

INTERNATIONAL STANDARD

ISO
8782-1

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1998-12-15

Safety, protective and occupational footwear for professional use —

Part 1: Requirements and test methods

*Chaussures de sécurité, de protection et de travail à usage
professionnel —*

Partie 1: Exigences et méthodes d'essais

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ISO 8782-1:1998(E)

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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.

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 8782-1 was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 3, *Foot protection*.

ISO 8782 consists of the following parts, under the general title *Safety, protective and occupational footwear for professional use*:

- *Part 1: Requirements and test methods*
- *Part 2: Specification for safety footwear*
- *Part 3: Specification for protective footwear*
- *Part 4: Specification for occupational footwear*
- *Part 5: Additional requirements and test methods*
- *Part 6: Additional specifications for safety footwear*
- *Part 7: Additional specifications for protective footwear*
- *Part 8: Additional specifications for occupational footwear*

Annex A forms an integral part of this part of ISO 8782. Annexes B, C and D are for information only.

Safety, protective and occupational footwear for professional use —

Part 1: Requirements and test methods

1 Scope

This part of ISO 8782 specifies requirements and, where appropriate, test methods to establish conformity with these requirements for footwear intended to protect the wearer's feet and legs against foreseeable hazards in a variety of working sectors.

This part of ISO 8782 can be used only in conjunction with ISO 8782-2, ISO 8782-3 or ISO 8782-4, which give requirements for footwear relating to specific levels of risk.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8782. 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 8782 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 34-1:1994, *Rubber, vulcanized or thermoplastic — Determination of tear strength — Part 1: Trouser, angle and crescent test pieces.*

ISO 868:1985, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness).*

ISO 1817:—¹⁾, *Rubber, vulcanized — Determination of the effect of liquids.*

ISO 2023:1994, *Rubber footwear — Lined industrial vulcanized-rubber boots — Specification.*

ISO 3376:1976, *Leather — Determination of tensile strength and elongation.*

ISO 3377:1975, *Leather — Determination of tearing load.*

ISO 4045:1977, *Leather — Determination of pH.*

ISO 4643:1992, *Moulded plastics footwear — Lined or unlined poly(vinyl chloride) boots for general industrial use — Specification.*

ISO 4648:1991, *Rubber, vulcanized or thermoplastic — Determination of dimensions of test pieces and products for test purposes.*

ISO 4649:1985, *Rubber — Determination of abrasion resistance using a rotating cylindrical drum device.*

1) To be published. (Revision of ISO 1817:1985)

ISO 4674-1:—²⁾, *Rubber- or plastics-coated fabrics — Determination of tear resistance — Part 1: Constant rate of tear methods.*

ISO 5423:1992, *Moulded plastics footwear — Lined or unlined polyurethane boots for general industrial use — Specification.*

ISO 8782-2:1998, *Safety, protective and occupational footwear for professional use — Part 2: Specification for safety footwear.*

ISO 8782-3:1998, *Safety, protective and occupational footwear for professional use — Part 3: Specification for protective footwear.*

ISO 8782-4:1998, *Safety, protective and occupational footwear for professional use — Part 4: Specification for occupational footwear.*

3 Definitions

For the purposes of this part of ISO 8782, the following definitions apply.

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

3.1

safety footwear for professional use

footwear incorporating protective features to protect the wearer from injuries which could arise through accidents in the working sectors for which the footwear was designed, fitted with toecaps designed to give protection against impact when tested at an energy level of 200 J

3.2

protective footwear for professional use

footwear incorporating protective features to protect the wearer from injuries which could arise through accidents in the working sectors for which the footwear was designed, fitted with toecaps designed to give protection against impact when tested at an energy level of 100 J

3.3

occupational footwear for professional use

footwear incorporating protective features to protect the wearer from injuries which could arise through accidents in the working sectors for which the footwear was designed

3.4 Leather

NOTE This term covers full-grain leather, corrected-grain leather and leather split.

3.4.1

full-grain leather

hide or skin tanned to be imputrescible, with its original fibrous structure more or less intact and still possessing the full-grain layer

3.4.2

corrected-grain leather

hide or skin tanned to be imputrescible, with its original fibrous structure more or less intact, but which has been subjected to mechanical buffing to modify its grain structure

²⁾ To be published. (Revision of ISO 4674:1977)

3.4.3

leather split

flesh or middle part of a skin or hide tanned to be imputrescible, with its original fibrous structure more or less intact and split or shaved to eliminate completely the grain layer

3.5

rubber

vulcanized elastomers

3.6

polymeric materials

materials made of polyurethane, poly(vinyl chloride) or thermoplastic rubber

3.7

height of the upper

vertical distance between the top surface of the extreme rear edge of the insole and the highest point of the back of the upper

3.8

insole

non-removable bottom inside component of the footwear adjacent to the foot

3.9

lining

inside layer of the upper which is adjacent to the foot

3.10

fuel oil

aliphatic hydrocarbon constituent of petroleum

4 Requirements

4.1 Sampling and conditioning

The minimum number of samples (i.e. separate items of footwear) to be tested in order to check compliance with the requirements specified in this clause, together with the minimum number of test pieces taken from each sample, shall be as given in table 1.

Wherever possible, test pieces shall be taken from the whole footwear unless otherwise stated.

