

---

---

**Personal protective equipment —  
Safety footwear**

*Équipement de protection individuelle — Chaussures de sécurité*

**iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview**

[ISO 20345:2021](#)

<https://standards.iteh.ai/catalog/standards/iso/06c42dbd-99ab-4abf-9690-e5a1b55c8491/iso-20345-2021>



Reference number  
ISO 20345:2021(E)

© ISO 2021

# iTeh Standards

## (<https://standards.iteh.ai>)

### Document Preview

[ISO 20345:2021](#)

<https://standards.iteh.ai/catalog/standards/iso/06c42dbd-99ab-4abf-9690-e5a1b55c8491/iso-20345-2021>



#### COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b>	<b>v</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>1</b>
<b>4 Classification and designs</b>	<b>8</b>
<b>5 Basic requirements for safety footwear</b>	<b>9</b>
5.1 General	9
5.2 Design	12
5.2.1 General	12
5.2.2 Height of upper	12
5.2.3 Heel area	12
5.3 Whole footwear	13
5.3.1 Constructional performance	13
5.3.2 Toe protection	13
5.3.3 Leak proofness	15
5.3.4 Specific ergonomic features	15
5.3.5 Slip resistance	15
5.3.6 Innocuousness	16
5.3.7 Seam strength	16
5.4 Upper	16
5.4.1 General	16
5.4.2 Thickness	17
5.4.3 Tear strength	17
5.4.4 Tensile properties	18
5.4.5 Flexing resistance	18
5.4.6 Water vapour permeability and coefficient	18
5.4.7 Resistance to hydrolysis	18
5.5 Lining	19
5.5.1 General	19
5.5.2 Tear strength	19
5.5.3 Abrasion resistance	19
5.5.4 Water vapour permeability and coefficient	19
5.6 Tongue	19
5.6.1 General	19
5.6.2 Tear strength	20
5.7 Insole, insock and footbed	20
5.7.1 Thickness	20
5.7.2 Water permeability	20
5.7.3 Water absorption and desorption	20
5.7.4 Abrasion resistance	20
5.8 Outsole	20
5.8.1 General	20
5.8.2 Design	21
5.8.3 Tear strength	21
5.8.4 Abrasion resistance	21
5.8.5 Flexing resistance	22
5.8.6 Resistance to hydrolysis	22
5.8.7 Interlayer bond strength	22
<b>6 Additional requirements for safety footwear</b>	<b>22</b>
6.1 General	22
6.2 Whole footwear	24
6.2.1 Perforation resistance	24

6.2.2	Electrical properties.....	26
6.2.3	Resistance to inimical environments.....	26
6.2.4	Energy absorption of seat region.....	26
6.2.5	Water resistance.....	27
6.2.6	Metatarsal protection.....	27
6.2.7	Ankle protection.....	27
6.2.8	Cut resistance.....	28
6.2.9	Scuff cap abrasion.....	28
6.2.10	Slip resistance.....	28
6.3	Upper — Water penetration and absorption.....	29
6.4	Outsole.....	29
6.4.1	Resistance to hot contact.....	29
6.4.2	Resistance to fuel oil.....	29
6.4.3	Ladder grip.....	29
7	<b>Marking.....</b>	<b>29</b>
8	<b>Manufacturer's instructions and information.....</b>	<b>31</b>
8.1	General.....	31
8.2	Electrical properties.....	31
8.2.1	Partially conductive footwear.....	31
8.2.2	Antistatic footwear.....	32
8.3	Inssocks.....	33
8.4	Perforation resistance.....	33
8.5	Date of obsolescence.....	33
<b>Annex A</b> (normative) <b>Customized safety footwear (safety footwear adapted to fit an individual user or a single unit to fit an individual user) .....</b>	<b>34</b>	
<b>Annex B</b> (informative) <b>Assessment of the footwear by the wearer .....</b>	<b>38</b>	
<b>Annex C</b> (informative) <b>Slip resistance .....</b>	<b>40</b>	
<b>Bibliography.....</b>	<b>43</b>	

ISO 20345:2021

<https://standards.iteh.ai/catalog/standards/iso/06c42dbd-99ab-4abf-9690-e5a1b55c8491/iso-20345-2021>

## 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 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/foreword.html](http://www.iso.org/foreword.html).

