



DRAFT INTERNATIONAL STANDARD ISO/DIS 20346

ISO/TC 94/SC 3

Secretariat: BSI

Voting begins on:
2009-04-23

Voting terminates on:
2009-09-23

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Personal protective equipment — Protective footwear

Équipement de protection individuelle — Chaussures de protection

[Revision of first edition (ISO 20346:2004)]

ICS 13.340.50

iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the European Committee for Standardization (CEN), and processed under the **CEN-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/DIS 20346](#)

<https://standards.iteh.ai/catalog/standards/sist/01ee0ce9-09a2-4388-a088-10ce11887441/iso-dis-20346>

Copyright notice

This ISO document is a Draft International Standard and is copyright-protected by ISO. Except as permitted under the applicable laws of the user's country, neither this ISO draft nor any extract from it may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission being secured.

Requests for permission to reproduce should be addressed to either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Reproduction may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

Contents

page

| | |
|--|----|
| Foreword | 6 |
| 1 Scope | 7 |
| 2 Normative references | 7 |
| 3 Terms and definitions | 7 |
| 4 Classification | 13 |
| 5 Basic requirements for protective footwear | 14 |
| 5.1 General | 14 |
| 5.2 Design | 17 |
| 5.2.1 Height of upper | 18 |
| 5.2.2 Seat region | 18 |
| 5.3 Whole footwear | 18 |
| 5.3.1 Sole performance | 18 |
| 5.3.1.1 Construction | 18 |
| 5.3.1.2 Upper/outsole bond strength | 18 |
| 5.3.2 Toe protection | 18 |
| 5.3.2.1 General | 18 |
| 5.3.2.2 Internal length of toecaps | 18 |
| 5.3.2.3 Impact resistance of protective footwear | 19 |
| 5.3.2.4 Compression resistance of protective footwear | 19 |
| 5.3.2.5 Behaviour of toecaps | 19 |
| 5.3.2.5.1 Corrosion resistance of metallic toecaps | 19 |
| 5.3.2.5.2 Non-metallic toecaps | 19 |
| 5.3.3 Leakproofness | 19 |
| 5.3.4 Specific ergonomic features | 20 |
| 5.3.5 Slip resistant requirement | 20 |
| 5.3.5.1 General | 20 |
| 5.3.5.2 Slip resistance on ceramic tile floor with sodium lauryl sulphate (SLS) solution | 20 |
| 5.3.5.3 Slip resistance on steel floor with glycerol | 20 |
| 5.3.5.4 Slip resistance on ceramic tile floor with SLS and on steel floor with glycerol | 20 |
| 5.4 Upper | 21 |
| 5.4.1 General | 21 |
| 5.4.2 Thickness | 21 |
| 5.4.3 Tear strength | 21 |
| 5.4.4 Tensile properties | 22 |
| 5.4.5 Flexing resistance | 22 |
| 5.4.6 Water vapour permeability and coefficient | 22 |
| 5.4.7 pH value | 22 |
| 5.4.8 Hydrolysis | 22 |
| 5.4.9 Chromium VI content | 22 |
| 5.5 Lining | 23 |
| 5.5.1 Tear strength | 23 |
| 5.5.2 Abrasion resistance | 23 |
| 5.5.3 Water vapour permeability and coefficient | 23 |
| 5.5.4 pH value | 23 |
| 5.5.5 Chromium VI content | 23 |
| 5.6 Tongue | 23 |
| 5.6.1 Tear strength | 24 |
| 5.6.2 pH value | 24 |
| 5.6.3 Chromium VI content | 24 |
| 5.7 Insole and insock | 24 |