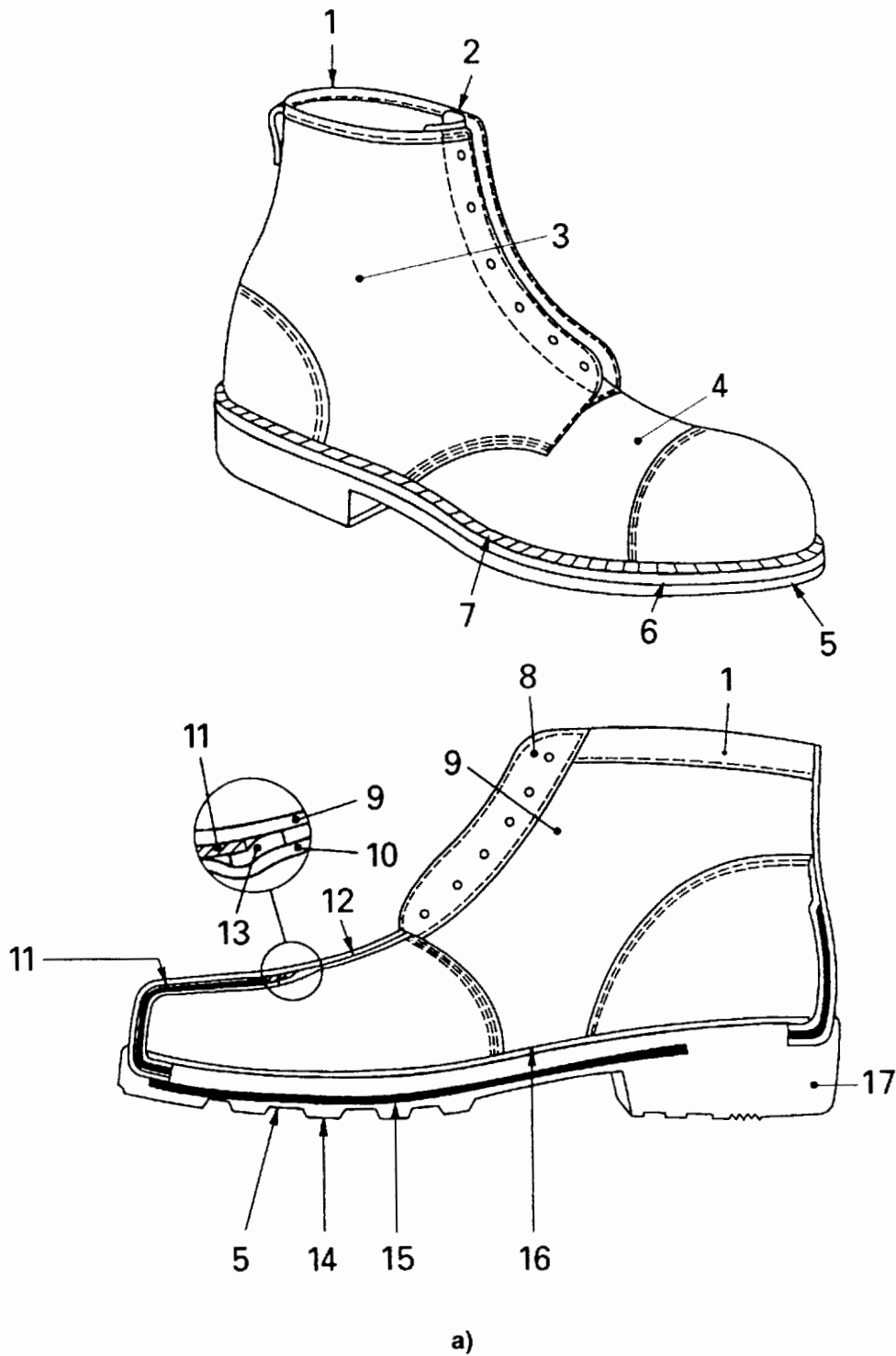
NOTE If it is not possible to obtain a test piece from the footwear large enough to comply with requirements, then a sample of the material from which the component has been manufactured may be used instead. However, this should be noted in the test report.

Where samples are required from each of three sizes, these shall comprise the largest, smallest and a middle size of the footwear under test.

