SLOVENSKI STANDARD
SIST EN 16452:2015+A1:2019

01-maj-2019

Železniške naprave - Zavore - Zavorne ploščice

Railway applications - Braking - Brake blocks

Bahnanwendungen - Bremse - Bremsklotzsohlen

Applications ferroviaires - Freinage - Semelles de frein

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ICS:

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

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English Version

Railway applications - Braking - Brake blocks

Applications ferroviaires - Freinage - Semelles de frein

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This European Standard was approved by CEN on 28 February 2015 and includes Amendment 1 approved by CEN on 21 December 2018.

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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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Foreword

This document (EN 16452:2015+A1:2019) 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of an identical text or by endorsement, at the latest by September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.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 includes Amendment 1 approved by CEN on 28 October 2018.

This document supersedes A1 EN 16452:2015 A1.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

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:

a) 7.3 “Static friction coefficient” has been modified;

b) 7.4.2 “Dynamometer test” has been modified;

c) 7.5.1 “Generic prescriptions” has been modified;

d) 7.4.3 “Train brake test” has been modified;

e) Annex A “Summary of Dynamometer test programs and acceptance criteria” has been modified;

f) Annex J “Dynamometer test program – Generic test program” has been modified;

g) Annex M “Test run to demonstrate the extreme winter braking properties brake blocks K – LL for freight wagons” has been modified;

h) Annex Q “Dynamometer test program – Determination of static friction coefficient” has been modified;

i) Annex T “Brake block shear and flexural strength tests” has been modified;

j) Annex ZA has been updated.

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.

Introduction

For environmental reasons (reduction of rolling noise), this European Standard does not cover cast iron brake block requirements, although cast iron brake block technology is still widely used in Europe. Cast iron has already been replaced by composite materials for new rolling stock builds and major steps have been taken by EEC (TSI) and UIC in 2004 to accelerate the change from cast iron to composite materials.

When published this European Standard will replace the current UIC requirements for technical approval of brake blocks. The requirements of this EN are based on the state of art form UIC leaflet and a European project “Euro Rolling Silently”.

1 Scope

This European Standard gives the requirements for the design, dimensions, performance, and testing of a brake block (otherwise known as brake shoe insert) that acts on the wheel tread as part of a tread brake system. This European Standard does not cover cast iron brake block requirements.

This European Standard is applicable to brake blocks of either “K”, “L”, or “LL” friction level designed to be fitted to tread braked rail vehicles.

This European Standard contains the requirements for interfacing the brake block with the rail vehicle, the testing procedures in order to confirm that it satisfies the basic safety and technical interchangeability requirements, the material control procedures to ensure product quality, reliability and conformity and considers health and environmental needs.

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 13452-1, *Railway applications — Braking — Mass transit brake systems — Part 1: Performance requirements*

EN 13452-2, *Railway applications — Braking — Mass transit brake systems — Part 2: Methods of test*

EN 13715, *Railway applications — Wheelsets and bogies — Wheels — Tread profile*

EN 13979-1:2003+A2:2011, *Railway applications — Wheelsets and bogies — Monobloc wheels — Technical approval procedure — Part 1: Forged and rolled wheels*

EN 14033-1, *Railway applications — Track — Railbound construction and maintenance machines — Part 1: Technical requirements for running*

EN 14033-2:2008+A1:2011, *Railway applications — Track — Railbound construction and maintenance machines — Part 2: Technical requirements for working*

EN 14198, *Railway applications — Braking — Requirements for the brake system of trains hauled by a locomotive*

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

EN 15179, *Railway applications — Braking — Requirements for the brake system of coaches*

EN 15313, *Railway applications — In-service wheelset operation requirements — In-service and off-vehicle wheelset maintenance*

EN 15663, *Railway applications — Definition of vehicle reference masses*

EN 15734-1, *Railway applications — Braking systems of high speed trains — Part 1: Requirements and definitions*

EN 15734-2, *Railway applications — Braking systems of high speed trains — Part 2: Test methods*

EN 16185-1, *Railway applications — Braking systems of multiple unit trains — Part 1: Requirements and definitions*

EN 16185-2, *Railway applications — Braking systems of multiple unit trains — Part 2: Test methods*

EN 50126-1, *Railway applications — The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS) — Part 1: Basic requirements and generic process*

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

EN ISO 4288, *Geometrical product specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture (ISO 4288)*

UIC 544-1, *Brakes — Braking power*

3 Terms and definitions

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

3.1
application parameter
configuration parameters refer to vehicle mass, operating speed, wheel diameter, braked mass, brake block configuration, brake block force

3.2
Bg configuration
one brake block 320 mm per brake block holder

Note 1 to entry: Bg comes from UIC and means “Bremsklotzsohle geteilt”.

