SLOVENSKI STANDARD
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Železniške naprave - Zavore - Nosilec zavorne ploščice in zavorni ključ

Railway applications - Braking - Brake block holder and brake block key

Bahnanwendungen - Bremsen - Bremsklotzhalter und Bremsklotzkeil

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Applications ferroviaires - Freinage - Porte-semelles et clavette de semelle et clavette de semelle de frein

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45.040	Materiali in deli za železniško tehniko	Materials and components for railway engineering

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EUROPEAN STANDARD

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Railway applications - Braking - Brake block holder and brake block key

Applications ferroviaires - Freinage - Porte-semelles et clavette de semelle de frein

Bahnanwendungen - Bremsen - Bremsklotzhalter und Bremsklotzkeil

This European Standard was approved by CEN on 30 December 2018.

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European foreword

This document (EN 15329:2019) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15329:2015.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

Compared to the previous edition, the following changes have been made:

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a) the standard title has been modified;

b) normative references have been updated;

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c) terms and definitions have been revised;

d) requirements on materials have been revised;

e) requirements on design have been revised;

f) requirements on markings have been revised;

g) requirements on type testing have been revised;

h) normative Annexes have been revised;

i) new informative Annex ZA has been added.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This document applies to brake block holders and brake block keys included in brake rigging installed on railway vehicles.

Brake block holders and brake block keys made of non-ferrous materials are not within the scope of this document.

This document contains requirements for design and evaluation testing of conformity.

The requirements contained in this document apply to the brake block holders and brake block keys fitted on railway vehicles with brake blocks whose dimensions are in accordance with the requirements given in EN 16452.

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 10204, *Metallic products — Types of inspection documents*

EN 14478, *Railway applications — Braking — Generic vocabulary*

EN 15085 (all parts), *Railway applications — Welding of railway vehicles and components*

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EN 16452, *Railway applications — Braking — Brake blocks*

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

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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)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14478, EN 16452 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
brake block key
securing element for the brake block in the brake block holder

3.2
brake block with low coefficient of friction
composite (organic or sinter) brake block material type L or LL as defined in EN 16452 or cast iron brake block material

3.3
brake block with high coefficient of friction
composite (organic or sinter) brake block material type K as defined in EN 16452

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3.4
single brake block holder
brake block holder suitable for one brake block typically of length 320 mm; corresponds to “Bg” configuration as defined in EN 16452

3.5
double brake block holder
brake block holder suitable for two brake blocks typically of length 250 mm; corresponds to “Bgu” configuration as defined in EN 16452

3.6
integrated brake rigging
brake rigging as an integrated part of the brake actuator

3.7
non-integrated brake rigging
independent brake rigging

Note 1 to entry: Known as “standard rigging”.

4 Symbols and abbreviations

4.1 Symbols

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For the purposes of this document, the symbols given in Table 1 apply.

Table 1 — Symbols and units

Symbol	Description	Unit
D	Diameter	mm
F_{bmax}	Maximum application force in service = maximum pneumatic application force + overlapping parking brake force [a]	kN
F_{Pr}	Test force	kN
F_{Prdyn}	Dynamic test force	kN
F_{Prm}	Dynamic mean force	kN
h	Pitch before deflection test	mm
L_S	Span during deflection test	mm

[a] Overlapping is to be considered if overlapping is a normal mode.

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4.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

MP magnetic particle testing
UT Ultrasonic Testing
GE Go Everywhere

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5 Materials

5.1 General

The ferrous materials used for the manufacturing of brake block holders and their components shall comply with relevant standards of material (as for instance welded design shall be in accordance with EN 15085).

Declaration of conformity with standards (e.g. with EN 10204 or internal specification) shall be provided.

5.2 Material for brake block holder

The brake block holders shall be produced from one of the following:

— steel (cast, forged, rolled or welded);

— grey or nodular cast iron.

5.3 Material for brake block key

The selection of the material and the manufacturing process are free and shall comply with the technical specifications and/or the drawings.

5.4 Corrosion protection

If corrosion protection is applied, it shall not contain any components constituting a hazard for the staff coming into contact with them. Should paint colouring be applied, care shall be taken to ensure that bearing points for bolts, bushes and moving parts are free from paint.

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6 Design

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6.1 Environmental conditions

6.1.1 General

For vehicles used in “general operation” or “GE” (various formations of vehicles from different origins; train formation not declared at design stage) and using non-integrated brake rigging, all the environmental requirements listed shall be taken into account within the design concept of the components. However only the assessment tests listed in Clause 8 shall be performed. The remaining proofs are to be presented in the declarations of conformity.

For other vehicles any deviation on below environmental conditions is allowed. Any special requirement shall be declared in a specification.

6.1.2 Ambient temperature

The brake component shall be able to operate within the temperature class TX in accordance with EN 50125-1, where the upper limit for TX shall be raised up to +70 °C for the external air temperature.

6.1.3 External air humidity

The following humidity levels shall be considered for the external environment (EN 50125-1:2014, 4.4):

— yearly average: 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^3 occurring in tunnels.

