

---

---

**Machinery for forestry — Portable chain-  
saws — Safety requirements and testing —  
Part 2:  
Chain-saws for tree service**

**iTeh STANDARD PREVIEW**  
*Matériel forestier — Scies à chaîne portatives — Exigences de sécurité et  
essais —  
(standards.iteh.ai)  
Partie 2: Scies à chaîne pour l'élagage des arbres*

[ISO 11681-2:1998](https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998)

[https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-  
5b4caf57ab8c/iso-11681-2-1998](https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998)



## Content

1 Scope .....	1
2 Normative references .....	1
3 Definitions .....	2
4 Safety requirements .....	3
4.1 Handles .....	3
4.2 Hand protection .....	3
4.2.1 Protection at the front handle.....	3
4.2.2 Protection at the rear handle .....	4
4.3 Balance .....	4
4.4 Protection against injury by kickback .....	4
4.5 Chain catcher .....	5
4.6 Spiked bumper .....	5
4.7 Chip discharge .....	5
4.8 Guide-bar cover .....	5
4.9 Noise emission.....	5
4.10 Vibration .....	5
4.11 Throttle trigger .....	5
4.12 Engine-stopping device .....	6
4.13 Protection against contact with parts under high voltage .....	6
4.14 Clutch.....	6
4.15 Carburettor adjustment.....	6
4.16 Protection against contact with hot parts.....	6
4.17 Exhaust gases.....	6

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 11681-2:1998  
<https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998>

© ISO 1998

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization  
Case postale 56 • CH-1211 Genève 20 • Switzerland  
Internet central@iso.ch  
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

Printed in Switzerland

4.18 Chain lubrication .....	7
4.19 Tank openings .....	7
4.20 Chain tensioning.....	7
4.21 Attachment point .....	7
5 Verification of safety requirements.....	7
6 Information for use .....	9
6.1 General .....	9
6.2 Technical data.....	9
6.3 Instruction handbook.....	10
6.4 Marking .....	12
Annex A (normative) List of hazards .....	13
Annex B (normative) Minimum handle clearance and sizes.....	16
Annex C (normative) Determination of holding moment .....	19

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

[ISO 11681-2:1998](https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998)

<https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998>

## 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 11681-2 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 17, *Manually portable forest machinery*.

ISO 11681 consists of the following parts, under the general title *Machinery for forestry — Portable chain-saws — Safety requirements and testing*:

— *Part 1: Chain-saws for normal forestry work*

— *Part 2: Chain-saws for tree service.*

Annexes A, B and C form an integral part of this part of ISO 11681.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO 11681-2:1998](https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998)

<https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998>

## Introduction

This part of ISO 11681 has been prepared for a special type of chain-saws used by trained persons for tree service work up in trees.

This part of ISO 11681 differs from ISO 11681-1<sup>1)</sup> as follows:

- clause 1: the tree service chain-saws are limited in size by a maximum engine displacement of 40 cm<sup>3</sup>;
- clause 3: definitions for tree service chain-saw, attachment point and vibration isolation system have been added;
- subclause 4.1: the required handle dimensions have been altered;
- subclause 4.3: a requirement for maximum allowed holding moment has been added;
- subclause 4.4: requirements have been added that the non-manual chain brake system meet the requirement in ISO 13772 and that the allowed kickback angle be reduced to 30°;
- subclause 4.6: a permanently fixed spiked bumper is excluded;
- subclauses 4.9 and 4.10: the achievable values for noise and vibration have been deleted and replaced by a note concerning the need for a future development of "state of the art" values;
- subclause 4.12: the requirement has been modified to be valid for an engine-stopping device (instead of an ignition switch);
- subclause 4.13: the requirement for protection from contact with parts under high voltage has been enlarged to include a requirement for an ignition interruption or short-circuiting device on the low voltage side and a method to verify, by inspection and use of a finger probe, the protection of the operator from unintentional contact with parts under high voltage;
- subclause 4.16: the requirement for protection from hot parts has been enlarged to all parts of the machine and a reference to EN 563 has been added;
- subclause 4.18: the requirement has been clarified to be valid when holding the saw in both handles (normal operating position);
- subclause 4.21: a requirement for an attachment point has been added
- subclause 6.2: additional information is required;
- subclause 6.3: new safety warnings have been added;
- subclause 6.4: new markings on the saw are required.

Machinery is to comply as appropriate with ISO/TR 12100 for hazards which are not covered by this part of ISO 11681.

---

<sup>1)</sup> Equivalent to EN 608:1994.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 11681-2:1998

<https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998>

# Machinery for forestry — Portable chain-saws — Safety requirements and testing —

## Part 2: Chain-saws for tree service

### 1 Scope

This part of ISO 11681 specifies safety requirements and their verification for the design and construction of portable combustion-engined, hand-held chain-saws for tree service, designed for use by one operator (see figure 1).