3.3
Bgu configuration
two brake blocks 250 mm per brake block holder

Note 1 to entry: Bgu comes from UIC and means “Bremse geteilt mit unterteilter Sohle”.

3.4
brake block
stator part of a tread brake adapted to generate a friction force when engaged with a wheel tread

3.5
brake block force
force with which the brake block is made to come into contact with the wheel tread

3.6
friction material
consumable portion of the brake block that acts on the wheel tread in order to provide the specified brake performance

3.7
coefficient of friction
3.7.1
mean coefficient of friction
coefficient of friction of the friction material, integrated over distance, for any one condition of braking

3.7.2
instantaneous coefficient of friction
value of coefficient of friction of the friction material at any one instant

3.7.3
static coefficient of friction
coefficient of friction achieved by the friction material at standstill at the point where relative movement between the block friction surface and wheel tread takes place

3.8
K material
friction material with a mean coefficient of friction of 0,25 to 0,30

3.9
L material
friction material with a mean coefficient of friction of 0,15 to 0,25

3.10
LL material
friction material with a mean coefficient of friction of 0,10 to 0,15

3.11
EU-D Rolling stock
rolling stock governed by the requirements of the European Directive 2008/57/EC

3.12
metal pick-up
damage to the brake block surface as a result of the interaction between the brake block and wheel tread

3.13
non EU-D Rolling stock
rolling stock not governed by the requirements of the European Directive 2008/57/EC

3.14
brake block back plate
element onto which the friction material is fixed, acting as the interface between the brake block and brake block holder

3.15
track circuit
integral part of certain signalling systems, the operation of which is essential to ensure the safe operation of the signalling system

3.16
brake type
classification term for air brakes as specified by the UIC in accordance with their action (G = Goods = slow-acting, P = Passenger = quick-acting)

4 Abbreviations

m	[t]	Mass to be braked per wheel (inclusive of the rotational masses)
F_B	[kN]	Nominal application force per wheel
F_b	[kN]	Instantaneous application force per wheel
v	[km/h]	Theoretical initial speed at the brake application initiation
v_i	[km/h]	Instantaneous speed
v_3	[km/h]	Final speed at the end of braking
v_m	[km/h]	Maximum service speed.
$\mu_a = \frac{F_{tR}}{F_b}$	[-]	Instantaneous friction coefficient (brake block): The instantaneous friction coefficient μ_a specified at every instance of the braking time by the ratio between the total brake force F_{tR} and the total application force F_b
$\mu_m = \frac{1}{s_2} \cdot \int_0^{S2} \mu_a \cdot ds$	[-]	Mean friction coefficient: the mean friction coefficient μ_m integrated over the time from where 95 % of the nominal application force F_B is reached over the stopping distance s_2
θ_0	[°C]	Mean initial temperature at the beginning of the brake application
s_2	[m]	Stopping distance from the moment on when $F_b = 0{,}95 \cdot F_B$ to rest
R_z	[µm]	Surface roughness (maximum height of profile)
d	[mm]	Diameter of wheel
e	[mm]	Flange thickness
h	[mm]	Flange height
qR	[mm]	Distance between flange angle
a_1	[mm]	Back-to-back distance between wheels
P	[-]	Brake type – P = passenger

5 Overall requirements

5.1 Deviations from requirements

If deviating from some points of the requirements of this standard for a particular assessment, theses deviations shall be reported and explained. The influence on the assessment of the brake block in terms of the acceptance criteria shall be evaluated and recorded. The outcome of this study shall be considered as an integral part of the requirements of this standard when applied to the assessment process of the brake block.

5.2 Functions

The brake block is to be used as part of the friction brake of a vehicle. It shall provide the performance specified, in terms of stopping distance for instance, and in doing so shall fulfil the following requirements:

— create a braking moment or torque;