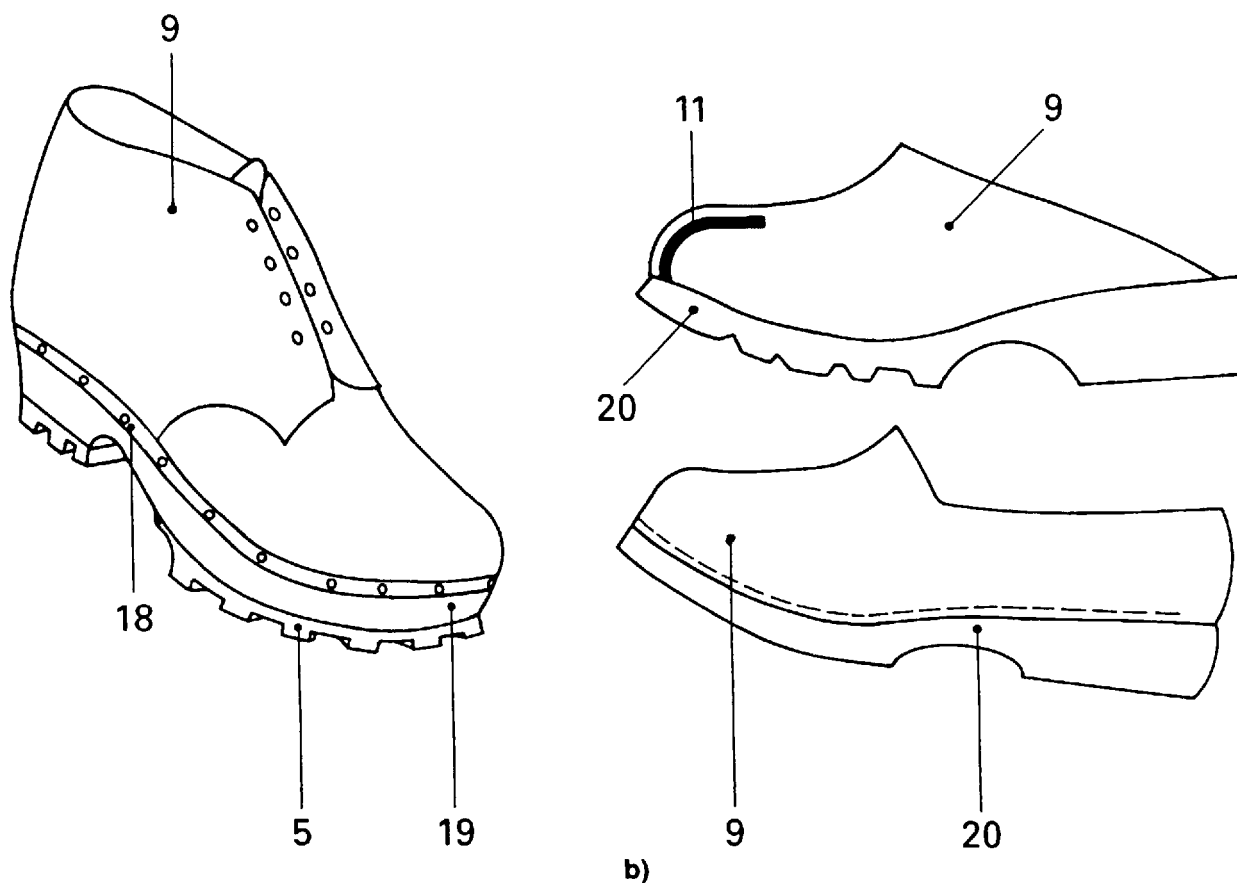
All test pieces shall be conditioned in a standard atmosphere of $(20 \pm 2) ^\circ\text{C}$ and $(65 \pm 5) \%$ relative humidity (RH) for a minimum of 48 h before testing, unless otherwise stated in the test method.

The maximum time which shall elapse between removal from the conditioning atmosphere and the start of testing shall be no greater than 10 min, unless otherwise stated in the test method.

Each test piece shall individually satisfy the specified requirement, unless otherwise stated in the test method.

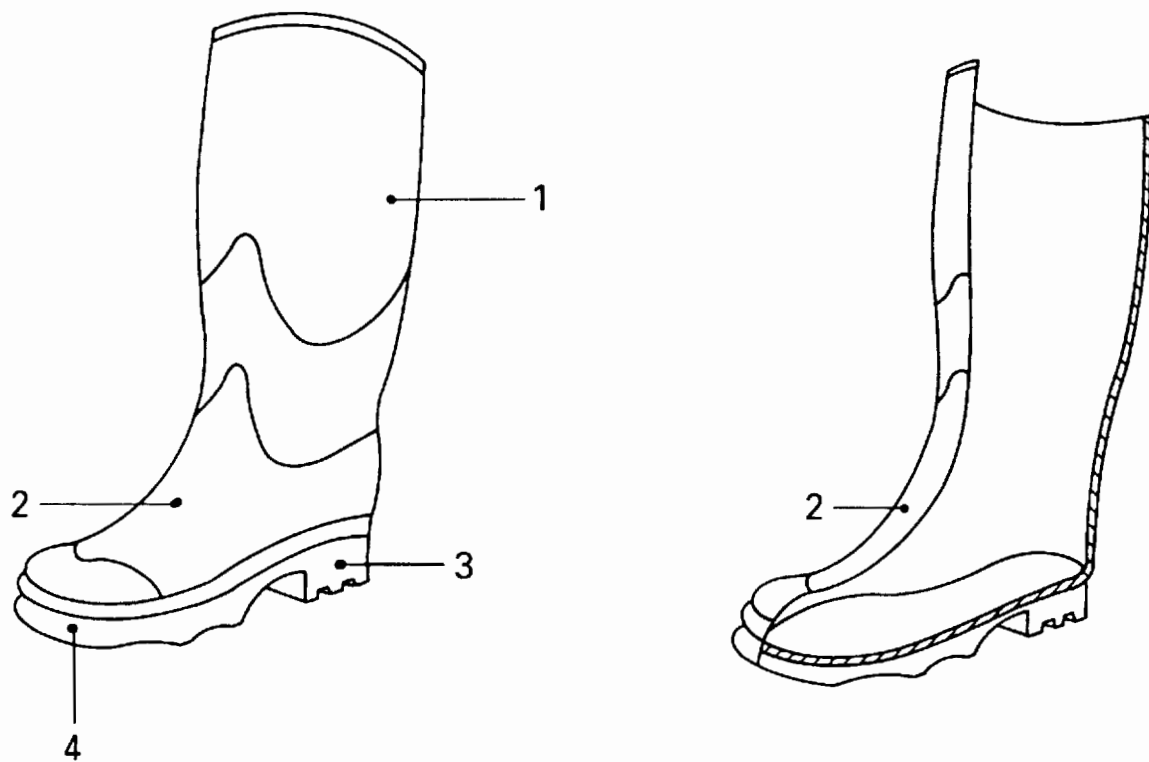


a)

**Key**

- | | | |
|----------------|---------------------------------|---------------------------------|
| 1 Collar | 8 Facing | 15 Penetration-resistant insert |
| 2 Tongue | 9 Upper | 16 Insole |
| 3 Quarter | 10 Lining | 17 Heel |
| 4 Vamp | 11 Safety or protective toe cap | 18 Reinforcing welt with nails |
| 5 Outsole | 12 Vamp lining | 19 Wooden sole |
| 6 Through sole | 13 Foam strip | 20 Rigid sole |
| 7 Feather line | 14 Cleat | |