It is applicable to chain-saws with a maximum engine displacement of 40 cm<sup>3</sup>. These chain-saws are only intended to be used for tree service operation by an operator working up in trees.

It describes methods for the elimination or reduction of hazards arising from their use. In addition it specifies the type of information on safe working practices to be provided by the manufacturer. It does not, however, give any technical requirement to reduce noise and vibration hazards. Indeed, the different means available to reduce these hazards are a matter for the technical aids to which the manufacturer may resort, through specialized books or specific bodies.

The list of significant hazards which require action to reduce the risk is given in annex A.

The environmental aspects are not covered.

This part of ISO 11681 is primarily applicable to machines which are manufactured after the date publication.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 11681. 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 11681 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 7182:1984, *Acoustics — Measurement at the operator's position of airborne noise emitted by chain-saws.*<sup>2)</sup>

ISO 3767-5:1992, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 5: Symbols for manual portable forestry machinery.*

ISO 3864:1984, *Safety colours and safety signs.*

ISO 6531:—<sup>3)</sup>, *Machinery for forestry — Portable hand-held chain-saws — Vocabulary.*

ISO 6533:1993, *Forestry machinery — Portable chain-saw front hand-guard — Dimensions.*

<sup>2)</sup> Equivalent to EN 27182:1991.

<sup>3)</sup> To be published. (Revision of ISO 6531:1982)

ISO 6534:1992, *Portable chain-saws — Hand-guards — Mechanical strength.*

ISO 6535:1991, *Portable chain-saws — Chain brake performance.*

ISO 7293:1997, *Forestry machinery — Portable chain-saws — Engine performance and fuel consumption.*

ISO 7505:1986, *Forestry machinery — Chain saws — Measurement of hand-transmitted vibration.*

ISO 7915:1991, *Forestry machinery — Portable chain-saws — Determination of handle strength.*

ISO 8334:1985, *Forestry machinery — Portable chain-saws — Determination of balance.*

ISO 9207:1995, *Manually portable chain-saws with internal combustion engine — Determination of sound power levels — Engineering method (grade 2).*

ISO 9518:—<sup>4)</sup>, *Forestry machinery — Portable chain-saws — Kickback test.*

ISO 10726:1992, *Portable chain-saws — Chain catcher — Dimensions and mechanical strength.*

ISO/TR 12100-1:1992, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology.*<sup>5)</sup>

ISO/TR 12100-2:1992, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications.*<sup>6)</sup>

ISO 13772:1997, *Forestry machinery — Portable chain-saws — Non-manually actuated chain brake performance.*

IEC 60335-1:1991, *Safety of household and similar electrical appliances — Part 1: General requirements.*

EN 563:1994, *Safety of machinery — Temperatures of touchable surfaces — Ergonomics data to establish temperature limit values for hot surfaces.*

<https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998>

### 3 Definitions

For the purposes of this part of ISO 11681, the definitions given in ISO 6531 and the following apply.

#### 3.1 chain-saw for tree service

chain-saw with a limited engine displacement, specially designed for use by trained tree service workers only when working up in trees

#### 3.2 attachment point

suspension point located behind or within the rear handle, which allows for the attachment of a safety strap, carabiner or rope, as appropriate

#### 3.3 vibration isolation system

set of components (for example elastic buffers, springs) designed to reduce the transmission of vibrations generated by the engine and the cutting attachments, to the hands of the operator

NOTE — Certain commonly used terms relating to chain-saws for tree service are given in figure 1.

---

<sup>4)</sup> To be published. (Revision of ISO 9518:1992)

<sup>5)</sup> Equivalent to EN 292-1:1991.

<sup>6)</sup> Equivalent to EN 292-2:1991.



