



**SLOVENSKI STANDARD**  
**SIST EN 12568:1999**  
**01-julij-1999**

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Foot and leg protectors - Requirements and test methods for toecaps and metal penetration resistant inserts

Fuß- und Beinschutz - Anforderungen und Prüfverfahren für durchtrittsichere Einlagen aus Metall und Zehenkappen

Protecteurs du pied et de la jambe - Exigences et méthodes d'essais des embouts et des inserts métalliques anti-perforation

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**Ta slovenski standard je istoveten z: EN 12568:1998**

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**ICS:**

13.340.50      Varovanje nog in stopal      Leg and foot protection

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EUROPEAN STANDARD

EN 12568

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 1998

ICS 13.340.10

Descriptors: personal protective equipment, accident prevention, footwear, end pieces, metals, specifications, dimensions, shock resistance, crushing strength, perforating strength, corrosion prevention, tests, marking

English version

## Foot and leg protectors - Requirements and test methods for toecaps and metal penetration resistant inserts

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This European Standard was approved by CEN on 26 June 1998.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 161 "Foot and leg protectors", the secretariat of which is held by BSI.

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 January 1999, and conflicting national standards shall be withdrawn at the latest by January 1999.

This European Standard 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).

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

## Introduction

There is a series of European Standards relating to safety, protective and occupational footwear for professional use which give the performance and required properties for the footwear. On introducing these standards all national standards relating to safety toecaps and metal mid soles were withdrawn leaving the manufacturers of these items with no means of demonstrating the performance of their products. This European Standard has been prepared to allow manufacturers to demonstrate the performance level of the toecaps and penetration resistant inserts before being inserted in to the footwear.

## 1 Scope

This European Standard specifies requirements and test methods for toe caps and metal penetration resistant inserts.

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## 2 Normative references

[SIST EN 12568:1999](#)

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 344

Requirements and test methods for safety, protective and occupational footwear for professional use

### 3 Definitions

For the purposes of this standard, the definitions given in EN 344 apply.

**3.1 Internal toe cap** : a toe cap which is incorporated into the footwear and which is positioned underneath the upper.

**3.2 External toe cap** : a toe cap which is incorporated into the footwear and which is positioned on top of the upper.

### 4 Toe caps

Each test sample shall comply with the requirements.

#### 4.1 General requirements

##### 4.1.1 Finishing

Toe caps shall be finished so as to be free from surface marks or defects and shall be free from burrs and sharp edges.

##### 4.1.2 Dimensions

When measured in accordance with the method described in 7.1.2 the internal length of toe caps shall be not less than the appropriate value given in table 1.

If toe caps are formed with a flange, the width,  $e$ , of the flange shall be no greater than 10 mm as shown in figure 1.

Table 1: Minimum internal length of toe caps

Toe cap number	up to and including 5	6	7	8	9	10 and above
Minimum internal length in mm	34	36	38	39	40	42

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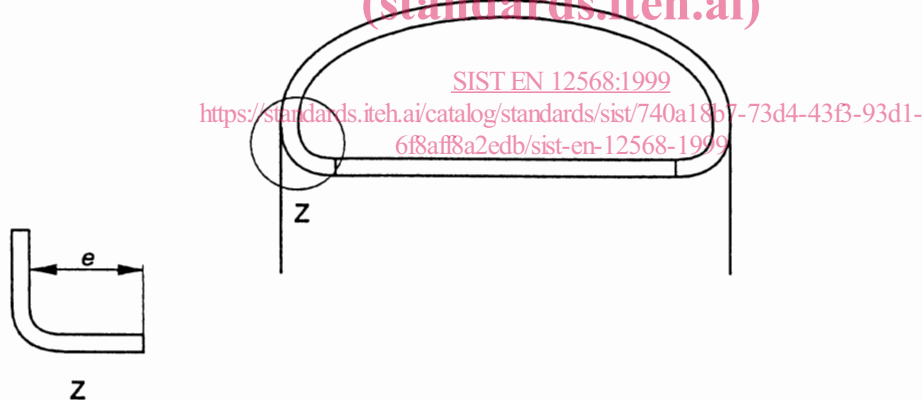