| | | |
|-----------|--|----|
| 5.7.1 | Thickness | 24 |
| 5.7.2 | pH value | 24 |
| 5.7.3 | Water absorption and desorption | 24 |
| 5.7.4 | Abrasion resistance | 24 |
| 5.7.4.1 | Insoles | 24 |
| 5.7.4.2 | Insocks | 24 |
| 5.7.5 | Chromium VI content | 25 |
| 5.8 | Outsole..... | 25 |
| 5.8.1 | Thickness of non-cleated outsoles..... | 25 |
| 5.8.2 | Tear strength..... | 25 |
| 5.8.3 | Abrasion resistance | 25 |
| 5.8.4 | Flexing resistance..... | 25 |
| 5.8.5 | Hydrolysis..... | 25 |
| 5.8.6 | Interlayer bond strength | 25 |
| 6 | Additional requirements for protective footwear | 25 |
| 6.1 | General..... | 25 |
| 6.2 | Whole footwear | 26 |
| 6.2.1 | Penetration resistance | 26 |
| 6.2.1.1 | Determination of penetration force | 26 |
| 6.2.1.2 | Construction | 26 |
| 6.2.1.3 | Dimensions | 26 |
| 6.2.1.4 | Flex resistance of penetration-resistant inserts | 28 |
| 6.2.1.5 | Behaviour of penetration-resistant inserts | 28 |
| 6.2.1.5.1 | Corrosion resistance of penetration-resistant metallic inserts | 28 |
| 6.2.1.5.2 | Penetration-resistant non-metallic inserts | 29 |
| 6.2.2 | Electrical properties | 29 |
| 6.2.2.1 | Conductive footwear..... | 29 |
| 6.2.2.2 | Antistatic footwear..... | 29 |
| 6.2.2.3 | Electrically insulating footwear | 29 |
| 6.2.3 | Resistance to inimical environments | 29 |
| 6.2.3.1 | Heat insulation of sole complex | 29 |
| 6.2.3.2 | Cold insulation of sole complex | 29 |
| 6.2.4 | Energy absorption of seat region | 29 |
| 6.2.5 | Water resistance | 30 |
| 6.2.6 | Metatarsal protection | 30 |
| 6.2.6.1 | Construction | 30 |
| 6.2.6.2 | Impact resistance of metatarsal protective device..... | 30 |
| 6.2.7 | Ankle protection..... | 30 |
| 6.3 | Upper..... | 30 |
| 6.3.1 | Water penetration and water absorption..... | 30 |
| 6.3.2 | Construction..... | 30 |
| 6.3.3 | Cut resistance | 31 |
| 6.3.3.1 | Design | 31 |
| 6.3.3.2 | Construction | 31 |
| 6.3.3.3 | Resistance to cutting..... | 31 |
| 6.3.3.4 | Penetration resistance..... | 31 |
| 6.4 | Outsole..... | 31 |
| 6.4.1 | Cleated area..... | 31 |
| 6.4.2 | Thickness of cleated outsoles..... | 32 |
| 6.4.3 | Cleat height | 32 |
| 6.4.4 | Resistance to hot contact | 32 |
| 6.4.5 | Resistance to fuel oil | 32 |
| 7 | Marking | 32 |
| 8 | Information to be supplied..... | 33 |
| 8.1 | General..... | 33 |
| 8.2 | Electrical properties | 34 |
| 8.2.1 | Conductive footwear | 34 |
| 8.2.2 | Antistatic footwear..... | 35 |

ITeH STANDARD PREVIEW

(standards.iteh.ai)

ISO/DIS 20346

<http://standards.iteh.ai/catalog/standards/sis/01ee0cc9-09a2-4388-a088-10ce11887441/iso-dis-20346>

| | | |
|---|---|----|
| 8.2.3 | Electrically insulating footwear | 35 |
| 8.2.4 | High electrical resistance outsoles | 36 |
| 8.3 | Insocks | 36 |
| Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC Personal Protective Equipment..... | | 37 |
| Bibliography..... | | 39 |

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/DIS 20346](https://standards.iteh.ai/catalog/standards/sist/01ee0ce9-09a2-4388-a088-10ce11887441/iso-dis-20346)

<https://standards.iteh.ai/catalog/standards/sist/01ee0ce9-09a2-4388-a088-10ce11887441/iso-dis-20346>

Foreword

ISO 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 20346 was prepared by Technical Committee ISO/TC 94, *Personal safety - Protective clothing and equipment*, Subcommittee SC 3, and by Technical Committee CEN/TC 161, *Foot and leg protectors* in collaboration.

