



**SLOVENSKI STANDARD**  
**oSIST prEN 16451:2022**  
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**Železniške naprave - Zavore - Nosilec zavorne obloge**

Railway applications - Braking - Brake pad holder

Bahnanwendungen - Bremse - Bremsbelaghalter

Applications ferroviaires - Freinage - Porte-garnitures

**Ta slovenski standard je istoveten z: prEN 16451**

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## Railway applications - Braking - Brake pad holder

Applications ferroviaires - Freinage - Porte-garnitures

Bahnanwendungen - Bremse - Bremsbelaghalter

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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**prEN 16451:2022 (E)****European foreword**

This document (prEN 16451:2022) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 16451:2015.

In comparison with the previous edition, the following technical modifications have been made:

- update of normative and informative references;
- modification of requirements on latch mechanism;
- modification of requirements on loading in the direction of force application and in the direction of the braking moment;
- modifications to Annex A and Annex B;
- informative Annex D “Geometry of standard brake pads” has been deleted and references to EN 15328 have been added.

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

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## Introduction

This document gives the requirements to be met for the design, dimensioning, testing and quality assessment of brake pad holders. These requirements cannot be written in sufficient detail to ensure good workmanship or proper construction. Each manufacturer is therefore responsible for taking every necessary step to make sure, that the quality of workmanship and construction is such as to ensure accordance with good engineering practice.

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**prEN 16451:2022 (E)****1 Scope**

The requirements contained in this document apply to the brake pad holders with which the rail vehicles of main-line railways, regional and suburban railways are fitted. Brake pad holders pursuant to this document are to be made from ferrous materials e.g. cast iron, cast steel or forged steel. Brake pad holders made of non-ferrous materials are not subject of this document.

**2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 18203:2022, *Steel - Determination of the thickness of surface-hardened layers (ISO 18203:2016)*

EN 14478:2017, *Railway applications - Braking - Generic vocabulary*

EN 15328:2020, *Railway applications — Braking — Brake pads*

EN 50125-1:2014, *Railway applications - Environmental conditions for equipment - Part 1: Rolling stock and on-board equipment*

EN 60068-2-6:2008, *Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal) (IEC 60068-2-6:2007)*

EN 60068-2-47:2005, *Environmental testing - Part 2-47: Tests - Mounting of specimens for vibration, impact and similar dynamic tests (IEC 60068-2-47:2005)*

EN 60721-3-5:1997, *Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 5: Ground vehicle installations (IEC 60721-3-5:1997)*

EN 61373:2010, *Railway applications - Rolling stock equipment - Shock and vibration tests (IEC 61373:2010)*

EN ISO 6506-1:2014, *Metallic materials - Brinell hardness test - Part 1: Test method (ISO 6506-1:2014)*

EN ISO 6507-1:2018, *Metallic materials - Vickers hardness test - Part 1: Test method (ISO 6507-1:2018)*

EN ISO 6508-1:2016, *Metallic materials - Rockwell hardness test - Part 1: Test method (ISO 6508-1:2016)*

EN ISO 6892-1:2019, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2019)*

EN ISO 9227:2017, *Corrosion tests in artificial atmospheres - Salt spray tests (ISO 9227:2017)*

EN ISO 14284:2002, *Steel and iron - Sampling and preparation of samples for the determination of chemical composition (ISO 14284:1996)*

EN ISO 148-1:2016, *Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1:2016)*



### 3 Terms and definitions

For the purposes of this document, the following terms and definitions given EN 14478:2017 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1

##### **compact disc brake unit**

disc brake unit, generally with reduced envelope and weight with a single interface to the bogie

#### 3.2

##### **operational mounting condition**

normal and nominal conditions of assembly on a vehicle

#### 3.3

##### **referenced technical drawings**

drawings used for definition of brake pad holder

### 4 Symbols and abbreviations

$A \%$	Percentage elongation after fracture (as specified by EN ISO 6892-1:2019)
$F$	Force
$g$	Gravity acceleration 9,81 m/s <sup>2</sup>
KV	Absorbed energy for a V-notch test piece (as specified by EN ISO 148-1:2016)
KU	Absorbed energy for a U-notch test piece (as specified by EN ISO 148-1:2016)
SL1 and SL2	Classes of loading
T1 and TX	Classes of temperature (as specified by EN 50125-1:2014)
VL and VH	Classes of vibration