Figure 1 — Parts of footwear

**Key**

- 1 Upper
- 2 Vamp
- 3 Heel
- 4 Outsole

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

Table 1 — Minimum number of samples and test pieces

Requirement	Subclause	Number of samples	Number of test pieces from each sample
Upper/outsole and sole interlayer bond strength	4.3.1.2 4.8.7	1 from each of 3 sizes	1
Internal toecap length	4.3.2.2	1 pair from each of 3 sizes	1 pair
Impact resistance	4.3.2.3.1 4.3.2.3.2	1 pair from each of 3 sizes	1 pair
Compression resistance	4.3.2.4.1 4.3.2.4.2	1 pair from each of 3 sizes	1 pair
Corrosion resistance of metal toecaps or metal penetration-resistant inserts	4.3.2.5 4.3.3.2.3	2	1
Penetration resistance	4.3.3.1	1 pair from each of 3 sizes	1 pair
Dimensions of penetration-resistant inserts	4.3.3.2.2	1 pair from each of 3 sizes	1 pair
Electrical resistance	4.3.4	1 pair from each of 3 sizes	1 pair
Insulation against heat	4.3.5.1	2	1
Insulation against cold	4.3.5.2	2	1
Energy absorption of seat region	4.3.6	1 pair from each of 3 sizes	1 pair
Leakproof footwear	4.3.7	2	1
Thickness	4.4.1	1 from each of 3 sizes	3
Tear strength	4.4.2 4.5.2 4.6.1 4.8.3	1 from each of 3 sizes	3
Tensile properties	4.4.3	1 from each of 3 sizes	3
Flexing resistance	4.4.4	1 from each of 3 sizes	1
Water penetration and water absorption	4.4.5	1 from each of 3 sizes	1
Water vapour permeability and water vapour coefficient	4.4.6 4.5.4	1 from each of 3 sizes	1
pH value	4.4.7 4.5.5 4.6.2 4.7.2	1 from each of 3 sizes	1
Hydrolysis	4.4.8 4.8.6	1 from each of 3 sizes	1

Table 1 (concluded)

Requirement	Subclause	Number of samples	Number of test pieces from each sample
Abrasion resistance of lining	4.5.3	1 from each of 3 sizes	4
Thickness of insole	4.7.1	1 from each of 3 sizes	1
Water absorption and water desorption of insole	4.7.3	1 from each of 3 sizes	1
Abrasion resistance of insole	4.7.4	1 from each of 3 sizes	1
Thickness of outsole	4.8.1 4.8.2	1 from each of 3 sizes	1
Abrasion resistance of outsole	4.8.4	1 from each of 3 sizes	1
Flexing resistance of outsole	4.8.5	1 from each of 3 sizes	1
Resistance to hot contact	4.8.8	1 from each of 3 sizes	1
Resistance to fuel oil	4.8.9	1 from each of 3 sizes	1

4.2 Design

NOTE The designs of footwear covered by this part of ISO 8742 are illustrated in figure 3.

4.2.1 Height of upper

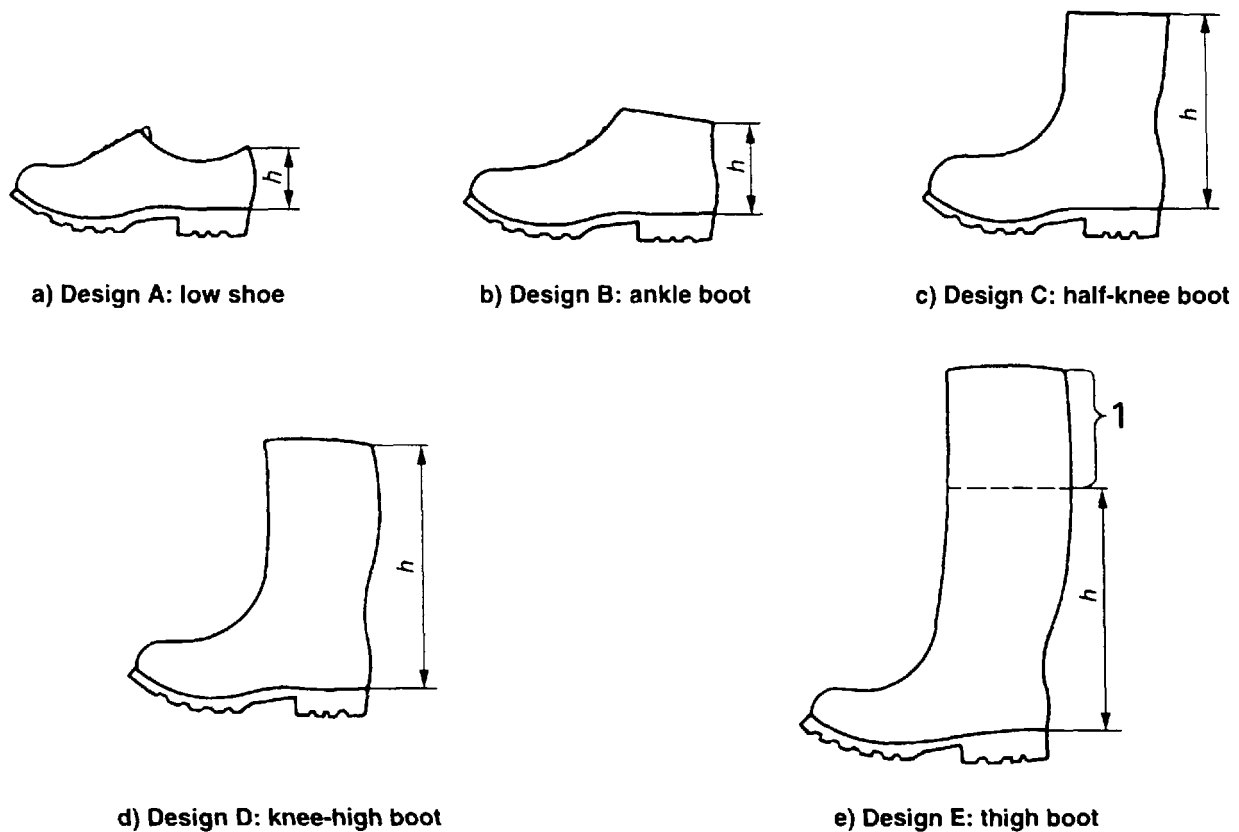
The height of the upper (h) shall be as given in table 2.

