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**Forestry and gardening machinery —  
Noise test code for portable hand-held  
machines with internal combustion  
engine — Engineering method (Grade 2  
accuracy)**

*Machines forestières et machines de jardin — Code d'essai acoustique  
pour machines portatives tenues à la main à moteur à combustion  
interne — Méthode d'expertise (classe de précision 2)*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22868 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 17, *Manually portable forest machinery*.

This second edition cancels and replaces the first edition (ISO 22868:2005), which has been technically revised. It now also deals with pole-mounted powered pruners, hedge-trimmers and garden blowers/vacuums.

## Introduction

This document is a type-C standard as stated in ISO 12100.<sup>1)</sup>

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

During the first steps in the preparation of this International Standard it became obvious that the repeatability of the test results could become better if the operator were to be replaced by a simulation process, representing the normal operating modes with chain-saws and trimmers/brush-cutters. Furthermore, it was found that the cutting process performed with chain-saws causes considerable deviations, which are not related to the measured object but to the test procedure itself.

Based on these observations, it was concluded that the operators in both test procedures, i.e. for chain-saws and trimmers/brush-cutters, ought to be replaced by a defined fixture and the cutting process with chain-saws by a brake simulating the load. In this manner, the operating conditions during measurement would simulate normal operating conditions.

The determination of noise emission characteristics is primarily intended for

- manufacturers' declarations of noise emitted,
- comparing the noise emitted by machines in the family concerned, and
- purposes of noise control at source at the design stage.

The use of this noise test code will ensure reproducibility of the determination of the noise emission characteristics within specified limits determined by the grade of accuracy of the basic noise measurement method used. Noise measurement methods allowed by this International Standard give results with Grade 2 accuracy.

The operating modes specified for the tests are consistent with those involved in the assessment of the exposure sound pressure levels, for example, over a typical working day.

**NOTE** Exposure sound pressure levels are the mean sound pressure levels experienced by the operator over a defined period of time.

The work cycles chosen for this test code are based on the following considerations of application:

- a) chain-saws with an engine of  $< 80 \text{ cm}^3$  are used for various operations, including felling, bucking and delimbing;
- b) chain-saws with an engine of  $\geq 80 \text{ cm}^3$  are normally used for felling and bucking.

Delimbing will cause the saw to run at racing speed; therefore, racing is included only for saws with a  $< 80 \text{ cm}^3$  engine.

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1) *Safety of machinery — General principles for design — Risk assessment and risk reduction.*

For brush-cutters, grass-trimmers, hedge-trimmers and pole-mounted powered pruners, the cutting mode (full load) is estimated to be valid only for short periods, while racing and idling are the two dominant modes. Moreover, it has also been found to be diverse and not able to be performed under repeatable conditions.

For trimmers, the full load and the racing modes are integrated in one single mode due to the loading effect of the flexible line.

For brush-cutters, hedge-trimmers and pole-mounted powered pruners, it is not possible to simulate the full load mode in a feasible way since there are no constant load conditions comparable to chain-saws. Since the operating mode "racing" is anyhow the worst case, it is used as representative.

For garden blowers, full load and idling are the two dominant modes.

In either case, transport and other tasks between operations will cause the machine to run at idling. Experience has led to the conclusion that, except for hedge-trimmers and blowers, equal duration for the different working modes is a good estimation of daily exposure.

For hedge-trimmers, experience has shown that the machine is used 1/5 at idling and 4/5 at racing, while for garden blowers it is used 1/7 at idling and 6/7 at racing.

A summary of results from "round robin" tests, carried out between 2007 and 2008 in up to eight test laboratories on a single chain-saw, brush-saw and grass-trimmer, is given in Annex G.

# Forestry and gardening machinery — Noise test code for portable hand-held machines with internal combustion engine — Engineering method (Grade 2 accuracy)

**CAUTION** — Some of the test procedures specified in this International Standard involve processes that could lead to a hazardous situation. Any person performing tests in accordance with this International Standard shall be appropriately trained in the type of work to be carried out.

## 1 Scope

This International Standard specifies a noise test code for determining, efficiently and under standardized conditions, the noise emission characteristics of portable, hand-held, combustion-engine-powered forest and garden machines, including chain-saws, brush-cutters, grass-trimmers, pole-mounted powered pruners, hedge-trimmers and garden blowers/vacuums. Noise emission characteristics include the A-weighted emission sound pressure level at the operator position and the A-weighted sound power level.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 354, *Acoustics — Measurement of sound absorption in a reverberation room*

ISO 3744, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane*

ISO 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment*

ISO 6531, *Machinery for forestry — Portable chain-saws — Vocabulary*

ISO 7112, *Machinery for forestry — Portable brush-cutters and grass-trimmers — Vocabulary*

ISO 7293, *Forestry machinery — Portable chain saws — Engine performance and fuel consumption*

ISO 8893, *Forestry machinery — Portable brush-cutters and grass-trimmers — Engine performance and fuel consumption*

ISO 11201, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections*

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*