This second edition cancels and replaces the first edition (2004), which has been technically revised.

CEN Foreword

This document (prEN ISO 20346:2009) has been prepared by Technical Committee CEN/TC 161 "Foot and leg protectors", the secretariat of which is held by BSI, in collaboration with Technical Committee ISO/TC 94 "Personal safety - Protective clothing and equipment".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by xxx, and conflicting national standards shall be withdrawn at the latest by xxx.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

In conjunction with EN ISO 20344: 2004, this standard supersedes EN ISO 20346: 2004 + EN ISO 20344:2004/AC:2005 + EN ISO 20344:2004/A1:2007

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This European Standard specifies basic and additional (optional) requirements for protective footwear.

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.

prEN 12568:2008¹⁾ *Foot and leg protectors – Requirements and test methods for toecaps and penetration resistant inserts*

prEN ISO 20344:2009²⁾ *Personal protective equipment – Test methods for footwear*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

NOTE The component parts of footwear are illustrated in figures 1 and 2.

3.1

protective footwear

footwear, incorporating protective features to protect the wearer from injuries which could arise through accidents, fitted with toecaps, designed to give protection against impact when tested at an energy level of at least 100 J and against compression when tested at a compression load of at least 10 kN

3.2

leather

<https://standards.iteh.ai/catalog/standards/sist/01ee0ce9-09a2-4388-a088-10ce11887441/iso-dis-20346>

3.2.1

leather

hide or skin tanned to be imputrescible

3.2.2

leather split

flesh or middle part of a hide or skin tanned to be imputrescible obtained by splitting a thick leather

3.3

rubber

vulcanized elastomers

3.4

polymeric materials

for example polyurethane or polyvinylchloride

3.5

insole

non-removable component used to form the base of the shoe to which the upper is usually attached during lasting

1) Revision of EN 12568: 1998, currently at the stage of Enquiry

2) Revision of EN ISO 20344: 2004, currently at the stage of parallel Enquiry

3.6

insock

removable or permanent footwear component used to cover part or all of the insole

3.7

lining

material covering the inner surface of the upper

NOTE 1 The wearer's foot is in direct contact with the lining.

NOTE 2 Where an upper is split at the forepart to house the toecap, or if an external piece of material is stitched to the upper to form a pocket to house the toecap, the material under the toecap acts as a lining.

3.7.1

vamp lining

material covering the inner surface of the forepart of the upper

3.7.2

quarter lining

material covering the inner surface of the quarters of the upper

3.8

cleat(s)

protruding part(s) of the outer surface of the sole

3.9

rigid outsole

sole which, when the complete footwear is tested in accordance with prEN ISO 20344:2009, 8.4.1, can not be bent through an angle of 45° under a load of 30 N

3.10

cellular outsole

outsole having a density of 0,9 g/ml or less with a cell structure visible under 10x magnification

3.11

penetration-resistant insert

footwear component placed in the sole complex in order to provide protection against penetration

3.12

protective toecap

footwear component built into the footwear designed to protect the toes of the wearer from impacts up to an energy level of at least 100 J and compression at a load of at least 10 kN

3.13

seat region

rear quarter of the total length of the footwear (upper and sole)

3.14

conductive footwear

footwear whose resistance, when measured according to prEN ISO 20344:2009, 5.10, lies in the range of 0 to 100 k Ω

3.15

antistatic footwear

footwear whose resistance, when measured according to prEN ISO 20344:2009, 5.10, lies above 100 k Ω and is less than or equal to 1 000 M Ω

3.16

electrically insulating footwear

footwear which protects the wearer against electrical shocks by preventing the passage of dangerous current through the body via the feet