Table 2 — Height of upper

Size of footwear			Height h			
Mondopoint	Paris points	English	Design A mm	Design B min. mm	Design C min. mm	Design D min. mm
225 and below	36 and below	3 and below	< 103	103	162	255
230 to 240	37 and 38	4 and 5	< 105	105	165	260
245 to 250	39 and 40	6	< 109	109	172	270
255 to 265	41 and 42	7 and 8	< 113	113	178	280
270 to 280	43 and 44	9 and 10	< 117	117	185	290
285 and above	45 and above	11 and above	< 121	121	192	300

4.2.2 Seat region

The seat region shall be closed.

**Key**

1 Variable extension which can be adapted to the wearer

NOTE Design E is a knee-height boot (design D) equipped with a thin, impermeable material which extends the upper and which can be cut to adapt the boot to the wearer.

Figure 3 — Designs of footwear

4.3 Whole footwear

4.3.1 Sole performance

4.3.1.1 Construction

Unless the footwear has a rigid sole, an insole shall be present in such a way that it cannot be removed without damaging the footwear.

4.3.1.2 Upper/outsole bond strength

When footwear, other than that with a rigid sole, is tested in accordance with the method given in 5.1, the bond strength shall be no less than 4,0 N/mm, unless there is tearing of the sole, in which case the bond strength shall be no less than 3,0 N/mm.

4.3.2 Toe protection

4.3.2.1 General

Safety or protective toecaps shall be incorporated in the footwear in such a manner that they cannot be removed without damaging it.

With the exception of all-rubber and all-polymeric footwear, footwear fitted with internal toecaps shall have a vamp lining or an element of the upper that serves as a lining, and in addition the toecaps shall have an edge covering extending from the back edge of the toecap to at least 5 mm beneath it and at least 10 mm in the opposite direction.

Scuff-resistant coverings for the toe region shall be no less than 1 mm in thickness.

NOTE Recommendations for the assessment of toecaps to be used in safety or protective footwear are given for information only in annex B.

4.3.2.2 Internal length of toecaps

When measured in accordance with the method given in 5.2, the internal toecap length shall be no less than the appropriate value given in table 3.

Table 3 — Minimum internal length of toecaps

Size of footwear			Minimum internal length mm
Mondopoint	Paris points	English	
225 and below	36 and below	3 and below	34
230 to 240	37 and 38	4 and 5	36
245 to 250	39 and 40	6	38
255 to 265	41 and 42	7 and 8	39
270 to 280	43 and 44	9 and 10	40
285 and above	45 and above	11 and above	42

4.3.2.3 Impact resistance

4.3.2.3.1 Impact resistance of safety footwear

When safety footwear is tested in accordance with the method given in 5.3 at an energy level of (200 ± 4) J, the clearance under the toecap at the moment of impact shall be no less than the appropriate value given in table 4. In addition, the toecap shall not develop any cracks on the test axis which go through the material, i.e. through which light can be seen.

4.3.2.3.2 Impact resistance of protective footwear

When protective footwear is tested in accordance with the method given in 5.3 at an energy level of (100 ± 2) J, the clearance under the toecap at the moment of impact shall be no less than the appropriate value given in table 4. In addition the toecap shall not develop any cracks on the test axis which go through the material, i.e. through which light can be seen.

Table 4 — Minimum clearance under toecaps at impact

Size of footwear			Minimum clearance mm
Mondopoint	Paris points	English	
225 and below	36 and below	3 and below	12,5
230 to 240	37 and 38	4 and 5	13,0
245 to 250	39 and 40	6	13,5
255 to 265	41 and 42	7 and 8	14,0
270 to 280	43 and 44	9 and 10	14,5
285 and above	45 and above	11 and above	15,0

4.3.2.4 Compression resistance

4.3.2.4.1 Compression resistance of safety footwear

When safety footwear is tested in accordance with the method given in 5.4, the clearance under the toecap at a compression load of $(15 \pm 0,1)$ kN shall be no less than the appropriate value given in table 4.

4.3.2.4.2 Compression resistance of protective footwear

When protective footwear is tested in accordance with the method given in 5.4, the clearance under the toecap at a compression load of $(10 \pm 0,1)$ kN shall be no less than the appropriate value given in table 4.

4.3.2.5 Corrosion resistance of metal toecaps

When all-rubber footwear is tested and assessed in accordance with the method given in 5.5.1, the metal toecap shall exhibit no more than five areas of corrosion, none of which shall exceed $2,5 \text{ mm}^2$ in area.

When metal toecaps to be used in all other types of footwear are tested and assessed in accordance with the method given in 5.5.2, they shall exhibit no more than five areas of corrosion, none of which shall exceed $2,5 \text{ mm}^2$ in area.

4.3.3 Penetration resistance

4.3.3.1 All penetration-resistant footwear

When footwear is tested in accordance with the method given in 5.6, the force required to penetrate the sole unit shall be no less than 1 100 N.

