



# SLOVENSKI STANDARD

## SIST ENV 13287:2003

01-januar-2003

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**Zaščitna, varovalna in delovna obutev za poklicno uporabo - Preskusne metode in specifikacije za ugotavljanje odpornosti proti zdrsu**

Safety, protective and occupational footwear for professional use - Test method and specifications for the determination of slip resistance

Sicherheits-, Schutz- und Berufsschuhe für den gewerblichen Gebrauch - Prüfverfahren und Spezifikationen zur Bestimmung der Rutschhemmung

Chaussures de sécurité, chaussures de protection et chaussures de travail a usage professionnel - Exigences et méthodes d'essais pour déterminer la résistance au glissement

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**Ta slovenski standard je istoveten z: ENV 13287:2000**

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**ICS:**

13.340.50      Varovanje nog in stopal      Leg and foot protection

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EUROPEAN PRESTANDARD  
PRÉNORME EUROPÉENNE  
EUROPÄISCHE VORNORM

ENV 13287

November 2002

ICS 13.340.50

Supersedes ENV 13287:2000

English version

## Safety, protective and occupational footwear for professional use - Test method for the determination of slip resistance

Chaussures de sécurité, chaussures de protection et chaussures de travail à usage professionnel - Exigences et méthodes d'essais pour déterminer la résistance au glissement

Sicherheits-, Schutz- und Berufsschuhe für den gewerblichen Gebrauch - Prüfverfahren zur Bestimmung der Rutschhemmung

This European Prestandard (ENV) was approved by CEN on 19 August 2002 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, 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

Management Centre: rue de Stassart, 36 B-1050 Brussels

## ENV 13287:2002 (E)

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## Foreword

This document (ENV 13287:2002) has been prepared by Technical Committee CEN/TC 161 "Foot and leg protectors", the secretariat of which is held by BSI.

This document supersedes ENV 13287:2000.

Annexes A and B are informative.

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

## 1 Scope

This European Prestandard describes a method of test for the slip resistance of safety, protective and occupational footwear for professional use.

NOTE For safety, protective and occupational footwear for professional use for special purposes this Prestandard cannot be applicable.

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## 2 Normative references

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This European Prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 344-2:1996 *Safety, protective and occupational footwear for professional use - Part 2: Additional requirements and test methods.*

## 3 Terms and definitions

For the purposes of this European Prestandard, the following terms and definitions apply:

### 3.1

#### **frictional force**

horizontal force arising when footwear slides over the surface

### 3.2

#### **normal force**

normal force exerted by the footwear on the surface at time of measurement

### 3.3

#### **measurement period**

period of the whole measurement cycle during which the actual measurements are taken

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### 3.4

#### static contact time

time between the first contact of the footwear with the surface and beginning of movement

### 3.5

#### coefficient of friction (CoF)

ratio of the frictional force divided by the normal force

### 3.6

#### surface

floor with or without contaminant (lubricant) used for testing the slip resistance

## 4 Test surfaces

Table 1 lists surfaces that can be appropriate for general purpose slip resistant footwear. Other floor/lubricant combinations can be appropriate for specific footwear applications.

Table 1 Surfaces and lubricants

Floor	Lubricant
Steel	Glycerine
Ceramic tiles	Water and detergent
Ceramic tiles	Glycerine

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NOTE The user of the footwear should be made aware that new footwear can initially have lower slip resistance than indicated by the test result, that the slip resistance of the footwear can change during wear and that a high coefficient of friction does not guarantee the absence of slip under all conditions.

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## 5 Method of test

### 5.1 Principle of measurement

The item of footwear to be tested is put on the surface, charged with a given normal force, and moved relative to the surface (or the surface is moved relative to the item of footwear) horizontally. The frictional force is measured and the dynamic coefficient of friction is calculated.

### 5.2 Sampling

Test at least one item of footwear each of three different sizes (smallest, medium, largest).

### 5.3 Apparatus

**5.3.1** *Horizontal testing surface* on which the sole of the item of footwear to be tested slides. Suitable surfaces are given in annex A.

**5.3.2** A *mechanism* for inducing movement between the artificial foot and the surface at the end of the static contact time given in 5.4.5.

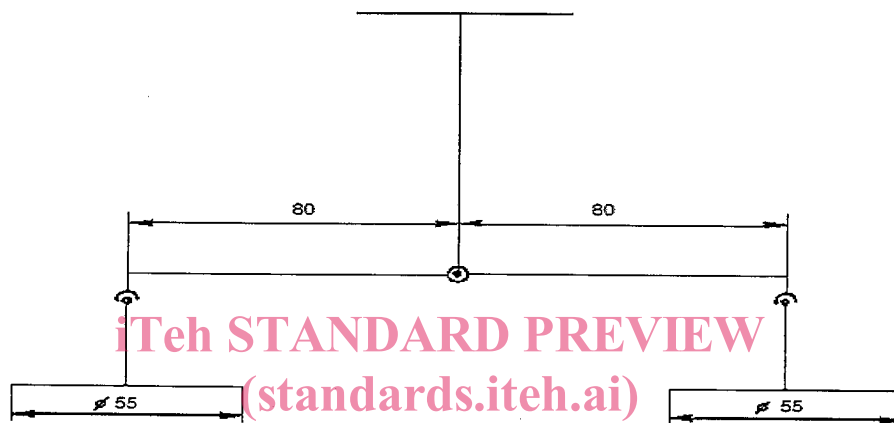
**5.3.3** *Artificial foot conforming to Figure 1* to hold the item of footwear. The dimensions given are valid for footwear of Paris points size 40 and above. For footwear of Paris points size below 40 (English size 6,5) the following changes shall be made:

- diameter of the contact plates: 40 mm (instead of 55 mm);
- distance of the centres of the contact plates: 2 × 70 mm (instead of 2 × 80 mm).

