



SLOVENSKI STANDARD

SIST EN 14535-1:2019

01-maj-2019

Nadomešča:

SIST EN 14535-1:2006+A1:2011

Železniške naprave - Kolutne zavore za železniška vozila - 1. del: Kolutne zavore (diski), nameščene na osi s hladnim ali vročim postopkom, mere in zahteve za kakovost

Railway applications - Brake discs for railway rolling stock - Part 1: Brake discs pressed or shrunk onto the axle or drive shaft, dimensions and quality requirements

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Bahnanwendungen - Bremscheiben für Schienenfahrzeuge - Teil 1: Wellenbremscheiben, aufgepresst oder geschrumpft, Abmessungen und Qualitätsanforderungen

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Applications ferroviaires - Disques de frein pour matériel roulant ferroviaire - Partie 1 : Disques de frein calés ou frettés sur essieu ou sur arbre moteur, dimensions et exigences de qualité

Ta slovenski standard je istoveten z: EN 14535-1:2019

ICS:

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

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en,fr,de

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EUROPEAN STANDARD

EN 14535-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2019

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Supersedes EN 14535-1:2005+A1:2011

English Version

Railway applications - Brake discs for railway rolling stock - Part 1: Brake discs pressed or shrunk onto the axle or drive shaft, dimensions and quality requirements

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Schienenfahrzeuge - Teil 1: Wellenbrems scheiben,
aufgepresst oder geschrumpft, Abmessungen und
Qualitätsanforderungen

This European Standard was approved by CEN on 14 October 2018.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



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

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

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European foreword

This document (EN 14535-1:2019) 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 14535-1:2005+A1:2011.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 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's scope has been modified;
- b) normative references have been updated;
- c) terms and definitions have been revised;
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- d) requirements on materials, design, dimensions and installation have been revised;
- e) requirements on testing have been revised;
- f) requirements on designation and markings have been revised;
- g) Annexes have been revised.

The EN 14535 series, *Railway applications - Brake discs for railway rolling stock*, consists of the following parts:

- *Part 1: Brake discs pressed or shrunk onto the axle or drive shaft, dimensions and quality requirements;*
- *Part 2: Brake discs mounted onto the wheel, dimensions and quality requirements;*
- *Part 3: Brake discs, performance of the disc and the friction couple, classification.*

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.

EN 14535-1:2019 (E)**Introduction**

The requirements given in this document 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 design, workmanship and construction is such as to ensure accordance with good engineering practice.

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1 Scope

This document specifies requirements for the design and dimensions of the brake disc.

This document applies to discs pressed or shrunk onto the axle or drive shaft of railway rolling stock by a cylindrical or conic tapered interference fit.

This document applies to discs having one or more disc brake rings, each having two axially separated friction faces.

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 14478, *Railway applications – Braking - Generic vocabulary*

EN 14535-3:2015, *Railway applications - Brake discs for railway rolling stock – Part 3: Brake discs, performance of the disc and the friction couple, classification*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1)*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14478 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 disc

rotor having co-planar annular friction faces to which brake pads are applied in order to develop a braking torque

Note 1 to entry: The brake disc dissipates braking energy resulting from vehicle or train deceleration.

3.2

friction face

surface of a disc that provides the friction interface for transferring the brake force

3.3

brake ring

portion of the disc having friction faces

EN 14535-1:2019 (E)**3.4****hub**

portion of the disc having an internal cylindrical or conical surface, the hub bore, for interference fit engagement with the axle or drive shaft

Note 1 to entry: The hub can be constructed integrally with the brake ring (monobloc disc) or connected to it by a separate linking arrangement.

3.5**non ventilated disc**

disc having a continuity of material or materials allowing in that volume no flow of air between the friction faces

3.6**ventilated disc**

disc in which passages to conduct a flow of cooling air are located between the friction faces of the brake ring

Note 1 to entry: The airflow is usually occasioned by the rotation of the disc.

3.7**single disc**

disc in which one brake ring is associated with one hub

3.8**double disc**

disc in which one hub supports two axially spaced brake rings

3.9**split disc**

disc in which the brake ring is separated in two halves

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3.10**segmented disc**

disc in which the brake ring is separated in more than two parts

3.11**brake disc temperature**

arithmetic average value of the measured temperatures of the disc friction face

Note 1 to entry: The temperatures are measured by six sensors as described in EN 14535-3:2015, 8.1.

3.12**maximum permissible disc temperature**

highest operation temperature applied to the disc

Note 1 to entry: This may be expressed as an absolute peak value or as a nominal value over a defined period of time.

3.13**maximum permissible rotational speed**

highest speed applicable to the application

3.14**indirect actuation**

brake in which the brake pad normal force is applied via a lever system

3.15**performance class**

set of the values of braking energy, braking power and braking torque, related to the outer diameter, width and type of the disc, at which it is type tested to demonstrate its capability to withstand these conditions without exceeding the defined limits of structural degradation

Note 1 to entry: Discs are categorized into performance classes according to the tests stated in EN 14535-3.