4.3.3.2 Additional requirements for footwear which incorporates penetration-resistant inserts

NOTE Recommendations for further tests which may be used to assess the suitability of penetration-resistant inserts before they are incorporated in footwear are given for information only in annex C.

4.3.3.2.1 Construction

The penetration-resistant insert shall be built into the bottom of the shoe in such a manner that it cannot be removed without damaging the footwear.

The insert shall not lie above the flange of the safety or protective toecap and shall not be attached to it.

4.3.3.2.2 Dimensions

With the exception of the heel region, the penetration-resistant insert shall be of such a size that the maximum distance between the line represented by the feather edge of the last and the edge of the insert is 6,5 mm. In the heel region the maximum distance between the line represented by the feather edge of the last and the insert shall be 17 mm. (See figure 4.)

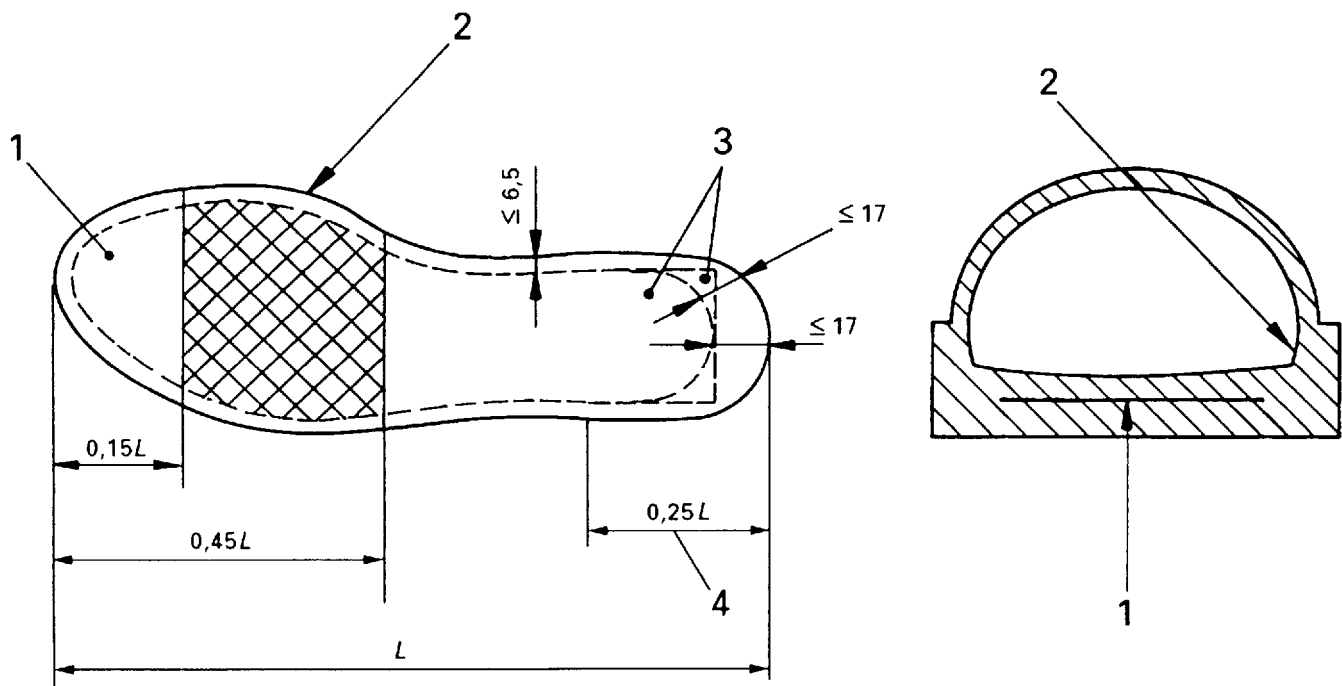
The penetration-resistant insert shall have no more than three holes of maximum diameter 3 mm to attach it to the bottom of the footwear. The holes shall not lie in the shaded area shown in figure 4.

4.3.3.2.3 Corrosion resistance of metal penetration-resistant inserts

When all-rubber footwear is tested and assessed in accordance with the method given in 5.5.1 the metal penetration-resistant insert shall exhibit no more than five areas of corrosion, none of which shall exceed $2,5 \text{ mm}^2$ in area.

In all other types of footwear, when metal penetration-resistant inserts are to be used, they shall be tested in accordance with the method given in 5.5.3. They shall exhibit no more than five areas of corrosion, none of which shall exceed $2,5 \text{ mm}^2$ in area.

Dimensions in millimetres



Key

- 1 Insert
- 2 Line left by the feather edge of the last
- 3 Alternative shapes of insert
- 4 Heel region

NOTE L is the length of the inside of the bottom of the footwear

Figure 4 — Position of penetration-resistant insert

4.3.4 Electrical resistance

4.3.4.1 Conductive footwear

When measured in accordance with the method given in 5.7 after conditioning in a dry atmosphere [5.7.2.3 a)], the electrical resistance shall be no greater than 100 k Ω .

4.3.4.2 Antistatic footwear

When measured in accordance with the method described in 5.7 and after conditioning in a dry and wet atmosphere [5.7.2.3 a) and b)], the electrical resistance shall be no less than 100 k Ω and shall be no greater than 1 000 M Ω .

4.3.5 Resistance to harsh environments

4.3.5.1 Heat-insulation of sole complex

When footwear is tested in accordance with the method given in 5.8, the temperature increase on the upper surface of the insole shall be no greater than 22 °C.

The insulation shall be incorporated in the footwear in such a manner that it cannot be removed without damaging the bottom of the footwear.

