
Železniške naprave - Zavore - Nosilec zavorne ploščice in okovski zavorni ključ za železniška vozila

Railway applications - Braking - Brake block holder and brake shoe key for rail vehicles

Bahnanwendungen - Bremsen - Bremsklotzhalter und Bremsklotzkeil für Schienenfahrzeuge

Applications ferroviaires — Freinage — Porte-semelles et clavette de semelle de frein pour véhicules ferroviaires

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Railway applications - Braking - Brake block holder and brake shoe key for railway vehicles

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EN 15329:2015 (E)**Foreword**

This document (EN 15329:2015) 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of an identical text or by endorsement, at the latest by December 2015 and conflicting national standards shall be withdrawn at the latest by December 2015.

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Introduction

The requirements of this European Standard cannot be laid down in such detail as to ensure defect-free design and production without obstructing further development. It is therefore essential for each manufacturer himself to take all requisite steps to ensure on his part that the quality of design and production are state of the art.

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EN 15329:2015 (E)**1 Scope**

This European Standard applies to brake block holders and brake shoe keys installed on railway vehicles.

Brake block holders and brake shoe keys made of non-ferrous materials are not subject to this European Standard.

This European Standard contains requirements for design, evaluation testing of conformity and serial production monitoring.

The requirements contained in this European Standard apply to the brake block holders and brake shoe keys with which the railway vehicles of main-line railways, private railways (regional railways, company railways) are fitted.

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 14478:2005: *Railway applications - Braking - Generic vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14478:2005 and the following apply.

3.1
brake block
friction element which transfers the brake block application force onto the tread of the wheel or the friction surface of brake drum in the radial direction

3.2
brake block force
force with which the brake block is applied to contact with the friction surface

3.3
brake block holder
component for the secure mounting and positioning of the brake block and transmitting the brake block force

3.4
brake block key
securing element for the brake block in the brake block holder

3.5
brake block with low friction factor
brake blocks with a low friction factor of 0,10 to 0,15

Note 1 to entry: This definition generally corresponds to cast iron brake blocks and composite material type L or LL brake blocks.

3.6
brake block with high friction factor
brake block with a high friction factor of 0,25 to 0,30

Note 1 to entry: This definition generally corresponds to composite material type K brake blocks.

3.7**single brake block holders**

brake block holders apt to receive one brake block length of 320 mm; corresponds to “Bg” configuration

3.8**double brake block holders**

brake block holders apt to receive two brake blocks length of 250 mm; corresponds to “Bgu” configuration

4 Symbols and abbreviations**4.1 Symbols**

For the purposes of this document, the following symbols and abbreviations apply:

Table 1 — Symbols and units

Symbol	Description	Unit
D	diameter	mm
F_{Pr}	test force	kN
F_{Prdyn}	dynamic test force	kN
F_{Pm}	dynamic mean force	kN
h	pitch before deflection test	mm
L_s	span during deflection test	mm

4.2 Abbreviations

MP	magnetic particle testing
US	ultrasound

5 Materials**5.1 General**

The ferrous materials used for the manufacturing of brake block holders and their components shall comply with applicable European Standards.

5.2 Material for brake block holder

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

- steel (cast, forged or rolled),
- grey cast iron.

Welded designs are permitted subject to agreement between manufacturer and customer. Welding shall only be used for rectification of manufacturing defects, when subject to a formal procedure.

5.3 Material for brake shoe key and brake block key

The selection of the material and the manufacturing process are left to the discretion of the manufacturer but they shall comply with the technical specifications and/or the drawings approved by the operator.

EN 15329:2015 (E)**5.4 Corrosion protection**

If corrosion protection is required, it shall be agreed between manufacturer and customer. 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.

6 Design**6.1 Brake block holders****6.1.1 General**

The purpose of 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. Cast brake block holders shall be normalized.

Brake block holders should be designed to accommodate:

- one brake block (see Figure A.10 and Figure B.11);
- two brake blocks securely mounted separately in the brake block holder (see Figure A.9 and Figure B.10);
- two brake blocks mounted separately but with movable supports (see Figure C.1).

The curvature of the contact surface of the brake block holder with the brake blocks shall be smooth and have the same radius as shown on the figures. The entire length of the contact surface shall be perpendicular to the longitudinal centre plane of the brake block holder so as to ensure large surface contact with the brake block. The same applies to the clearance of the key-hole eyes for guiding the brake shoe key and to the recesses for accommodating the brake block mounting cams. The brake block holder shall not become permanently deformed at the maximum brake force. The suitability of the brake block holder shall be demonstrated by determining its fatigue limit by means of the test forces and number of cycles stipulated in Clause 8. Repair welding is not permitted.

6.1.2 Dimensional accuracy

In order to ensure the interchangeability of the brake block holders and the brake blocks – nationally and internationally – the main dimensions of the brake block holders shall be as per the circled areas in the figures given in Annexes A and B.

