power tool with pistol grip

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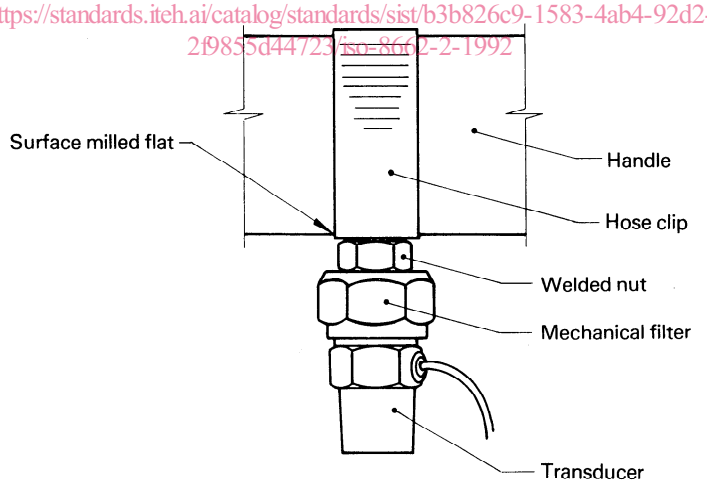

Figure 1 — Position and fastening of transducer and measurement direction

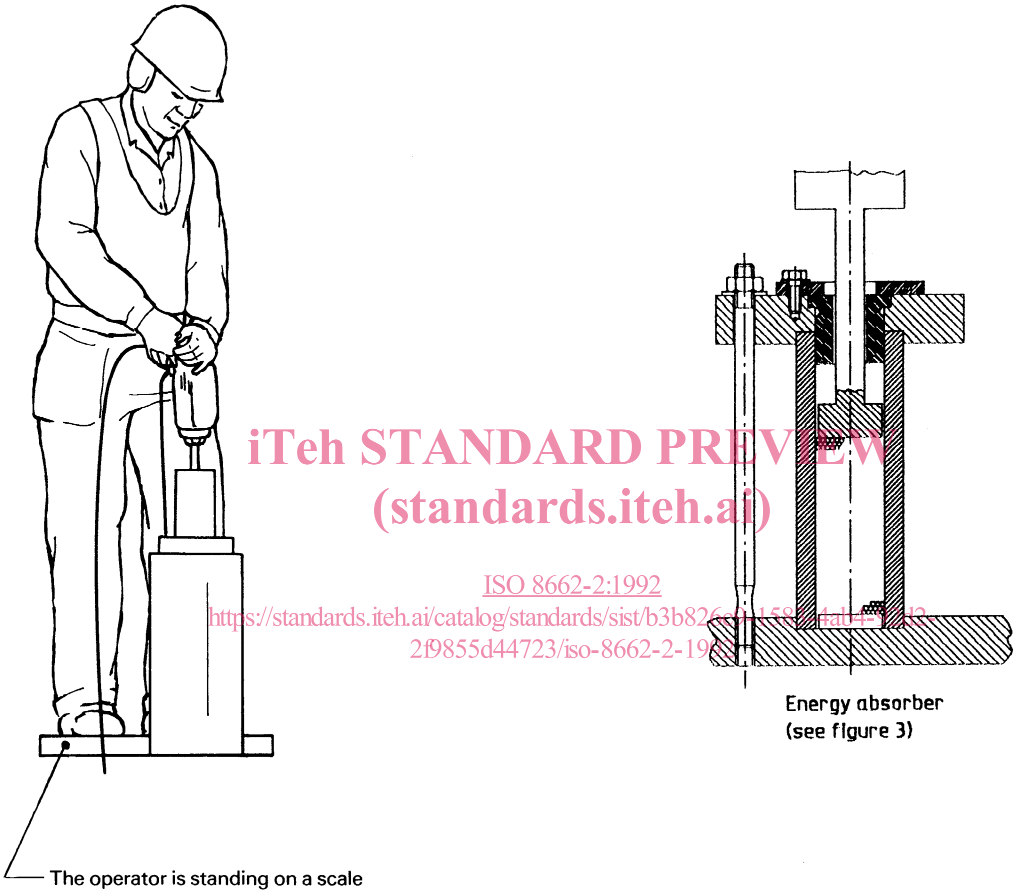

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Figure 2 — Working position of operator

6.2 Energy absorber

The load used is a steel ball energy absorbing device which gives an appropriate absorption of the shock wave and sends consistent reflections, of the order of 15 % to 20 % (as is normal in a working situation), back to the tool.