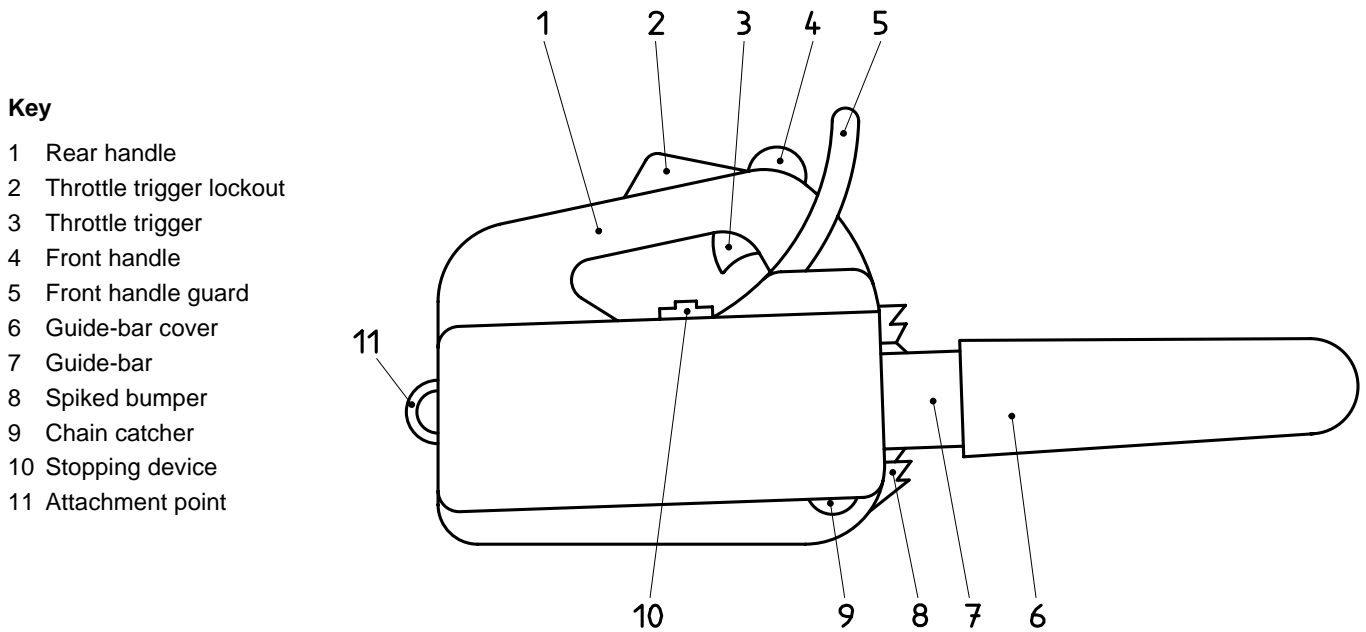


Figure 1 — Chain-saw for tree service

## 4 Safety requirements

The safe running of chain-saws depends on both the safety requirements as described in this clause and the safe environment associated with the use of personal protection equipment such as gloves, leg protection, boots, as well as eye and ear protection equipment. For protective clothing see EN 381<sup>7)</sup>.

<https://standards.iteh.ai/catalog/standards/sist/0599a1f1-323f-4f60-9a58-5b4caf57ab8c/iso-11681-2-1998>

### 4.1 Handles

Chain-saws shall have a handle for each hand. These handles shall be designed so that they can be fully gripped by an operator when wearing protective gloves, provide the necessary sureness of grip by their shaping and surface and conform to the dimensions and clearances given in annex B.

The strength of both handles shall comply with ISO 7915.

The operator shall be able to stop the chain-saw with the stopping device (see 4.12) even in case of failure in the vibration isolation system.

### 4.2 Hand protection

#### 4.2.1 Protection at the front handle

A guard shall be fitted in the vicinity of the front handle (see figure 1), to protect the operator's fingers from injury by contact with the saw chain.

The dimensions of this front hand-guard shall comply with ISO 6533. Its strength shall comply with ISO 6534.

<sup>7)</sup> EN 381 (all parts), *Protective clothing for users of hand-held chainsaws.*