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6.1.4 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.

6.1.5 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.

6.1.6 Solar radiation

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

6.1.7 Resistance to pollution

The effects of pollution shall be considered in the design of equipment and components. Means may be provided to reduce exposure to 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 2 shall be considered as a minimum.

Table 2 — Class of environmental definition

Pollution	Class to be considered (IPX level 5)
Chemically active substances	Class 5C2 of EN 60721–3-5:1997
Contaminating fluids	Class 5F2 (electrical engine) of EN 60721-3-5:1997
Biologically active substances	Class 5B2 of EN 60721–3-5:1997
Dust	Class 5S2 of EN 60721–3-5:1997
Stones and other objects Ballast and other objects	maximum 15 mm diameter
Sand	Class 5S2 of EN 60721–3-5:1997
Salt mist	Class 5C2 of EN 60721–3-5:1997

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6.2 Brake block holders

6.2.1 General

The brake block holders shall provide secure mounting and positioning of the brake block made of grey cast iron, sintered material or composite material. Sprues, suction heads and sharp edges caused by manufacturing shall be removed. Brake block holders should be designed to accommodate

— one brake block configuration Bg for single brake block holders (see Annex A),

— two brake blocks configuration Bgu for double brake block holders (see Annex B).

For vehicles used in “general operation” or “GE” and using non-integrated brake rigging, the dimensional characteristics shall ensure the interchangeability of brake block holders designed in accordance with Annexes A and B and including marking as described in Annex C.

For other vehicles with integrated brake rigging and using brake blocks in accordance with EN 16452, only the interface between brake block holder and brake block shall be in accordance with Annexes A and B.

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6.2.2 Dimensional accuracy

In order to ensure the interchangeability of the brake block holders and the brake blocks the main dimensions of the brake block holders shall comply with dimensions given in Annexes A and B.

6.3 Brake block key

No specific requirement for design of brake block key.

7 Markings

Brake block holders shall be provided with permanent markings. The marking on the brake block holder shall also be legible when the brake block is fitted.

The markings shall be applied raised or recessed.

The area in which the markings are to be applied shall be shown in the drawing.

The following details are to be marked:

a) manufacturer identification (code, logo, etc.);

b) traceability batch number;

c) additionally for brake block holders to be used with non-integrated brake rigging:

   1) year of manufacturing;

   2) sign of railway (if required);

   3) interchangeability sign and dimensions of the markings in accordance with Annex C.

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Marking on brake block key can be provided if required by technical specification.

8 Type testing

8.1 General

8.1.1 General requirements for type testing

Type testing shall be performed in accordance with Table 3.

Table 3 — Type testing

Type	Non-integrated brake rigging	Integrated brake rigging
Material testing	X [a]	X [a]
Component testing	X [a]	X [a]
Static loading	X [a]	Evaluation at unit level [b]
Dynamic loading	X [a]	Evaluation at unit level [b]

[a] Mandatory.

[b] Evaluation at unit level can be performed by test, Finite Element Method or any other method.

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8.1.2 Elements of type testing

Type testing consists of material and component testing. The components presented for acceptance shall comply with the technical documentation for series production (dimensional accuracy, surface conditions – but without painting treatment of the surface, material).

8.1.3 Material testing

Within the framework of material testing, all test certificates concerning structural composition and physical/mechanical properties shall provide evidence of compliance with the technical documentation.

The materials used shall exhibit characteristics, stipulated by a material standard, down to –25 °C.

For vehicles used in “general operation” or “GE” and using non-integrated brake rigging, the material shall also exhibit sufficient toughness down to –40 °C to exclude any brittle fracture behaviour.

8.1.4 Component testing

The test shall be performed at (20 ± 5) °C and under the conditions given in 8.2.

If required, component testing may also be performed at sub-zero temperatures or under other operating conditions which shall be defined prior to the tests.

8.2 Type testing for brake block holders

8.2.1 Static loading

8.2.1.1 Test procedure

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The brake block holders shall be mounted in accordance with Figures 1 and 2 in a testing appliance and loaded with a steadily increasing test force F_{Pr} up to the maximum value F_{Prmax} defined in Table 4.

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Figure 1, single block holder: The span L_s represents the minimum distance between application areas of force to be applied.

Figure 2, double block holder: Interface part areas for counter force. Counter force shall be applied simultaneously on both brake block areas.

For all block holder types, the width of application areas should be representative of brake block width 80 mm.

Testing forces shall be applied until values given in Table 4 are reached.

Speed of application of the testing force should be set to ensure that shock loading is prevented. The maximum testing force F_{Prmax} shall be applied for (25 ±5) s.

Table 4 — Testing force definition

Rigging type	Application	Maximum application force in service per brake block holder F_{bmax} kN	Testing force per brake block holder F_{Prmax} kN
Non-integrated brake rigging	Brake block with high coefficient of friction for S and SS braked wagon equipped with “triangle type” 45 kN	22,5	50 [a]