



# SLOVENSKI STANDARD

## SIST EN 13893:2003

01-februar-2003

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Resilient, laminate and textile floor coverings - Measurement of dynamic coefficient of friction on dry floor surfaces

Elastische, laminierte und textile Bodenbeläge - Messung des Gleitreibungskoeffizienten von trockenen Bodenbelagsoberflächen

Revetements de sol résilients, stratifiés et textiles - Détermination du coefficient de frottement dynamique sur la surface des sols secs

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Ta slovenski standard je istoveten z: EN 13893:2002

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### ICS:

59.080.60	Tekstilne talne obloge	Textile floor coverings
97.150	Netekstilne talne obloge	Non-textile floor coverings

**SIST EN 13893:2003**

**en**

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EUROPEAN STANDARD

EN 13893

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2002

ICS 59.080.60; 97.150

English version

## Resilient, laminate and textile floor coverings - Measurement of dynamic coefficient of friction on dry floor surfaces

Revêtements de sol résilients, stratifiés et textiles -  
Détermination du coefficient de frottement dynamique sur  
la surface des sols secs

Elastische, laminierte und textile Bodenbeläge - Messung  
des Gleitreibungskoeffizienten von trockenen  
Bodenbelagsoberflächen

This European Standard was approved by CEN on 26 August 2002.

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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 Management Centre has the same status as the official versions.

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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

## Foreword

This document (EN 13893:2002) has been prepared by Technical Committee CEN/TC 134 "Resilient, textile and laminate floor coverings", 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of an identical text or by endorsement, at the latest by May 2003, and conflicting national standards shall be withdrawn at the latest by May 2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

In this European Standard the annex A is normative.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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## Introduction

Dynamic friction testing is a means of assessing the slipperiness of floors. Many test devices have been constructed but these give different results since the design and construction methods differ and because different test parameters are chosen.

CEN/TC 134 therefore decided not to standardize a particular device for testing slipperiness properties of floor coverings. The aim is to fix and standardize the principle of testing and specify the parameters to be followed when designing a test device and when testing with it.

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## EN 13893:2002 (E)

### 1 Scope

This European Standard specifies the method for the measurement of dynamic coefficient of friction ( $\mu$ ) on surfaces of resilient, laminate and textile floor coverings, usually walked on with shoes.

Relief floor coverings with a displacement volume  $\leq 4 \text{ cm}^3/\text{dm}^2$  are covered by this standard.

The measurements are made in a laboratory on ex-factory dry floor covering surfaces only. The method described is not suitable for testing on wet or contaminated surfaces.

### 2 Normative references

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 (including amendments).

EN 522:1998, *Adhesives for leather and footwear materials — Bond strength — Minimum requirements and adhesive classification*.

EN 12466:1998, *Resilient floor coverings — Vocabulary*.

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

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### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions of EN 12466:1998 together with the following apply.

#### 3.1 dynamic coefficient of friction, $\mu$

quotient of the horizontal frictional force and the vertical load during motion at a constant speed between the slider and the horizontal floor covering

#### 3.2 displacement volume

open volume of a relief floor covering beneath the wear surface

NOTE The method for determination of this property is given in annex A.

### 4 Principle

Sliders made from the defined material and having a definite shape are loaded to impose a specified force on the floor covering. The loaded sliders are pulled parallel to the surface of the floor covering at a constant speed. The horizontal force applied to pull the sliders is recorded over the length of a trace. The horizontal force is divided by the vertical force to obtain the dynamic coefficient of friction.

## 5 Apparatus and materials

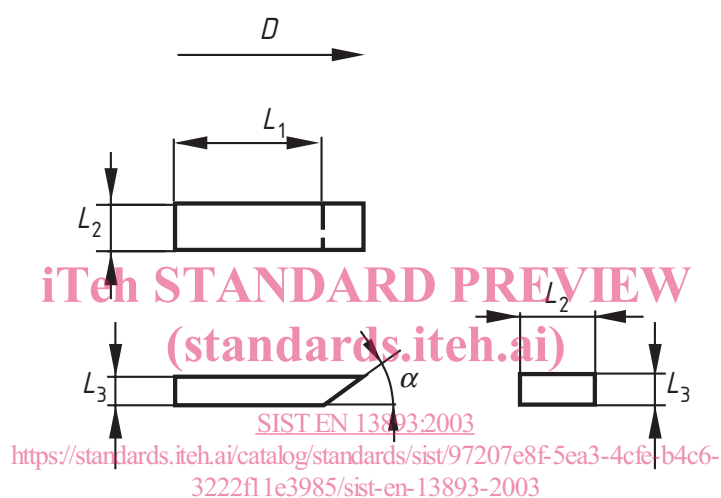
### 5.1 Apparatus

**5.1.1 A pulling device**, able to pull a loaded slider assembly at a constant speed, to a tolerance of 0,01 m/s, within the range of 0,20 m/s to 0,30 m/s along a length which allows a stable measurement reading for at least 0,30 m.

**5.1.2 A measuring device**, capable of measuring the horizontal force with an error limit of 1 %.

**5.1.3 A slider assembly**, with two leather sliders and one shoe rubber slider of shape and dimensions specified in Figure 1, arranged on the assembly as shown in Figure 2. The three sliders shall be of similar thickness within the range 2 mm to 6 mm, to ensure that they are all capable of being in contact with a flat surface, and shall be firmly fixed to the assembly by means of a contact adhesive. The slider assembly shall be loaded with a mass such that the total mass of the loaded slider assembly is  $(10,0 \pm 0,1)$  kg.

