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**Protective clothing for users of hand-held chainsaws —**

**Part 4:  
Performance requirements and test  
methods for protective gloves**

**iTeh STANDARD PREVIEW**  
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*Vêtements de protection pour utilisateurs de scies à chaîne tenues à la main —*

*Partie 4: Exigences de performance et méthodes d'essai pour les gants de protection*

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Published in Switzerland

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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 documents 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)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html). (standards.iteh.ai)

This document was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 162, *Protective clothing including hand and arm protection and lifejackets*, in collaboration with ISO Technical Committee TC 94, *Personal safety – Personal protective equipment*, Subcommittee SC 13, *Protective clothing*, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 11393-4:2003), which has been technically revised. The main changes compared to the previous edition are as follows:

- in the Introduction, the term “hand-held chainsaws primarily constructed for cutting wood” has been added;
- the normative references have been updated;
- the terms and definitions 3.11, 3.12 and 3.13 have been added;
- in Clause 4, two types have been defined and 4.4 has been added;
- in 5.1, Table 3 has been revised;
- the original Clause 7 has been deleted and a new Clause 7 has been specified;
- in Clause 8, 8.2.2 has been added and 8.3 has been revised;
- in 9.2, a test procedure has been added;
- in 5.4 and Clauses 6, 8, 10, 11 and 12 the definitions have been specified;
- A.4 has been added.

A list of all parts in the ISO 11393 series can be found on the ISO website.

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).

## Introduction

This document forms part of a series concerned with personal protective equipment (PPE) designed to protect against the risks arising from the use of hand-held chainsaws primarily constructed for cutting wood.

In some areas of work with chainsaws, one third of injuries occur to the hands. However, with different working practices few hand injuries occur. Accidents occur due to a number of complex reasons, but a common factor is incorrect use of the chainsaw. The importance of correct training and proper use of a chainsaw in preventing accidents cannot be underestimated.

In some countries, chainsaw users adopt working practices that, together with training, make the use of chainsaw protective gloves unnecessary. These usually include the instruction to hold the chainsaw with both hands and to use the chain brake if it becomes necessary to stop cutting and clear away branches, etc.

All parts of the hand (palm, back and fingers) have been shown to be at risk when using a chainsaw. It is generally accepted for ergonomic and health and safety reasons that protecting the palm and the underside of the fingers is not practicable. Neither is it possible to adequately protect the back of the fingers unless a mitt is used. In this document, specifications for the protective coverage and performance of the back of the right-hand glove and the left-hand glove are given.

For certain operations, such as tree surgery from lifts or platforms, chainsaw operators may be assisted by other workers who also require protection from the chainsaw, particularly for their hands. The gloves specified in this document are suitable for these workers too.

Further information is provided in [Annex A](#) on risk analysis, glove ergonomics and selection.

No PPE can ensure a 100 % protection against cutting from a hand-held chainsaw. Nevertheless, experience has shown that it is possible to design PPE that offers a certain degree of protection. As far as is known, all chainsaws are designed for right-handed use and, therefore, all protective clothing designs and requirements have assumed right-handed use. Protection may not be adequate for left-handed use.

Different functional principles may be applied in order to give protection. These include:

- a) chain slipping: on contact the chain does not cut the material;
- b) clogging: fibres are drawn by the chain into the drive sprocket and block chain movement;
- c) chain braking: fibres have a high resistance to cutting and absorb rotational energy, thereby reducing the chain speed.

Often more than one principle is applied in chainsaw protective clothing. It should be noted, however, that none has yet been shown to be fully effective in gloves.

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# Protective clothing for users of hand-held chainsaws —

## Part 4: Performance requirements and test methods for protective gloves

### 1 Scope

This document specifies the performance requirements, test methods, design requirements, identification and marking information for gloves that offer protection against cutting by hand-held chainsaws.

Guidance on chainsaw use and the selection of gloves is given in [Annex A](#).

### 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 7000, *Graphical symbols for use on equipment — Registered symbols*

ISO 11393-1:2018, *Protective clothing for users of hand-held chainsaws — Part 1: Test rig driven by a flywheel for testing resistance to cutting by a chainsaw*

EN 388:2016, *Protective gloves against mechanical risks*

EN 420:2009, *General requirements for gloves*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions 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 <http://www.electropedia.org/>

#### 3.1 back of the hand

posterior surface of the hand between the wrist and the fingers

#### 3.2 chainsaw protective glove

product that protects the *back of the hand* (3.1) against cutting by a hand-held chainsaw

#### 3.3 crotch

deepest point between two fingers

#### 3.4 cuff

portion of a glove that covers the wrist

3.5

**cut-through**

any visible change on the underside of the innermost layer of the test sample caused by the saw chain