3.17

fuel oil

aliphatic hydrocarbon constituent of petroleum

3.18

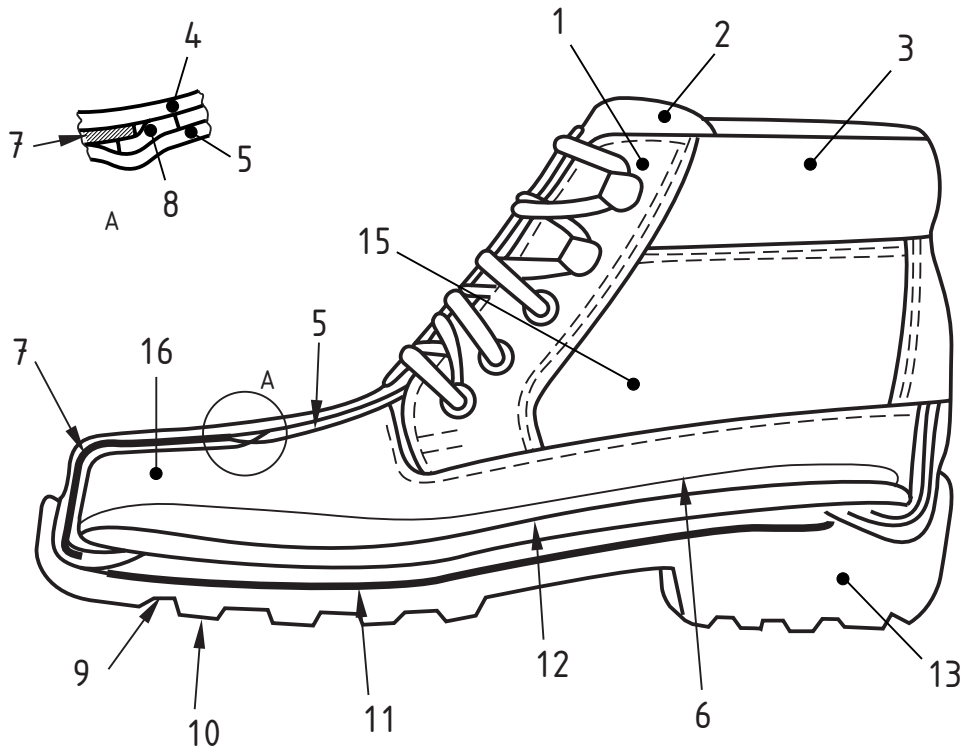
specific job related footwear

safety, protective or occupational footwear relating to a specific profession, e.g. footwear for firefighters, footwear with resistance to chain saw cutting, etc.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

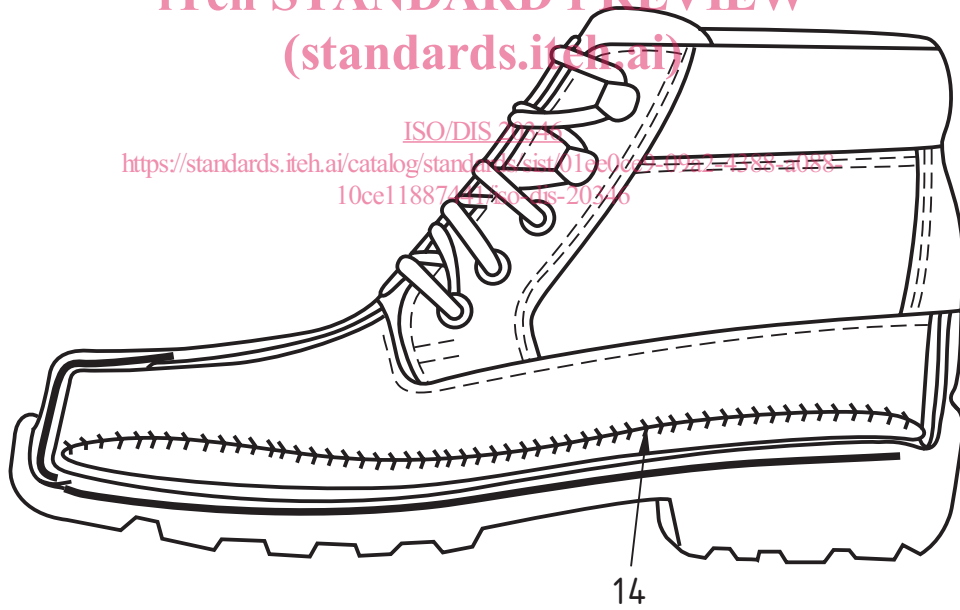
[ISO/DIS 20346](https://standards.iteh.ai/catalog/standards/sist/01ee0ce9-09a2-4388-a088-10ce11887441/iso-dis-20346)