## 5 Design and manufacture

### 5.1 Latch mechanism

The design of the latch mechanism to retain the brake pads shall satisfy the following principles:

- there shall be a positive retention (generation of strain to obtain unlocking) of the latch when in the closed position;
- the brake pad holder and its latch mechanism shall be designed to withstand railway-typical conditions. A secondary retention of the latch mechanism may be installed optionally, which is recommended;
- ease of operation – no special tools to open and close the latch mechanism. Preferably designed to allow use of simple flat bladed screw driver;
- during pad renewal the latch mechanism should remain attached to the brake pad holder;
- renewal of a defective latch mechanism should not require the dismantling of the brake pad holder from the brake unit.

### 5.2 Interchangeability by applying same main dimensions and geometry

#### 5.2.1 General

Brake pad holders can be designed based on different concepts. The requirements specially for interchangeability are defined below.

#### 5.2.2 Interchangeability for “conventional” brake unit

The requirements for the dimensions for geometric interchangeability for “conventional” brake unit are given in Annex A. These dimensions are compatible with brake pads defined in EN 15328:2020, Annex F. If required a device with mechanical coding should be used. Annex C indicates an example for application.

#### 5.2.3 Interchangeability for “compact” brake unit

The recommendations for the dimensions for geometric interchangeability for “compact” brake unit are given in Annex B. These dimensions are compatible with brake pads defined in EN 15328:2020, Annex F. If required a device with mechanical coding should be used. Annex C indicates an example for application.

#### 5.2.4 Dimensional conformity

The dimensional requirements are defined in referenced technical drawings. The conformity assessment of the dimensions of the brake pad holder is verified in accordance with 6.3.1.

### 5.3 Material

As specified in the scope, this document applies only to the brake pad holders in “ferrous material” e.g. cast iron or steel, manufactured by a forging or casting process. The material used for the design of the brake pad holder shall conform to the technical requirements defined in this document.

The conformity assessment of the brake pad holder material, with referenced technical drawings, shall be verified in accordance with 6.3.2.

## 5.4 Environmental conditions

### 5.4.1 Ambient temperature

The brake pad holder shall be able to operate within the temperature classes T1 and TX as specified by EN 50125-1:2014, where the upper limit for TX is +70 °C external air temperature.

### 5.4.2 Other environmental conditions

#### 5.4.2.1 General

The following environmental conditions shall be considered in the design of the brake pad holder.

If not specifically required to be tested as part of the type testing requirements in this standard, suitable tests and/or design assessments considering the effect of the following environmental conditions on the brake pad holder shall be used in the development/design proving of the device, prior to type testing.

#### 5.4.2.2 Humidity

The following external humidity levels shall be considered:

- yearly average:  $\leq 75$  % relative humidity;
- on 30 days in the year continuously: between 75 % and 95 % relative humidity;
- on the other days occasionally: between 95 % and 100 % relative humidity;
- maximum absolute humidity: 30 g/m<sup>3</sup> occurring in tunnels.

#### 5.4.2.3 Rain

Rain rate of 6 mm/min shall be taken into account. The effect of rain shall be considered depending on the possible equipment installation together with wind and vehicle movement.

#### 5.4.2.4 Snow, ice and hail

Consideration shall be given to the effect of all kinds of snow, ice and hail. The maximum diameter of hailstones shall be taken as 15 mm, larger diameter can occur exceptionally. The effect of snow, ice and hail shall be considered depending on the equipment installation together with wind and vehicle movement.

#### 5.4.2.5 Solar radiation

Equipment design shall allow for direct exposure to solar radiation at the rate of 1 120 W/m<sup>2</sup> for a maximum duration of 8 h.

#### 5.4.2.6 Resistance to pollution

The effects of pollution shall be considered in the design of equipment and components. Means may be provided to reduce pollution by the effective use of protection of the device. The severity of pollution can depend upon the location of the equipment, therefore the effects of the kinds of pollution indicated in Table 1 shall be considered as a minimum.