6.2 Brake shoe key/Brake block key**6.2.1 General**

Some examples of brake shoe keys and brake block keys are given in the figures in Annex C and Annex D. The customer approves the types used. The surfaces shall be smooth and free from corrosion. Burrs and sharp edges shall be removed before treatment, the required hardness shall be indicated in the technical documentation.

6.2.2 Dimensional requirements

The dimensional characteristics shall ensure the interchangeability and shall be agreed between the manufacturer and the customer, and indicated in the drawings.

Distortions of the brake block key due to manufacture shall not exceed 2 mm.

7 Markings

7.1 General

Brake block holders, brake shoe keys/insert springs covered by this document shall be provided with permanent markings, as described in 7.2 and 7.3. The marking on the brake block holder shall also be legible when the brake block is fitted.

7.2 Brake block holder

The brake block holders shall be marked permanently.

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 provided:

- size of the brake blocks employed, e.g. (2 × 250 mm);
- outside radius of the brake block, e.g. (560 mm);
- ownership sign of the railway and year of manufacturing;
- dimension of the bore-hole for the bushing of the bearing pin, e.g. \varnothing 60 mm;
- interchangeability sign and dimensions of the markings according to Annex G.

7.3 Brake shoe key and brake block key

The brake shoe key shall be marked in raised letters in a recessed panel with the markings of the manufacturer and the year of manufacturing. The markings shall not protrude above the surface of the key. For keys manufactured by rolling, the markings may also be recessed, but care shall be taken to ensure that the tool used for this purpose does not have any sharp edges which might lead to the creation of fatigue fractures.

8 Type testing

8.1 General

8.1.1 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).

8.1.2 Material testing

Within the framework of material testing, the manufacturer shall submit all test certificates concerning structural composition and physical/mechanical properties to the customer/user for inspection and approval. The materials used shall exhibit toughness, stipulated by a material standard, down to $-30\text{ }^{\circ}\text{C}$. The manufacturer shall also ensure that the material used exhibits sufficient toughness down to $-50\text{ }^{\circ}\text{C}$ to exclude any brittle fracture behaviour.

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8.1.3 Component testing

The test shall be performed on the complete component at $(+20 \pm 5) ^\circ\text{C}$ and under laboratory conditions according to 8.2.

If required by the user/customer, component testing may also be performed at sub-zero temperatures or under other operating conditions which shall be agreed upon between the manufacturer and the customer.

8.2 Type testing for brake block holders

8.2.1 Static loading

8.2.1.1 Static loading with the specified test force

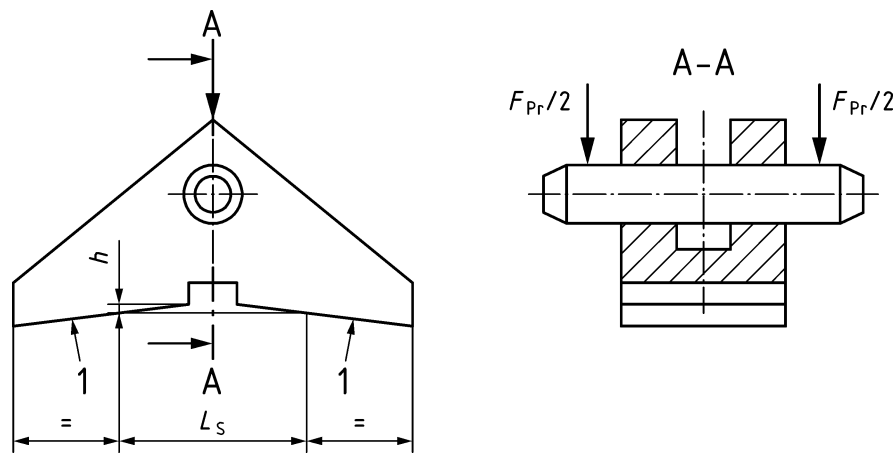
The brake block holders shall be mounted according to Figure 1 in a testing appliance and loaded with a steadily increasing test force F_{Pr} in kN up to the maximum value F_{Prmax} . The span L_s is determined by the spacing of the outer brake block mounting cams or by the dimension L_s pursuant to the approved drawing. For testing, a suitably dimensioned pin shall be inserted into the non-bushed brake block holder. After removal of the test force, the brake block holder shall not show any permanent deformations. The test force shall be specified as approved by the customer/user.

8.2.1.2 Static loading with the specified deflection

In accordance with 8.2.1.1, the brake block holder shall be mounted with the span L_s and loaded until the contact surface of the brake block holder is pressed through to the half-pitch h . A force/distance diagram shall be recorded during this loading test in order to be able to identify the beginning of plastic deformation.

During this loading test, no cracks shall occur.

At the end of the test, the brake block holders shall be inspected for incipient cracks by means of an appropriate testing procedure (e.g. US, MP or X-ray examination).



Key

- 1 contact surface
- F_{Pr} test force
- L_s span
- h pitch

Figure 1 — Test arrangement for static load test