3.16**technical specification**

document, describing specific parameter and/or product requirements as an addition to the requirements of this standard, including the final clause-by-clause agreement

4 Symbols and abbreviations

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

Table 1 — Symbols and units

Symbol	Description	Unit
d	Diametrical dimension	mm
R_a	Refer to EN ISO 4287.	μm
R_z	Refer to EN ISO 4287.	μm
R, r	Radial dimension	mm
U	Imbalance	$\text{g} \cdot \text{m}$
x	Axial dimension	mm
Ω	Taper angle	

5 Requirements**5.1 General**

The discs are intended to be used as part of a friction brake and shall not suffer damage or degradation other than normal wear, surface cracks and deformations of the friction face within permissible limits.

5.2 Materials, design and manufacture

The materials, design and manufacture of the disc shall, for all specified operating conditions, take into account the following:

- the main dimensions given in Table 2;
- the rotational speed;
- the magnitude of the braking torque;
- the quantity of braking energy to be converted and dissipated and its rate of conversion and dissipation;

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- the frictional working conditions, especially with the interaction with the brake pad;
- ventilation losses;
- noise;
- mass of disc;
- imbalance of disc;
- environmental influence, e.g. storage, transport, climatic, shock and vibration conditions;
- integrity, life and maintenance requirements of the disc, associated brake components, and brake and vehicle systems.

Where a disc consists of more than one constructional element designed for in-service replacement of the brake ring or part of it, the associated parts of that disc shall be interchangeable while the hub or carrier remains installed on the axle or shaft within the vehicle.

The design shall be such as to prevent the detachment of any part of the disc at any speed up to and including the maximum permissible rotational speed in all degraded conditions (e.g. wear, cracking) up to the limit given in the technical specification.

If any special application conditions are necessary, they shall be specified and documented.

NOTE Take into consideration the clearance gauge of vehicle when the rail wheels are at their minimum permitted diameter.

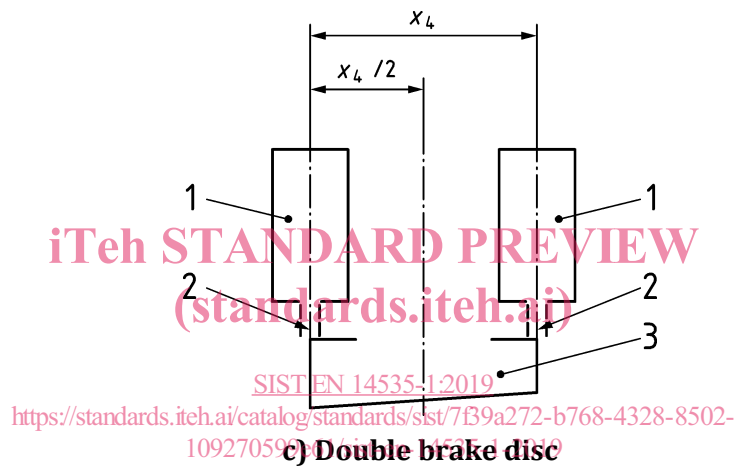
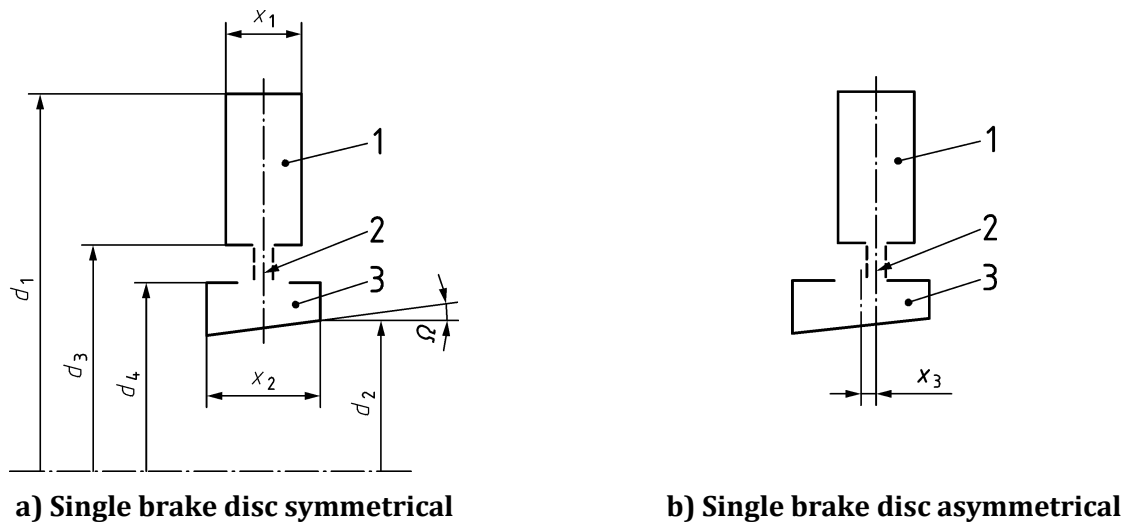
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5.3 Dimensions**5.3.1 Brake disc**

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The disc major dimensioning shall be as shown in Figure 1 and the preferred ranges of major dimensions as given in Table 2.

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**Key**

- 1 brake ring
- 2 linking element
- 3 hub

Figure 1 — Disc, definition of parts