Figure 1 : Illustration of toe cap flange width,  $e$

### 4.1.3 Impact resistance

When toe caps are tested in accordance with the method described in 7.1.3 at an energy level of either  $100 \text{ J} \pm 2 \text{ J}$  for caps intended for protective footwear, or  $200 \text{ J} \pm 4 \text{ J}$  for caps intended for safety footwear, the clearance under the cap at the moment of impact shall be not less than the appropriate value given in table 2. In addition the toe cap shall not develop any cracks on the test axis which go through the material, i.e. through which light can be seen.

**Table 2: Minimum clearance under toe caps at impact and compression**

Toe cap number	up and including 5	6	7	8	9	10 and over
Internal cap minimum clearance mm	19,5	20,0	20,5	21,0	21,5	22,0
External cap minimum clearance mm	24,5	25,0	25,5	26,0	26,5	27,0

### 4.1.4 Compression resistance

When toe caps are tested in accordance with the method described in 7.1.4 the clearance under the toe cap at a compression load of either  $10 \text{ kN} \pm 0,1 \text{ kN}$  for toe caps intended for protective footwear or  $15 \text{ kN} \pm 0,1 \text{ kN}$  for toe caps intended for safety footwear shall not be less than the appropriate value given in table 2.

### 4.2 Metal toe caps: Corrosion resistance

Both before and after testing internal metal toe caps in accordance with the method described in 7.1.1 they shall exhibit no more than five areas of corrosion, none of which shall exceed  $2,5 \text{ mm}^2$  in area.

NOTE : Toe caps intended for use in all-rubber footwear are exempt from this requirement.

### 4.3 Non-metal toe caps

When non-metal toe caps are subject to the treatments described in 7.1.5 and tested in accordance with the method described in 7.1.3 at an energy level of either  $100 \text{ J} \pm 2 \text{ J}$  for caps intended for protective footwear or  $200 \text{ J} \pm 4 \text{ J}$  for caps intended for safety footwear, the clearance under the cap at the moment of impact shall be not less than the appropriate value given in table 2. In addition, the toe cap shall not develop any cracks on the test axis through which light can be seen.

## 5 Penetration resistant metal inserts

Each test sample shall comply with the requirements.

### 5.1 Corrosion resistance

Both before and after testing in accordance with the method described in 7.2.1 the inserts shall exhibit no more than five areas of corrosion, none of which shall exceed 2,5 mm<sup>2</sup> in area.

NOTE : Inserts intended for use in all-rubber footwear are exempt from this requirement.

### 5.2 Penetration resistance

When the inserts are tested in accordance with the method described in 7.2.2 the force required to penetrate shall be not less than 1100 N.

### 5.3 Flexing resistance

When tested in accordance with the method described in 7.2.3, the inserts shall show no visible signs of cracking after they have been subjected to  $1 \times 10^6$  flexion cycles.

## 6 Marking

### 6.1 Toe Caps

Toe caps shall be clearly and permanently marked with the following information:

- a) toe cap size;
- b) left or right;
- c) manufacturer's identification mark;
- d) manufacturer's type designation;
- e) S. or 200 J (for safety toe caps);  
P. or 100 J (for protective toe caps);
- f) The number of this standard.

### 6.2 Penetration resistant inserts

- a) Insert size;
- b) Manufacturers identification mark;
- c) Manufacturers type designation;
- d) The number of this standard.

NOTE : Marking by embossing is acceptable.