3.6

**digit**

anatomical designation for fingers and thumb, where digit 1 is the thumb, digit 2 is the index finger, digit 3 is the middle finger, digit 4 is the ring finger and digit 5 is the little finger

3.7

**five-finger glove**

glove covering both the back and palm of the hand and wrist, and having separate individual coverings for all *digits* (3.6)

3.8

**line of longest length of the glove**

perpendicular line joining the seam of the *cuff* (3.4) across the back of the glove (or equivalent position if no seam is present) with the tip of digit 3 (or equivalent position in a *mitt* (3.9) or one-finger mitt)

3.9

**mitt**

glove covering both the back and the palm of the hand and wrist, and having a separate covering of digit 1 and a common covering for the other four *digits* (3.6)

3.10

**protective coverage**

area of the glove that is covered by *protective material* (3.11)

3.11

**protective material**

material that is designed to protect the wearer against the cutting effect of a hand-held chainsaw

Note 1 to entry: The protective material may include the outer fabric of the glove.

3.12

**specified protective area**

required *protective coverage* (3.10)

3.13

**three-finger mitt**

glove covering both the back and palm of the hand and wrist, and having a separate covering for digit 1, a separate covering for digit 2 and a common covering for the remaining *digits* (3.6)

## 4 Designs and types

### 4.1 Designs and types of gloves

Two different types of gloves are specified by this document. Type 1 gloves include cut protection against cutting by hand-held chainsaws in both right- and left-hand gloves. Type 2 gloves include protection against cutting by hand-held chainsaws in the left-hand glove only; the right-hand glove doesn't include protection against hand-held chainsaws.

Within those types, two designs of chainsaw protective gloves are considered: design A and design B. Design A and design B have different specified protective areas as defined in 4.2 and 4.3, respectively.



## 4.2 Design A

### 4.2.1 Description

Design A describes five-finger gloves with chainsaw protection at the metacarpus, but without chainsaw protection in the fingers and thumb.

### 4.2.2 Specified protective area, left- and right-hand gloves

The specified protective area is shown in [Figure 1](#).

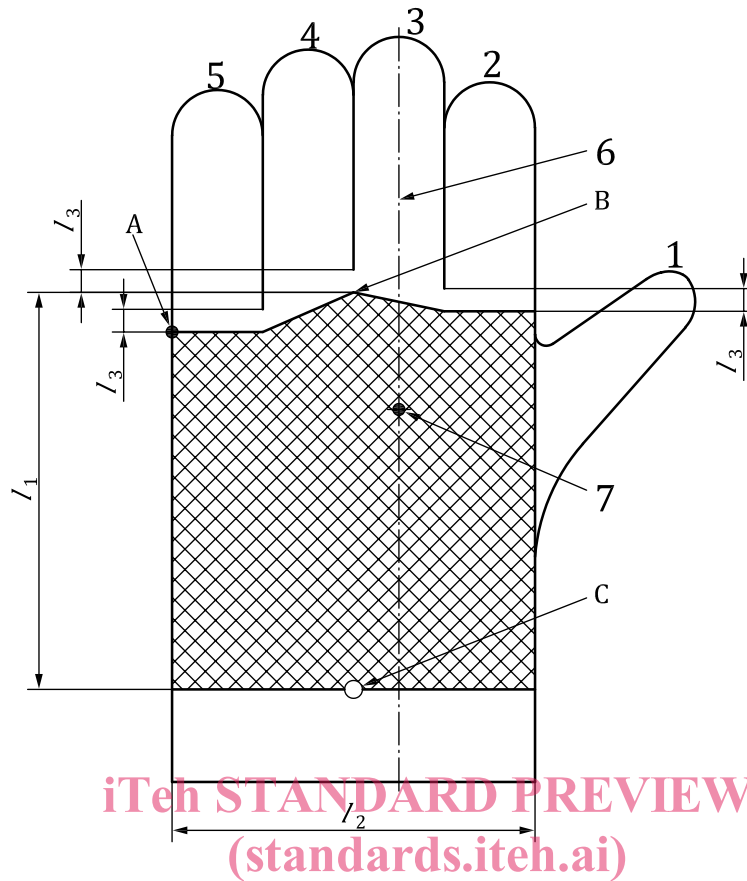
[Figure 1](#) shows a left-hand glove. The specified protective area for a right-hand glove is the mirror image to [Figure 1](#). The design A protected area shall cover the entire width of the back of the hand, including both the knuckles and the wrist. [Table 1](#) contains minimum values for dimensions  $l_1$  and  $l_2$ , and the maximum value for dimension  $l_3$ .