<https://standards.iteh.ai/catalog/standards/sist/01ee0ce9-09a2-4388-a088-10ce11887441/iso-dis-20346>



iTeh STANDARD PREVIEW
 (standards.itech.ai)

ISO/DIS 20346
<https://standards.itech.ai/catalog/standards/sist/018e0677-9227-4785-a058-10ce11887222/iso-dis-20346>



| | | | | | |
|---|-------------|----|--------------------------------|----|------------------------------|
| 1 | Facing | 6 | Insock | 11 | Penetration-resistant insert |
| 2 | Tongue | 7 | Toecap | 12 | Insole |
| 3 | Collar | 8 | Edge covering, e.g. foam strip | 13 | Heel |
| 4 | Upper | 9 | Outsole | 14 | Strobelt stitching |
| 5 | Vamp lining | 10 | Cleat | 15 | Quarter |
| | | | | 16 | Vamp |

Figure 1a) Parts of footwear of Strobelt construction

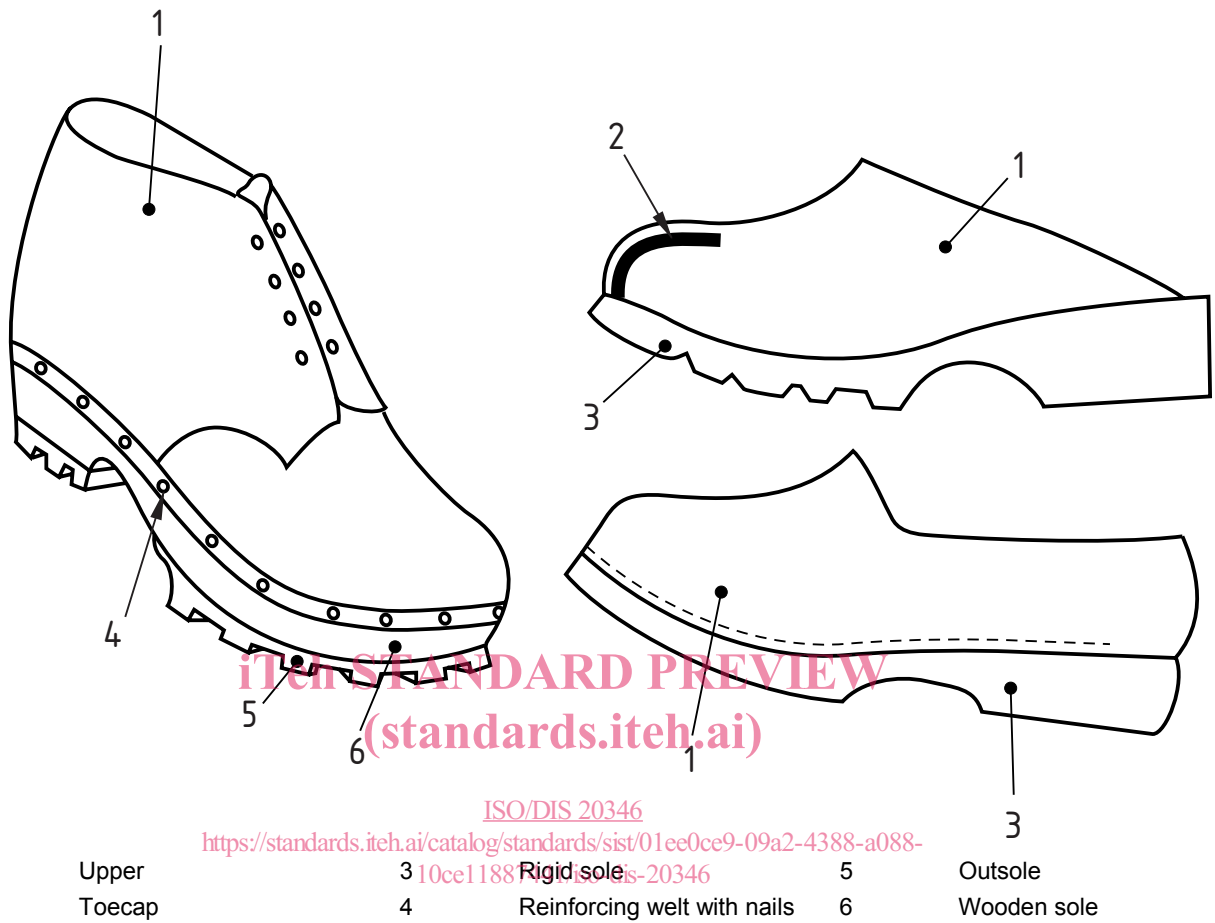
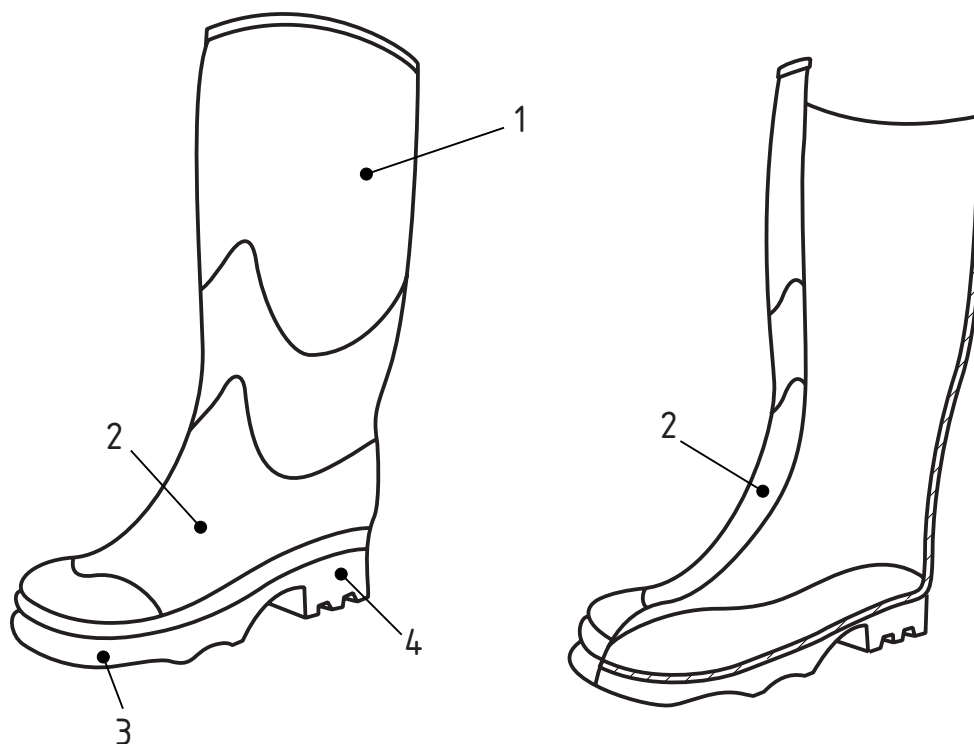


Figure 1b) Parts of footwear of conventional construction



1 Upper
2 Vamp

3 Outsole
4 Heel

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Figure 2 — Parts of all-rubber (i.e. vulcanized) or all polymeric (i.e. entirely moulded) footwear

[ISO/DIS 20346](https://standards.iteh.ai/catalog/standards/sist/01ee0ce9-09a2-4388-a088-10ce11887441/iso-dis-20346)

<https://standards.iteh.ai/catalog/standards/sist/01ee0ce9-09a2-4388-a088-10ce11887441/iso-dis-20346>