Any other artificial foot, for which it can be shown that it gives the same results, may be used.

- 5.3.4 A mechanism for lowering the item of footwear onto the surface and applying the required normal force according to 5.4.4.
- 5.3.5 A frictional force measuring device, connected to either footwear or floor.
- 5.3.6 A device for measuring the normal force exerted on the item of footwear. This may be omitted if the normal force is known by other means.
- 5.3.7 Floor and lubricant selected from Table 1

Dimensions in millimetres



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Figure 1 - Schematic of artificial foot for mounting the item of footwear

## 5.4 Test conditions

- 5.4.1 The footwear sole shall be put flat on the testing surface.
- 5.4.2 The artificial foot shall be positioned on the insole of the footwear such that the centre of the rear disc of the artificial foot is located at the centre of the heel part (about 15 % of the insole length from the rear of the insole). The longitudinal axis of the artificial foot shall be aligned parallel to the direction of movement.
- 5.4.3 The sliding velocity during measurement shall be  $(0,22 \pm 0,02)$  m/s.
- 5.4.4 The normal force for footwear of Paris points size 40 and above shall be  $(500 \pm 25)$  N. For footwear of Paris points size below 40 (English size 6,5 and below) the normal force shall be  $(400 \pm 20)$  N.
- 5.4.5 The static contact time with the surface prior to the beginning of movement shall be  $(5 \pm 1)$  s.
- 5.4.6 The climatic conditions during the test shall be a temperature of  $(22 \pm 4)$  °C. The test items shall be conditioned prior to the test in accordance with the standard atmosphere in 4.1 of EN 344-2:1996 and the test shall be performed within 30 min after removal from that standard atmosphere.
- 5.4.7 The item of footwear shall be tested sliding forwards.

## 5.5 Preparation of the sole

Wash the sole with a solution of  $(50 \pm 5)$  % volume fraction ethanol in water and dry at ambient temperatures.

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Abrade the sole until a visually uniform abraded surface is obtained over the whole of the heel/sole area that will be in contact with the surface during the subsequent slip test. Achieve this by applying by hand a moderate pressure and using an orbital sander with 2 mm oscillations operating at about 13000 r/min and using an engineering quality aluminium oxide abrasive paper, grit size P 180. When carrying out the preparation take care not to alter significantly the original geometry of the sole nor the edges of the cleats. Afterwards clean the sole to remove the grit. Clean the abrasive paper after each operation, and replace it if it is damaged, or debris cannot be removed.

### 5.6 Procedure

#### 5.6.1 Preparation of the floor

Before applying a new lubricant, the floor shall be cleaned appropriately.

#### 5.6.2 Application of lubricant

Apply the lubricant on the testing surface (floor) such that it forms a continuous layer of at least 1 mm thickness (corresponding to at least 10 ml per 100 cm<sup>2</sup>). Check and if necessary renew the layer before each test.

#### 5.6.3 Mounting the item of footwear

Mount the item of footwear on the artificial foot and attach it to the testing machine. Any slipping between the artificial foot and the insole shall be prevented by appropriate means, e.g. two-sided adhesive tape or abrasive paper stuck to the contact plate. It can also prove useful to place some paper or cloth in the tip of the footwear. If there is a removable insock, it shall be taken out. The upper of the footwear can be cut in order to facilitate its mounting.

#### 5.6.4 Measurement

Lower the item of footwear onto the testing surface and record the horizontal frictional forces with the force measuring device 5.2.4, in accordance with the conditions given in 5.3.

Determine the mean frictional force during the measurement period and calculate the mean coefficient of friction by dividing the frictional force (horizontal force) by the normal force. The measurement period is the period during which the conditions of test according to 2.3 are met. However, the measuring period shall not start before a steady state condition with respect to the coefficient of friction is reached.

### 5.7 Number of tests and compilation of test results

Take at least five measurements of each item of footwear at each condition chosen (i.e. combination of floor and lubricant). Calculate the arithmetic mean for each item of footwear for each condition and round to two decimal places. If the five consecutive results of the measurements show a systematic change, discard these results and repeat the measurements.

If the same item of footwear is to be tested with different lubricants, use water with detergent first and clean the sole again.

For guidance on the determination and application of uncertainty of measurement see annex B.

## 6 Test report

The test report shall contain the following:

- a) identification or description of the footwear tested;
- b) reference to this European Prestandard;
- c) description of the measuring device, lubricant, floor and temperature of the atmosphere;
- d) date of test;



- e) mean value of the coefficient of friction for each size and condition chosen;
- f) any deviation from this European Prestandard.

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