## 7 Test methods

### 7.1 Toe caps

#### 7.1.1 Determination of corrosion resistance of metal toe caps

##### 7.1.1.1 Preliminary examination

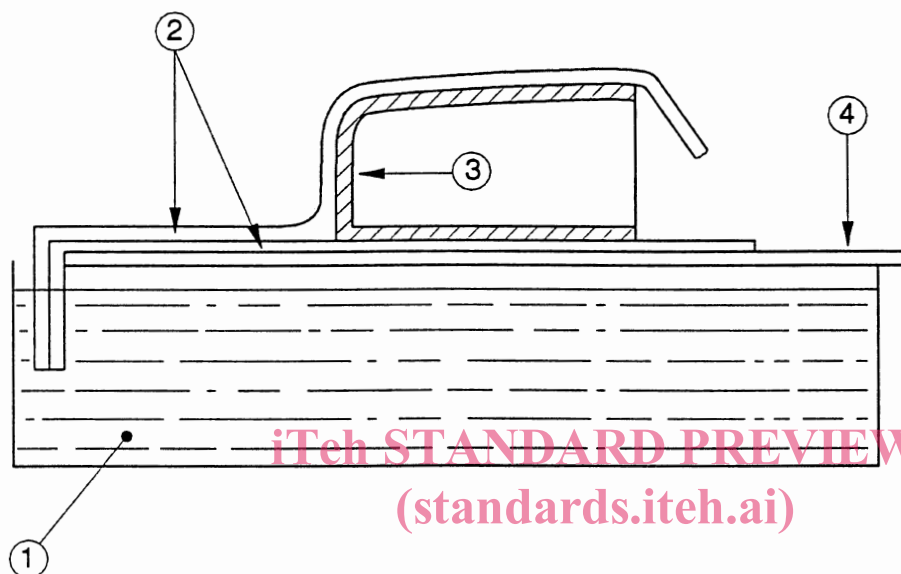
Examine the toe cap visually inside and outside for signs of corrosion under the coating and for corrosion occurring where the coating has broken down.

NOTE: If necessary the coating can be removed to aid this examination although if this is done, the toe cap will need to be replaced with another sample for the corrosion test.

Measure the size of each area of corrosion and note the number of such areas.

If a supporting jig is used during the coating disregard a circular area of 8 mm diameter around the jig contact points.

Three pairs of toe caps shall be examined.



- 1 Sodium chloride solution
- 2 Filter paper
- 3 Toecap
- 4 Glass plate

**Figure 2: Apparatus for corrosion resistance test for toe caps**

### 7.1.1.2 Corrosion test

Remove any coatings of grease which may be present.

Use a 1% (m/m) aqueous solution of sodium chloride as the test solution. Pour approximately 200 ml of this solution into a dish and cover with a glass plate leaving a small opening.

Dip two strips of white filter paper of dimensions at least 100 mm wide and 150 mm long into the test solution at one end so that the strips of filter paper become saturated with solution, the other ends being laid on the glass plate.

Lay the toe cap to be tested flange down over the free end of one filter paper so that the whole flange is in contact with the wetted area and lay the other filter paper over the toe cap so that the greatest possible area of the nose of the cap and its upper surface is in contact with the filter paper (see figure 2). Ensure that the filter paper remains saturated throughout the test.

After 48 h remove the filter paper and examine the toe cap for signs of corrosion caused by the sodium chloride solution. Measure the size of each area of corrosion in square millimetres and note the number of such areas.

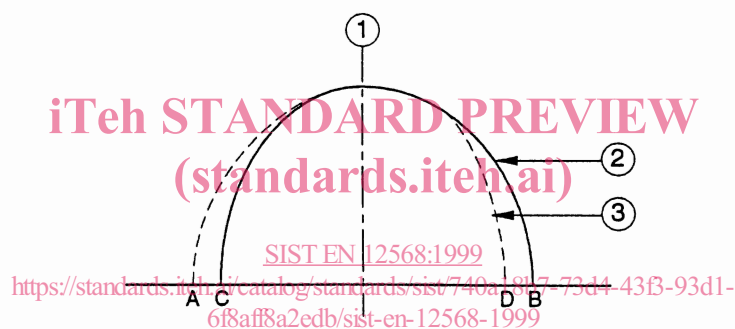
Three pairs of toe caps shall be tested.