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 steel tube shall have a hardness of 62 HRC ± 2 HRC or 750 HV 10, the anvil and test tool shall have a hardness of 55 HRC ± 2 HRC and the steel balls shall have a hardness greater than 63 HRC.

Figure 3 illustrates an energy absorber (loading device) and a test tool. Their dimensions should be chosen from table 1.

Table 1 — Design criteria for the energy absorber

Dimensions in millimetres

Shank diameter, d	Steel tube diameter, D	Steel ball diameter	Ball column height, H
$d \leq 13$	20	4	50
$d > 13$	40	4	100

The length of the test tool should be chosen to correspond to the shortest tool supplied.

Dimensions in millimetres

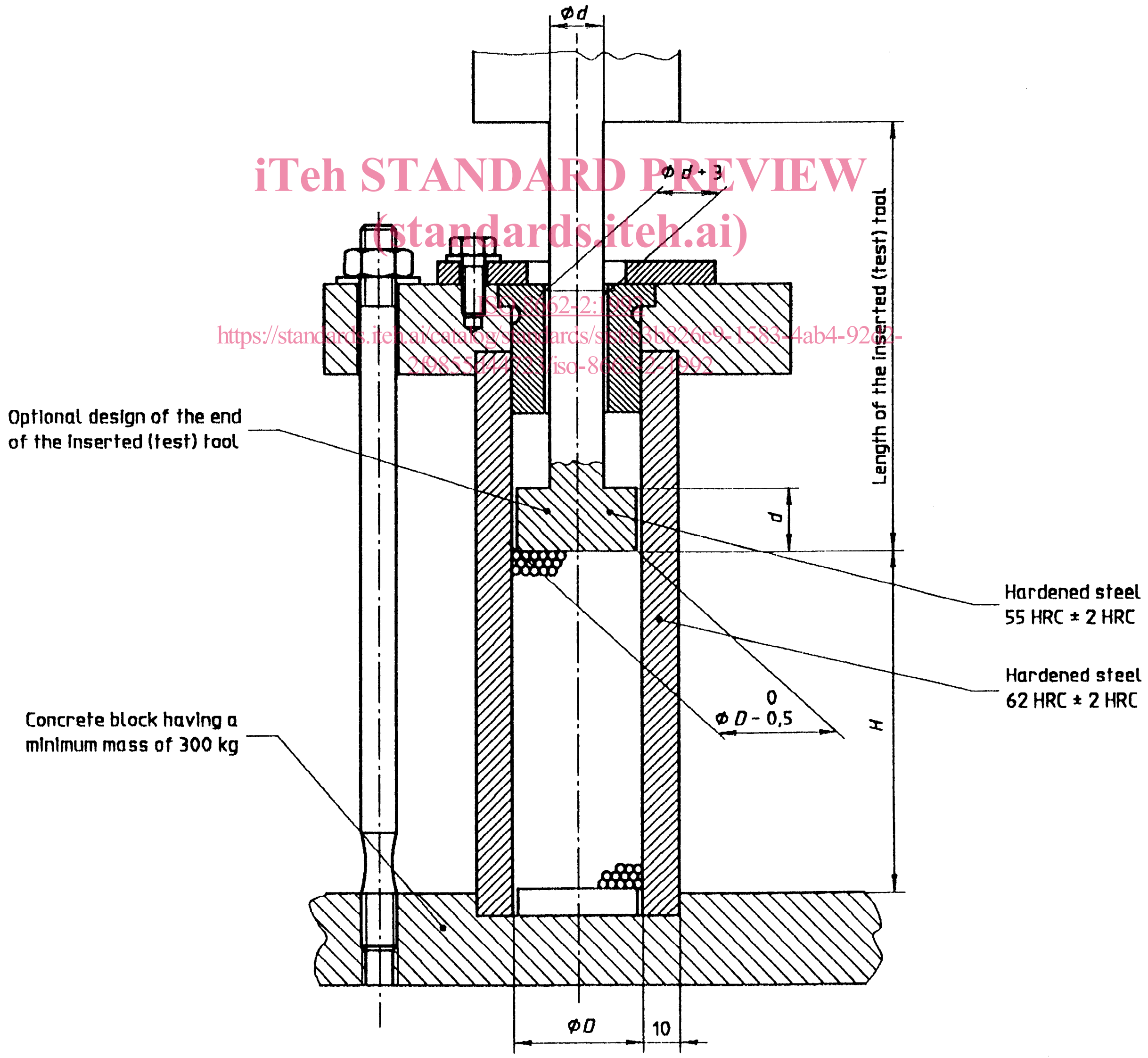

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Figure 3 — Steel ball energy absorber