

INTERNATIONAL STANDARD

**ISO
7916**

First edition
1989-12-01

Forestry machinery — Portable brush-saws — Measurement of hand-transmitted vibration

*Machines forestières — Débroussailleuses portatives — Mesurage des vibrations
transmises aux mains*



Reference number
ISO 7916 : 1989 (E)
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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7916 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*.

Annex A forms an integral part of this International Standard. Annex B is for information only.

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International Organization for Standardization

Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Forestry machinery — Portable brush-saws — Measurement of hand-transmitted vibration

1 Scope

This International Standard specifies general methods for data acquisition and processing concerning hand-transmitted vibrations induced by portable hand-held, combustion engine brush-saws for use primarily in forestry. The methods are valid irrespective of how the brush-saw is operated during the test, for example, whether it is hand-held or fitted in a stand, and whether it is cutting or not.

This International Standard specifies an operator hand-held procedure for acquisition of vibration data from portable brush-saws.

NOTES

- 1 The hand-arm system exerts an influence on the hand-transmitted vibration, and different hands and grips exert different influences. Therefore, the development of a standardized stand for holding the saw during the measurement is in progress.
- 2 The measurements in the three axes should be made at, or clearly related to, the surface of the hands where the energy enters the body. As the hands of the person are in direct contact with the vibrating surface of the hand grip, the transducer should be fastened to the vibrating structure.

This International Standard is primarily intended for user and manufacturer purposes.

NOTE 3 — For definitions of terms relating to portable brush-saws, see ISO 7112^[1].

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard 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 5349 : 1986, *Mechanical vibration — Guidelines for the measurement and the assessment of human exposure to hand transmitted vibration*.

ISO 8893 : 1989, *Forestry machinery — Portable brush-saws — Engine performance and fuel consumption*.

IEC 651 : 1979, *Sound level meters*.

3 Data acquisition and processing

3.1 Weighted acceleration sum

The acceleration in three perpendicular directions (defined in clause 4) shall be picked up by accelerometers and processed to form an overall vibration value, the weighted acceleration sum ($\bar{a}_{h,w}$) according to figure 1. Mathematically $\bar{a}_{h,w}$ is the mean square of the root (RMS) of the weighted signals from each direction. The weighting filters shall have the characteristics given in ISO 5349. (The definition of the weighting filter is given in annex A.)

NOTES

- 1 The weighted acceleration sum combines the vibrations from all three axes and should not be compared with the single axis value of ISO 5349.
- 2 $\bar{a}_{h,w}$ can be calculated from frequency spectra of 1/3 octave or 1/1 octave with the weighting factors for the mid-frequencies calculated from ISO 5349. (The 1/3 octave analysis will be the most accurate.)
- 3 To obtain more detailed information about the vibration level, the evaluation according to ISO 5349 should be carried out. (The 1/3 octave analysis will give the most detailed information.)
- 4 The three different acceleration directions may be measured at different times, but under the same operating conditions.

3.2 Mass of accelerometers

The total mass of the accelerometer(s) giving the acceleration at one measuring position shall be as low as possible and may not in any case exceed 25 g, including the mounting but excluding the cables.

3.3 Mounting of accelerometers

If a resilient coating is being used between the hand and the vibrating structure (for example, a cushioned handle), it is permissible to use a suitable mount for the transducer (for example, a thin, suitably formed metal sheet) placed between the hand and the surface of the resilient material. In either case, care shall be taken that the size, shape and mounting of the transducer or of the special transducer support do not significantly influence the transfer of vibration to the hand. Care shall also be taken when mounting the transducer that the transfer function is flat up to 1 500 Hz for all three directions.