



**International  
Standard**

**ISO 20599**

**Manually portable (hand-held)  
powered lawn and garden  
equipment and forest machinery —  
Engine performance and fuel  
consumption**

*Matériel pour jardins et pelouses et matériel forestier portatifs à  
main à moteur — Performance du moteur et consommation de  
carburant*

**First edition  
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 17, *Manually portable (hand-held) powered lawn and garden equipment and forest machinery*.

This first edition of ISO 20599 cancels and replaces ISO 7293:2021 and ISO 8893:2021, which have been technically revised.

The main changes are as follows: [standards/iso/97f74131-aca7-4990-a884-548deafa8631/iso-20599-2024](https://www.iso.org/standards/iso/97f74131-aca7-4990-a884-548deafa8631/iso-20599-2024)

— the requirements have been combined into a single International Standard.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Manually portable (hand-held) powered lawn and garden equipment and forest machinery — Engine performance and fuel consumption

## 1 Scope

This document specifies a method for testing the performance and fuel consumption of internal combustion engines used to power manually portable (hand-held) powered lawn and garden equipment and forest machinery, for example, chain-saws, hedge trimmers, brush-cutters, grass-trimmers, pole-mounted pruners, and edgers.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 6531, *Machinery for forestry — Portable chain-saws — Vocabulary*

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

ISO 5163, *Petroleum products — Determination of knock characteristics of motor and aviation fuels — Motor method*

ISO 5164, *Petroleum products — Determination of knock characteristics of motor fuels — Research method*

ISO 10517, *Powered hand-held hedge trimmers — Safety*

ISO 11680-1, *Machinery for forestry — Safety requirements and testing for pole-mounted powered pruners — Part 1: Machines fitted with an integral combustion engine*

ISO 11681-1, *Machinery for forestry — Portable chain-saw safety requirements and testing — Part 1: Chain-saws for forest service*

ISO 11789, *Powered edgers with rigid cutting means — Definitions, safety requirements and test procedures*

ISO 11806-1, *Agricultural and forestry machinery — Safety requirements and testing for portable, hand-held, powered brush-cutters and grass-trimmers — Part 1: Machines fitted with an integral combustion engine*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6531, ISO 7112, ISO 10517, ISO 11680-1, ISO 11681-1, ISO 11789 and ISO 11806-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

## 4 Accuracy of measurements

The following accuracy of measurements apply:

- a) Torque:  $\pm 2$  % of measured torque. The torque measuring system shall be calibrated to take friction losses into account.
- b) Engine speed:  $\pm 2$  % of measured speed.
- c) Fuel consumption:  $\pm 2$  % of measured consumption.
- d) Fuel temperature:  $\pm 2$  °C.
- e) Engine inlet air temperature:  $\pm 2$  °C.
- f) Barometric pressure:  $\pm 100$  Pa.

## 5 Correction factors

### 5.1 General

An engine's torque, power and fuel consumption will vary based on ambient temperature and pressure conditions. To address test variances, this clause prescribes allowable test atmospheric conditions and establishes a correction factor coefficient. This correction factor coefficient correlates the test atmospheric conditions to reference atmospheric conditions. The test atmospheric conditions are specified in [5.2](#). The reference atmospheric conditions and the calculation of the correction factor are specified in [5.3](#).

The corrected torque can be calculated using [Formula \(1\)](#):

$$T_o = \alpha T \quad (1)$$

where

$\alpha$  is the correction factor;

$T_o$  is the corrected torque (i.e. power under reference atmospheric conditions);

$T$  is the measured torque (test torque).

The corrected power can be calculated using [Formula \(2\)](#):

$$P_o = \alpha P \quad (2)$$

where

$P_o$  is the corrected power (i.e. power under reference atmospheric conditions);

$\alpha$  is the correction factor;

$P$  is the power calculated from the measured torque (test power).

The corrected specific fuel consumption may be calculated using [Formula \(3\)](#):

$$F_{SCo} = F_C / P_o \quad (3)$$