The dimensions shall be measured according to [Clause 7](#), after the glove has been cleaned according to the manufacturer's instructions.

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**Key**

- 1 to 5 numbers of the digits
- 6 line of longest length
- 7 midpoint of the line of longest length from a fingertip to the cuff seam
- $l_1$  minimum length of protective material measured parallel to the long axis
- $l_2$  minimum width of the protective material up to point A measured 90° to the long axis
- $l_3$  maximum distance from a crotch to the edge of the protective material
- A edge of the protective material at the outside in a level of crotch between digit 4 and 5 minus  $l_3$
- B crotch between digits 3 and 4 minus  $l_3$
- C beginning of the protective area nearest to the cuff shaded area is protective material

NOTE See [Table 1](#) for dimensions.

**Figure 1 — Design A, specified protective area left-hand glove (back uppermost)**

**Table 1 — Requirements for dimensions of zone of protection for design A gloves**

Dimension	Glove size as described in EN 420:2009					
	6	7	8	9	10	11
$l_1$	≥105 mm	≥110 mm	≥115 mm	≥120 mm	≥125 mm	≥130 mm
$l_2$	≥80 mm	≥90 mm	≥100 mm	≥110 mm	≥120 mm	≥130 mm
$l_3$	≤8 mm	≤8 mm	≤8 mm	≤8 mm	≤8 mm	≤8 mm

### 4.3 Design B

#### 4.3.1 Description

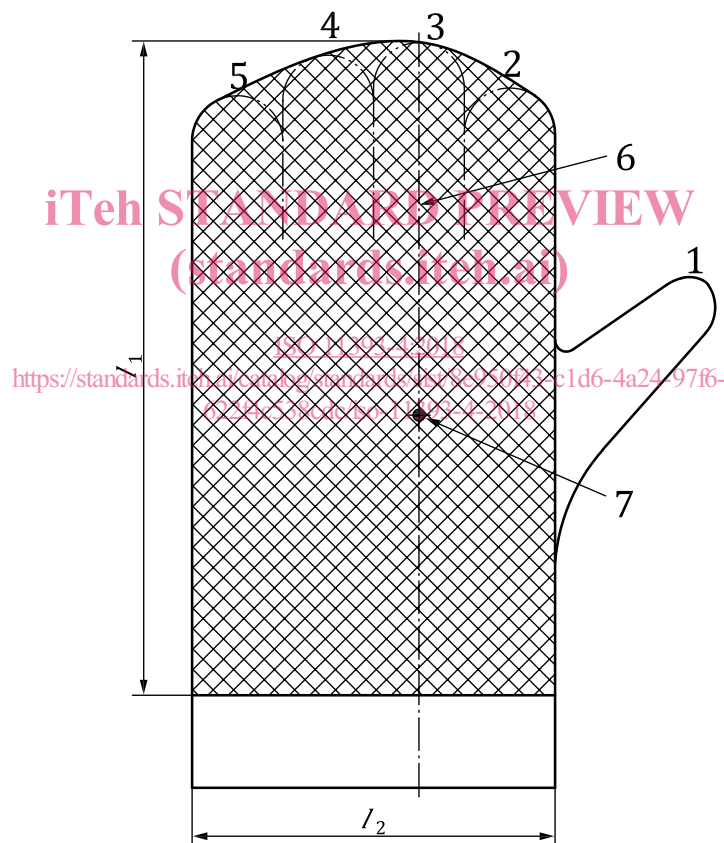
Design B describes protective gloves (five-finger gloves or mitts, or three-finger mitts) with specific chainsaw protection as in design A plus protection at the back of the fingers, but not at the thumb.

#### 4.3.2 Specified protective area, left- and right-hand gloves or mitts

The specified protective area is shown in [Figure 2](#).

[Figure 2](#) shows a left-hand mitt. The specified protective area for a right-hand mitt is the mirror image of [Figure 2](#). The design B protective area shall cover the entire width of the back of the hand, and cover both the backs of the fingers and the wrists. The minimum dimensions of the protective area are shown in [Table 2](#).

The dimensions shall be measured according to [Clause 7](#), after the glove or mitt has been cleaned according to the manufacturer's instructions.



#### Key

- 1 to 5 numbers of the digits
- 6 line of longest length
- 7 midpoint of the line of longest length from a fingertip to the cuff seam
- $l_1$  minimum length of protective material measured parallel to the long axis
- $l_2$  minimum width of the protective material 90° to the long axis shaded area is protective material

NOTE See [Table 2](#) for dimensions.

**Figure 2 — Design B, protective area left-hand glove or mitt (back uppermost)**