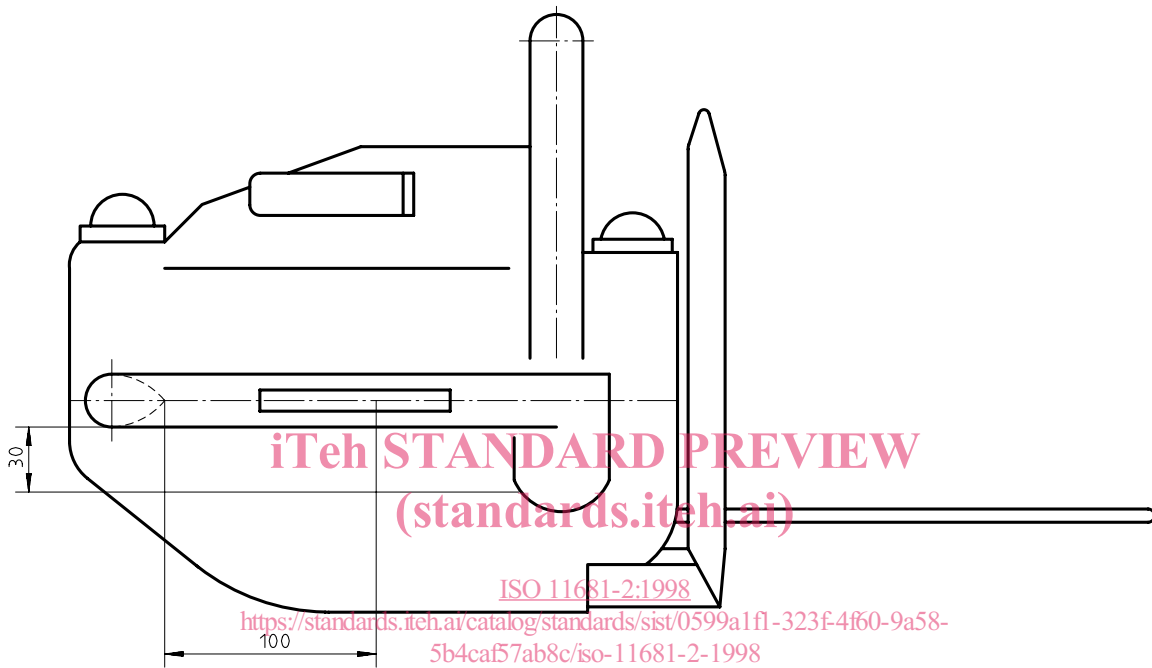
**4.2.2 Protection at the rear handle**

Hand protection shall be provided along the length of the right side of the bottom of the rear handle. This protection shall extend from the right edge of the handle for at least 30 mm at the guide-bar side and at least 100 mm lengthwise (see figure 2).

This protection can also be provided by parts of the saw.

The strength of the rear hand-guard shall comply with ISO 6534.

Dimensions in millimetres



**Figure 2 — Minimum dimensions of protection at the rear handle**

**4.3 Balance**

The chain-saw shall be balanced when fitted with the manufacturer's recommended guide-bars. The balance shall be tested in accordance with ISO 8334. The maximum angle of the guide-bar shall not exceed 30° above and below the horizontal plane.

The holding moment to hold the chain-saw in a sideways position shall be 7 Nm maximum when determined in accordance with annex C.

**4.4 Protection against injury by kickback**

**4.4.1** The chain-saw shall be fitted with a chain brake. It shall be possible to activate the chain brake manually by means of the front hand-guard.

There shall also be a non-manual chain brake activation system which activates the chain brake when kickback occurs. This system shall comply with ISO 13772.

The computed kickback angle and chain stop angle shall be determined with cutting attachments recommended by the manufacturer and in accordance with ISO 9518.

The computed kickback angle or chain stop angle, whichever is less, shall not exceed 30°.

**4.4.2** The chain brake release force shall be between 20 N and 60 N.

The average braking time shall not exceed 0,12 s and the maximum braking time shall not exceed 0,15 s.

Measurements of release force and braking times shall be carried out in accordance with ISO 6535.

#### 4.5 Chain catcher

The chain-saw shall be fitted with a chain catcher that conforms to the dimensions and strength requirements of ISO 10726.

#### 4.6 Spiked bumper

The chain-saw shall have provision to mount a spiked bumper.

#### 4.7 Chip discharge

The chain-saw shall be designed so that wood particles are directed below the underside of the saw when it is in upright position.

#### 4.8 Guide-bar cover

The chain-saw shall be provided with a guide-bar cover for safe transport (see figure 1).

#### 4.9 Noise emission

The time-averaged emission sound pressure levels at the operator's ear shall be measured in accordance with ISO 7182.

NOTE 1— The sound power levels are for information purposes and will appear in the instruction handbook (see 6.2).

The sound power levels from the chain-saw shall be measured in accordance with ISO 9207.

NOTE 2— It is the intention of ISO/TC 23/SC 17 to collect noise and vibration values, for each machine type, in accordance with relevant measurement standards. These values will be used to define the "state of the art" levels based on principles to be established by SC 17. The interaction of noise and vibration on the machine characteristics will be assessed. The relationship between "state of the art" values and exposure limits will also be considered. For interim noise and vibration values, reference is made to ISO 11681-1.

#### 4.10 Vibration

The weighted acceleration sum shall be measured and calculated in accordance with ISO 7505.

NOTE — It is the intention of ISO/TC 23/SC 17 to collect noise and vibration values, for each machine type, in accordance with relevant measurement standards. These values will be used to define the "state of the art" levels based on principles to be established by SC 17. The interaction of noise and vibration on the machine characteristics will be assessed. The relationship between "state of the art" values and exposure limits will also be considered. For interim noise and vibration values, reference is made to ISO 11681-1.

#### 4.11 Throttle trigger

A chain-saw shall be provided with a throttle trigger that, when released, automatically reverts to the idling position and is retained in that position by the automatic engagement of a throttle trigger lock-out.

The throttle trigger shall be positioned so that it can be pressed and released with a gloved hand while holding the rear handle.

The throttle control linkage shall be so designed that a force equal to three times the weight of the chain-saw unit (without cutting attachment and with empty tanks), applied on the rear handle in any direction, shall not increase the engine speed to a point where the clutch engages and chain movement begins.

If a throttle lock is provided for cold starting, it shall be such that the lock has to be set manually and is automatically released when the throttle trigger is operated.