Dimensions in millimetres

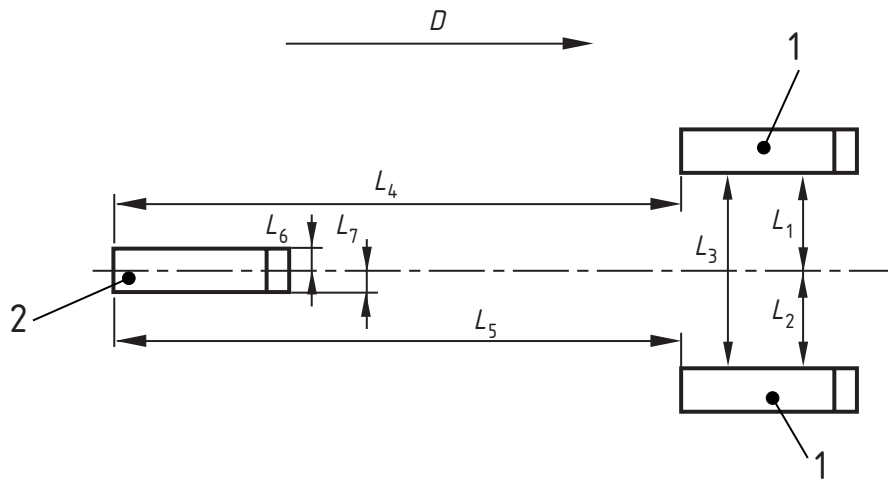


#### Key

$D$	Direction of movement	
$L_1$	Length	$(37,5 \pm 2,5)$ mm
$L_2$	Width	$(10 \pm 0,5)$ mm
$L_3$	Uniform thickness	within the range 2 mm to 6 mm
$\alpha$	Chamfer angle	$(35 \pm 5)^\circ$

**Figure 1 — Slider shape and dimensions**

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**Key**

1	Leather sliders
2	Shoe rubber slider
<i>D</i>	Direction of movement
$L_3$	$(46 \pm 2)$ mm
$L_4$	$(130 \pm 3)$ mm
$L_1$ minus $L_2$	$(0 \pm 0,3)$ mm
$L_4$ minus $L_5$	$(0 \pm 0,3)$ mm
$L_6$ minus $L_7$	$(0 \pm 0,3)$ mm

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**Figure 2 — Typical arrangement of sliders on slider assembly (bottom view)**

NOTE The use of a template is recommended to ensure the slider dimensions fall within the stated tolerances.

## 5.2 Sliders

**5.2.1 Leather slider**, consisting of pit-tanned leather of density  $(1,0 \pm 0,1)$  g/cm<sup>3</sup> and Shore D hardness  $60 \pm 10$  according to EN ISO 868.

**5.2.2 Shoe rubber slider**, consisting of reference test material SBR 1 based on styrene-butadiene rubber of Shore A hardness 95, as specified in EN 522:1998.

## 5.3 Balance

The balance shall be capable of measuring the mass of the loaded slider assembly to the nearest 10 g.

## 5.4 Calibrated weights

Three calibrated weights with different masses within the range 2 kg to 7 kg, (e.g. 2 kg, 4 kg and 7 kg) for calibrating the test device.

## 5.5 Abrasive paper

60 grade and 320 grade abrasive papers fitted to a plain rigid surface with a width greater than that of the slider assembly.



## 5.6 Clean cotton cloth and/or brush

# 6 Calibration

## 6.1 Calibration by weights

Measure and record the mass of the loaded slider assembly using the balance (5.3).

Place the test device in a vertical position to allow it to pull a calibrated weight (5.4) against the measuring device (5.1.2) without friction, parallel to the bottom of the device.

Take three measurements with each of the three calibrated weights. Record the three average results (calculated and indicated by the test device).

Compare each of these three average results with the theoretical value. i.e.:

$$\frac{\text{mass of calibrated weight}}{\text{known total load including sliders}}$$

The average deviation from the theoretical value shall be  $\leq 0,01$ .

## 6.2 Other calibration methods

For machines of special construction (that cannot be calibrated by weights), use the calibration procedure recommended by the manufacturer.

## 7 Sampling and preparation of test pieces

Take test pieces, from both production (machine) and cross-machine directions, of dimensions approximately 100 cm by 50 cm from a sample of the floor covering. If known, mark the machine direction on the test piece. Assemble panels and tiles so as to enable both machine and cross-machine directions to be measured.

Condition the test pieces for at least 24 h at the standard atmosphere ( $23 \pm 2$ ) °C and ( $50 \pm 5$ ) % relative humidity or alternatively at ( $20 \pm 2$ ) °C and ( $65 \pm 5$ ) % relative humidity.

Clean the surface of laminate and resilient floor covering test pieces with the clean dry cotton cloth and use the brush to clean the surface of textile floor coverings. Do not use any cleaning agent.

Relief floor coverings within the scope of CEN/TC 134 may be regarded as having a displacement volume of  $\leq 4$  cm<sup>3</sup>/dm<sup>2</sup>. For verification of this, determine the displacement volume as specified in annex A.

## 8 Preparation of sliders

Plane-grind the surface of new sliders with 60 grade abrasive paper (5.5) to ensure uniform thickness and then clean and plane-grind the surface of the sliders before testing using a 320 grade abrasive paper. During the plane-grinding the abrasive paper shall be in contact with all three sliders. The abrasive strokes shall be uniformly to-and-from in the length direction of the sliders, with the final two strokes against the direction of slider motion.

Remove any dust from the sliders. Repeat this preparation for every new set of 5 measurements.