4.3.5.2 Cold insulation of sole complex

When footwear is tested in accordance with the method given in 5.9, the temperature decrease on the upper surface of the insole shall be no more than 10 °C.

The insulation shall be incorporated in the footwear in such a manner that it cannot be removed without damaging the bottom of the footwear.

4.3.6 Energy absorption of seat region

When footwear is tested in accordance with the method given in 5.10, the energy absorption of the seat region shall be no less than 20 J.

4.3.7 Leakproof footwear

When tested in accordance with the method given in 5.11, there shall be no leakage of air.

4.4 Upper

NOTE 1 The requirements specified for uppers do not apply to the extension of the upper indicated for design E (see figure 3).

NOTE 2 The textile layer in all-rubber and all-polymeric footwear is a part of the upper and should not be removed before testing, except where otherwise indicated in the relevant test method.

4.4.1 Thickness

When determined in accordance with the appropriate method, the thickness of the upper at any point shall be no less than the value given in table 5.

NOTE The thickness of the upper should include the textile layer.

Table 5 — Minimum thickness of upper

Type of material	Test method	Minimum thickness mm
Rubber	ISO 4648 ¹⁾	1,50
Polymeric	ISO 4648 ¹⁾	1,00
1) Using a thickness gauge with a flat-presser foot of 10 mm diameter and a load of 1 N.		

4.4.2 Tear strength

When determined in accordance with the appropriate method, the tear strength of the upper shall be no less than the value given in table 6, with the exception of non-leather uppers required to have particular resistance to animal fats, when the minimum tear strength shall be 30 N.

Table 6 — Minimum tear strength of upper

Type of material	Test method	Minimum force N
Leather	ISO 3377	120
Coated fabric and textile	Method B ¹⁾ of ISO 4674-1:—	60
1) Using a rectangular test piece 50 mm × 25 mm with a cut 20 mm long placed centrally and parallel with the longer sides to form a trouser tear test piece. Carry out the test at a constant rate of traverse of 100 mm/min. For knitted and non-woven fabrics, use the largest possible test piece obtainable from the footwear.		

4.4.3 Tensile properties

When determined in accordance with the appropriate method, the tensile properties shall be as given in table 7.

Table 7 — Tensile properties

Type of material	Test method	Tensile property	Value
Leather split	ISO 3376 ¹⁾	Tensile strength	15 N/mm ² min.
Rubber	Annex C of ISO 2023:1994	Breaking force	180 N min.
Polymeric ²⁾	ISO 4643	Modulus at 100 % elongation	1,3 N/mm ² to 4,6 N/mm ²
		Elongation at break	250 % min.
1) Using the test piece, length $l = 90$ mm and the width $b_1 = 25$ mm.			
2) Remove the textile layer before testing.			

4.4.4 Flexing resistance

When tested in accordance with the appropriate method, the upper shall withstand no less than the number of continuous flexes given in table 8 without cracking.

Table 8 — Minimum number of flexes

Type of material	Test method	Minimum number of flexes
Rubber	Annex E of ISO 2023:1994	125 000
Polymeric	Annex B ¹⁾ of ISO 4643:1992	150 000
1) Test carried out at -5 °C.		

4.4.5 Water penetration and water absorption

When tested in accordance with the method given in 5.12, the water absorption shall be no higher than 30 % after 60 min from the start of the test. Water penetration shall not occur during this period, nor exceed 2 g after a further 30 min.

4.4.6 Water vapour permeability and water vapour coefficient

When tested in accordance with the methods described in 5.13, the water vapour permeability shall be no less than 0,8 mg/(cm²·h), and the water vapour coefficient shall be no less than 20 mg/cm².

4.4.7 pH value

When leather uppers are tested in accordance with the method given in ISO 4045, the pH value shall be no less than 3,5. If the pH is below 4, the difference figure shall be less than 0,7.

4.4.8 Hydrolysis

When polyurethane uppers are tested in accordance with the method given in annex B of ISO 5423:1992 after being prepared and conditioned as described in annex E of that International Standard, no cracking shall occur before 150 000 flex cycles. Conditioning at ambient temperature shall be carried out at (20 ± 2) °C.

4.5 Lining

4.5.1 General

Where an upper is split at the fore-part 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 and shall be tested as such.

NOTE The textile layer in all-rubber and all-polymeric footwear is a part of the upper and should not be tested.

4.5.2 Tear strength

When determined in accordance with the appropriate method, the tear strength of the lining shall be no less than the value given in table 9.

Table 9 — Minimum tear strength of lining

Type of material	Test method	Minimum force N
Leather	ISO 3377	30
Coated fabric and textile	Method B ¹⁾ of ISO 4674-1:—	15
1) See table 6 for test conditions.		

4.5.3 Abrasion resistance

When tested in accordance with the method given in 5.14, the wearing surface of textile linings shall not develop any holes before the following number of cycles has been performed:

- dry 25 600 cycles;
- wet 12 800 cycles.

4.5.4 Water vapour permeability and water vapour coefficient

When tested in accordance with the methods described in 5.13, the water vapour permeability shall be no less than 2,0 mg/(cm²·h) and the water vapour coefficient shall be no less than 30 mg/cm².

4.5.5 pH value

When leather linings are tested in accordance with the method given in ISO 4045, the pH value shall be no less than 3,5. If the pH is below 4, the difference figure shall be less than 0,7.

4.6 Tongue

NOTE The tongue need only be tested if the material from which it is made or its thickness differs from that of the upper material.

4.6.1 Tear strength

When determined in accordance with the appropriate method, the tear strength of the tongue shall be no less than the value given in table 10.

Table 10 — Minimum tear strength of tongue

Type of material	Test method	Minimum force N
Leather	ISO 3377	36
Coated fabric and textile	Method B ¹⁾ of ISO 4674-1:—	18
1) See table 6 for test conditions.		

