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

Part 3:

Rock drills and rotary hammers

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

Partie 3: Marteaux perforateurs et marteaux rotatifs



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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.

International Standard ISO 8662-3 was prepared by Technical Committee ISO/TC 118, *Compressors, pneumatic tools and pneumatic machines*, Sub-Committee 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: 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 rock drills and rotary 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 power tool under type test and other requirements for the performance of the type test.

The principle of operation of these power tools is that a drill bit is made to rotate while at the same time energy is converted into periodic impacts which are transmitted to the connection end of the drill bit.

For light rock drills, having a mass (without the drill bit) below 15 kg, and rotary hammers, testing is carried out in a way which closely resembles a typical work situation. Heavy rock drills with a mass above 15 kg have a high penetration rate and the loading device used for the light machines would not be economical. Another type of loading device, a steel ball energy absorber, is used. The method gives an operation similar to that in a real work situation, and since the loading device can be used for a large number of tests the method is economical.

The reproducibility of measurements has been found to be satisfactory for the methods specified in this part of ISO 8662.

In rotary hammers and rock drills the magnitude of the impact energy is determined by the internal design of the tool and is not influenced by external forces. A prerequisite for a stationary operating condition is that a certain minimum static force is applied.

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

Part 3: Rock drills and rotary hammers

1 Scope

This part of ISO 8662 specifies a laboratory method of measuring the vibrations at the handles of hand-held power driven rock drills and rotary 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.

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 for heavy rock drills 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 679:1989, *Methods of testing cements — Determination of strength*.

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 drill bit axis, 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 normal position of the transducer shall be half-way along the length of the handle. On power tools with a closed or open bow grip or a pistol grip, the location of the trigger may make this impossible. In this case the transducer shall be placed as close as possible to the hand, between the thumb and the index finger (see figure 1).

For power tools having two handles, the transducer shall be mounted on the handle without a trigger (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.

During the test the tool shall operate at the rated power, 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).

Performance characteristics, e.g. the rotational speed, of the power tool under test should be adjusted to suit the drill bit used, as specified by the manufacturer.

The drill bit shall rotate during the test.

During the test the workpiece or 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 figures 2 and 3).