



**SLOVENSKI STANDARD**  
**kSIST-TS FprCEN/TS 16165:2016**  
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**Ugotavljanje odpornosti talnih površin proti zdrsu - Metoda vrednotenja**

Determination of slip resistance of pedestrian surfaces - Methods of evaluation

Bestimmung des Gleitwiderstandes von Fußgängerbereichen - Ermittlungsverfahren

Détermination de la résistance à la glissance des surfaces piétonnières - Méthode d'évaluation

**Ta slovenski standard je istoveten z: FprCEN/TS 16165**

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English Version

**Determination of slip resistance of pedestrian surfaces -  
Methods of evaluation**

Détermination de la résistance à la glissance des  
surfaces piétonnières - Méthode d'évaluation

Bestimmung des Gleitwiderstandes von  
Fußgängerbereichen - Ermittlungsverfahren

This draft Technical Specification is submitted to CEN members for Vote. It has been drawn up by the Technical Committee CEN/TC 339.

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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## **European foreword**

This document (FprCEN/TS 16165:2016) has been prepared by Technical Committee CEN/TC 339 “Slip resistance of pedestrian surfaces - Methods of evaluation”, the secretariat of which is held by DIN.

This document is currently submitted to the Formal Vote.

This document will supersede CEN/TS 16165:2012.

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

## Introduction

This document describes the most commonly used test methods in Europe for the determination of the slip resistance of floorings in the most commonly encountered situations in which pedestrians walk.

The method in Annex A describes the test method based on the ramp with contaminant water and operator barefoot.

The method in Annex B describes the test method based on the ramp with contaminant oil and operator wearing specified shoes.

NOTE The contaminant oil is used only to make the test more sensitive.

The method in Annex C describes the test method based on the pendulum in dry and wet conditions using specified rubber sliders. This method can be used *in situ*.

The method in Annex D describes the test method based on the tribometer in dry and wet conditions using specified rubber sliders. This method can be used *in situ*.

The tests described in Annexes A and B are laboratory tests. The tests described in Annexes C and D are laboratory and *in situ* tests. It is recommended to use Annexes A to D in the situations described as follows:

The method in Annex A: Floorings in wet conditions where the pedestrian is barefoot.

The method in Annex B, C and D: Floorings in private and/or public and/or work areas in wet and/or dry conditions where the pedestrian is wearing shoes.

## 1 Scope

This Technical Specification specifies test methods for the determination of the slip resistance of surfaces in the most commonly encountered situations in which pedestrians walk.

This Technical Specification does not cover sports surfaces and road surfaces for vehicles (skid resistance).

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 438-4, *High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (Usually called Laminates) - Part 4: Classification and specifications for Compact laminates of thickness 2 mm and greater*

EN ISO 868, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868)*

EN ISO 4287, *Geometrical product specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters (ISO 4287)*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ISO 5725-5, *Accuracy (trueness and precision) of measurement methods and results — Part 5: Alternative methods for the determination of the precision of a standard measurement method*

ISO 7619-1, *Rubber, vulcanized or thermoplastic — Determination of indentation hardness — Part 1: Durometer method (Shore hardness)*

## 3 Terms and definitions

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

### 3.1

#### **pedestrian surface**

surface which is designed for people to walk upon

### 3.2

#### **acceptance angle**

lowest angle of the inclined ramp at which the test person reaches the limit of safe walking when slipping occurs

### 3.3

#### **contaminant**

material on the surface of the surface which is not an inherent part of the surface and which can affect the frictional properties of that surface

**3.4****surface**

pedestrian surface excluding road surfaces and sports surfaces

**3.5****friction**

resistance to relative motion between two bodies in contact, e.g. the test slider or the footwear sole and the pedestrian surface

Note 1 to entry: The frictional force is the force acting tangentially in the contact area.

**3.6****slip**

loss of traction which can cause the test persons to lose their footing

**3.7****slip resistance**

measure of dynamic friction between two surfaces in contact and which may or may not be in the presence of a specified contaminant

Note 1 to entry: The frictional force opposing movement of an object across a surface, usually with reference to the sole (including the heel) of a shoe or to the barefoot contact area on a floor. Slip resistance of a pedestrian surface is the property of the surface which limits the relative sliding movement.

**3.8****test person**

person who walks on the test surface or calibration surface

**3.9****test walk**

walking period to determine a single acceptance angle

**3.10****pendulum test value****PTV**

standardised value of the slip resistance as measure of the friction between the slider and the test surface obtained with the pendulum friction tester which incorporates a slider manufactured of rubber

**3.11****dynamic coefficient of friction**

coefficient of friction where movement of a body across a surface is maintained at constant speed

**3.12****sliding friction coefficient for surfaces** **$\mu$** 

quotient of the horizontal frictional force and the vertically acting force between the slider and the horizontal surface during movement at a constant speed

**3.13****sliding distance**

distance over which the body is pulled during a single measurement

**FprCEN/TS 16165:2016 (E)****3.14****measuring distance**

distance over which the sliding friction coefficient is determined

**3.15****measurement series**

series consisting of five single measurements on one measuring distance

**3.16****test cycle**

cycle consisting of three measurement series

**4 Test methods**

Carry out a test according to Annex A to Annex D. If tests are performed in the laboratory the room temperature should be  $(20 \pm 5)^{\circ}\text{C}$  unless otherwise stated.

## **Annex A**

### **(normative)**

## **Barefoot Ramp Test**

### **A.1 Principle**

Two bare-foot test persons are used to determine the acceptance angle, after the pedestrian surface material being tested has been continuously coated with water containing a wetting agent. The test persons, each in turn, facing downhill and with an upright posture, move forwards and backwards over the test surface, as they increase their angle of inclination, until the safe limit of walking is reached and a slip occurs. The mean acceptance angle obtained is used to express the degree of slip resistance. Subjective influences on the acceptance angle are limited by means of a calibration procedure.

### **A.2 Test equipment**

#### **A.2.1 Test apparatus**

The test device (Figure A.1) is a level and torsion-free platform of approximately 600 mm width and 2 000 mm length which can be adjusted longitudinally as a continuous movement to gradients from 0° to approximately 45°. The lifting stroke is controlled by the test person. An angle indicator on the test device shall show the platform tilt away from the horizontal plane at an accuracy of  $\pm 0,2^\circ$ . The test apparatus shall be rigid such that the angle does not vary by more than  $\pm 0,5^\circ$  during the walking. The display of the angle measurement system shall be fixed in such a way that the test person cannot read it during the test. The test person is safeguarded by railings along the sides and protected from falling by a safety harness which shall not cause a hindrance to the test person when walking on the test floor.