4.6.2 pH value

When leather tongues are tested in accordance with the method given in ISO 4045, the pH value shall be no less than 3,5. If the pH is below 4, the difference figure shall be less than 0,7.

4.7 Insole

4.7.1 Thickness

When determined by the following method, the thickness of the insole shall be no less than 2,0 mm.

Cut through the sole in the region of the cleat and measure the thickness using a graduated eyepiece with 0,1 mm scale graduations.

4.7.2 pH value

When leather insoles are tested in accordance with the method given in ISO 4045, the pH value shall be no less than 3,5. If the pH is below 4, the difference figure shall be less than 0,7.

4.7.3 Water absorption and water desorption

When tested in accordance with the method given in 5.15, the water absorption shall be no less than 35 % (*m/m*) and the water desorption shall be no less than 40 % (*m/m*) of the water absorbed.

4.7.4 Abrasion resistance

When non-leather insoles are tested in accordance with the method given in 5.16, there shall be no surface tearing before 400 cycles.

4.8 Outsole

4.8.1 Cleated outsoles

4.8.1.1 Cleated area

With the exception of the region under the flange of the toecap, at least the shaded area as shown in figure 5 shall have cleats which are open to the side.

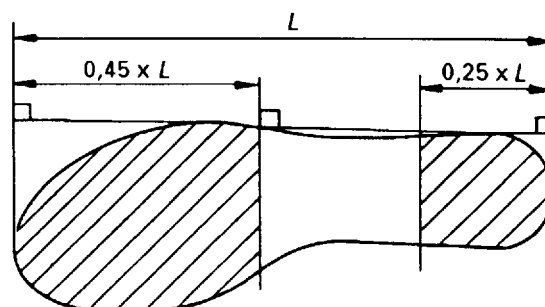


Figure 5 — Cleated area

4.8.1.2 Thickness

For direct-injected, vulcanized or cemented outsoles, the thickness d_1 , as shown in figure 6 a) and 6 b), shall be no less than 4 mm.

For multilayered outsoles, the thickness d_1 , as shown in figure 7, shall be no less than 4 mm.

For all-rubber and all-polymeric footwear, the thickness d_1 , as shown in figure 8, shall be no less than 3 mm and the thickness d_3 shall be no less than 6 mm.

4.8.1.3 Cleat height

For direct-injected, vulcanized or cemented outsoles, the cleat height d_2 , as shown in figure 6(a) and 6(b), shall be no less than 2,5 mm.

For multilayered outsoles, the cleat height d_2 , as shown in figure 7, shall be no less than 2,5 mm.

For all-rubber and all-polymeric footwear, the cleat height d_2 , as shown in figure 8, shall be no less than 4 mm.

NOTE Thickness or cleat height should be measured as indicated in figure 6 a), 6 b), 7 or 8, using a graduated eyepiece with 0,1 mm scale graduations after cutting through the sole in the region of the tread.

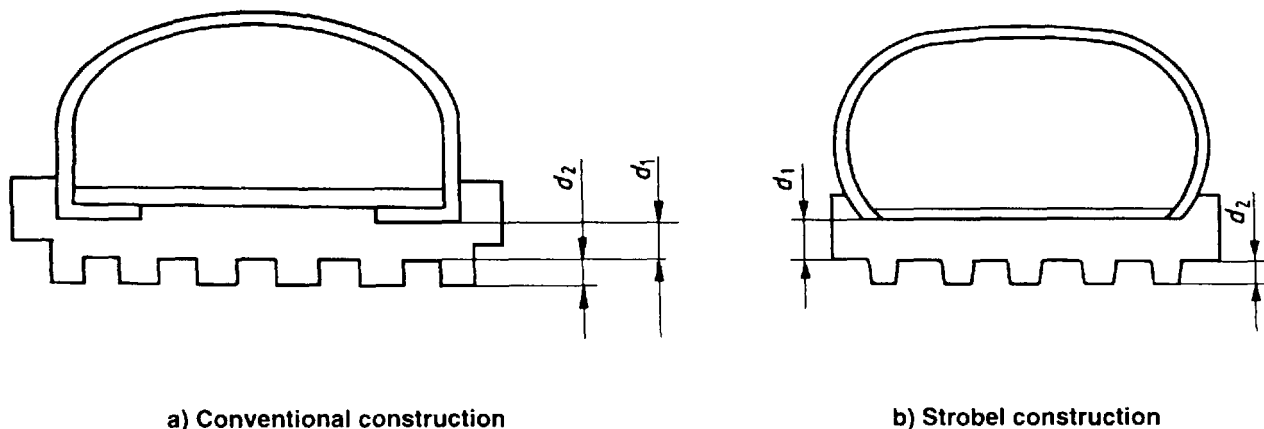


Figure 6 — Direct-injected, vulcanized and cemented outsoles

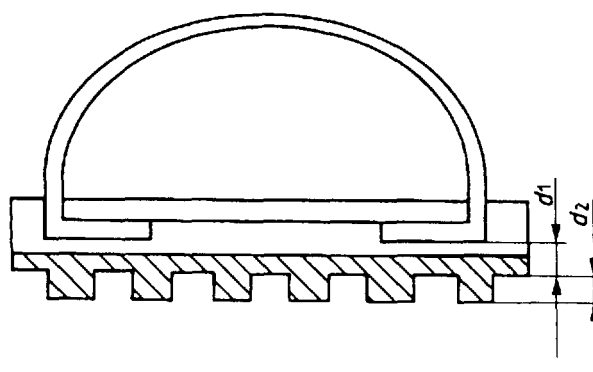


Figure 7 — Multilayered outsoles