ISO 20345 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 161, *Foot and leg protectors*, in collaboration with Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 3, *Foot protection*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 20345:2011), which has been technically revised. The main changes compared to the previous edition are as follows:

- revision of the terms and definitions in [Clause 3](#);
- [Figure 1](#) to [Figure 4](#) revised;
- [Tables 1, 2](#) and [3](#) revised;
- heel area defined ([5.2.3](#));
- toe protection, depending on ISO 22568-1 and ISO 22568-2, exchanging EN 12568:2010;
- requirement on slip resistance revised ([5.3.5](#) and [6.2.10](#)); marking “SRA, SRB and SRC” deleted; marking “SR” and “Ø” introduced;
- pH value and chromium VI tests added in [5.3.6](#); former separate clauses under upper, lining, tongue and insole/insock deleted;
- requirement for seam strength of hybrid footwear added ([5.3.7](#));
- requirement for upper materials not fulfilling WVP explained ([5.4.6](#));
- abrasion of insoles revised ([5.7.4](#));
- outsole requirements revised ([5.8](#));
- outsole thickness revised ([5.8.2.1](#));

- flexing resistance of outsole clarified ([5.8.5](#));
- perforation resistant insert, depending on ISO 22568-3 and ISO 22568-4, exchanging EN 12568:2010;
- tolerance added ([6.2.3.1](#));
- former [Annex A](#) Hybrid footwear included in the general text ([Table 2](#), [5.4.1.2](#));
- optional requirement of metatarsal protection revised ([6.2.6](#));
- optional requirement on ankle protection clarified ([6.2.7](#));
- optional requirement for “SC” scuff cap abrasion added ([6.2.9](#));
- water penetration and absorption, symbol “WRU” deleted, symbol “WPA” introduced;
- optional requirement for “LG” Ladder grip of outsoles added ([6.4.3](#));
- marking revised ([Table 16](#) and [Table 20](#));
- two new categories added, S6 and S7 ([Table 20](#));
- information on obsolescence date added ([8.5](#));
- [Annex A](#) with requirements for customized safety footwear added;
- [Annex B](#) added;
- [Annex C](#) added;
- requirement for electrically insulating footwear (EN 50321) deleted.

## iTeh Standards

(<https://standards.iteh.ai>)

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).

[ISO 20345:2021](#)

<https://standards.iteh.ai/catalog/standards/iso/06c42dbd-99ab-4abf-9690-e5a1b55c8491/iso-20345-2021>

# Personal protective equipment — Safety footwear

## 1 Scope

This document specifies basic and additional (optional) requirements for safety footwear used for general purpose. It includes, for example, mechanical risks, slip resistance, thermal risks, ergonomic behaviour. It also specifies requirements for safety footwear equipped with customized insocks, customized safety footwear or individual manufactured customized safety footwear. This standard does not cover the property of high visibility because of interaction with the clothing (e.g. trousers cover the footwear) and work area conditions (e.g. dirt, mud).

Special risks are covered by complementary job-related standards (e.g. footwear for firefighters, electrical insulating footwear, protection against chain saw injuries, protection against chemicals and molten metal splash, protection for motorcycle riders).

## 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 20344:2021, *Personal protective equipment — Test methods for footwear*

ISO 22568-1:2019, *Foot and leg protectors — Requirements and test methods for footwear components — Part 1: Metallic toecaps*

ISO 22568-2:2019, *Foot and leg protectors — Requirements and test methods for footwear component — Part 2: Non-metallic toecaps*

EN 13832-3:2018, *Footwear protecting against chemicals — Part 3: Requirements for footwear highly resistant to chemicals under laboratory conditions*

## 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 <https://www.electropedia.org/>

Note 1 to entry The component parts of footwear are illustrated in [Figure 1](#), [Figure 2](#) and [Figure 3](#).

Note 2 to entry Further terms and definitions can be found in ISO 19952<sup>[4]</sup>.

### 3.1

#### **safety footwear**

footwear incorporating safety features to protect the wearer from injuries that could arise through accidents

Note 1 to entry: Items of safety footwear are fitted with toecaps designed to give protection against impact of at least 200 J and against compression at least 15 kN.