### 7.1.2 Determination of internal toe cap length

#### 7.1.2.1 Determination of the test axis

Position the left toe cap with its rear edge in line with a base line and draw its outline. Repeat the exercise with the right toe cap of the pair. Position the outlines in such a manner that the outlines at the toe end of the toe caps coincide and the base lines coincide (see figure 3).

Mark the four points A, B, C and D where the outlines of the right and left toe caps intersect on the base line. Erect the perpendicular from the base line at the mid point of AB or CD. This constitutes the test axis for the toe cap.



- 1 Test axis
- 2 Right cap
- 3 Left cap

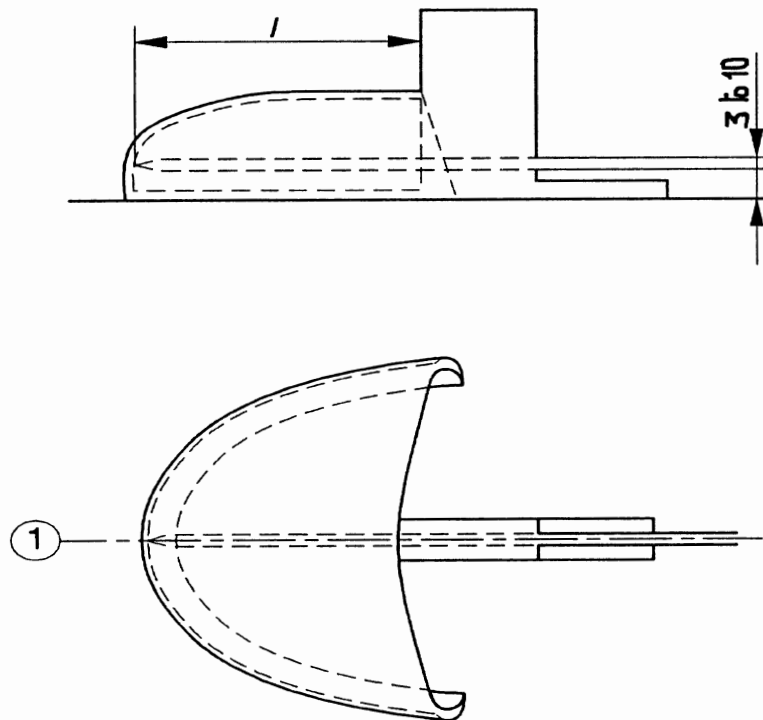
**Figure 3 : Determination of test axis**

### 7.1.2.2 Procedure

Place the toe cap, open side down, on a flat surface. Using an appropriate gauge, measure the internal length,  $l$ , along the test axis from the toe to the back edge between 3 mm and 10 mm above and parallel to the surface upon which the toe cap rests taking the longest distance as the length  $l$  (see figure 4).

Three pairs of toe caps shall be measured.

Dimensions in millimetres



1 Test axis

**Figure 4 : Measurement of internal toe cap length.**

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### 7.1.3 Determination of impact resistance (standards.iteh.ai)

#### 7.1.3.1 Apparatus

SIST EN 12568:1999

<https://standards.iteh.ai/catalog/standards/sist/740a18b7-73d4-43f3-93d1->

7.1.3.1.1 Impact apparatus, incorporating a steel striker of mass  $20 \text{ kg} \pm 0,2 \text{ kg}$  adapted to fall freely on vertical guides from a predetermined height to give the required impact energy calculated as potential energy.

The striker (see figure 5) shall consist of a wedge at least 60 mm long, the faces of which subtend an angle of  $90^\circ \pm 1^\circ$ . The apex where the faces meet shall be rounded to a  $3 \text{ mm} \pm 0,1 \text{ mm}$  radius.

During the test the apex shall be parallel within  $\pm 17'$  to the surface of the clamping device.

The base of the apparatus shall have a mass of at least 600 kg and a metal block of dimensions at least 400 mm x 400 mm x 40 mm deep shall be bolted to it.