



SLOVENSKI STANDARD
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Železniške naprave - Profili - 1. del: Splošna pojasnila in metode za določanje profilov

Railway applications - Gauges - Part 1: Generic explanations and methods of gauging

Bahnanwendungen - Begrenzungslinien - Teil 1: Grundprinzipien und Methoden der Lichtraumbestimmung

Applications ferroviaires - Gabarits - Partie 1 : Explications de base et méthodes de détermination du gabarit

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ICS:

45.060.01 Železniška vozila na splošno Railway rolling stock in general

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EUROPEAN STANDARD
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English Version

Railway applications - Gauges - Part 1: Generic explanations and methods of gauging

Applications ferroviaires - Gabarits - Partie 1 :
Explications de base et méthodes de détermination du
gabarit

Bahnanwendungen - Lichtraum - Teil 1: Teil 1:
Grundprinzipien und Methoden der
Lichtraumbestimmung

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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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 (prEN 15273-1:2018) 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, together with prEN 15273-4:2018, will supersede EN 15273-1:2013+A1:2016.

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 Directive 2008/57/EC.

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

EN 15273 series consists of the following parts:

- prEN 15273-1:2018, *Generic explanations and methods of gauging* gives the general explanations of gauging and defines the sharing of the space between rolling stock and infrastructure;
- prEN 15273-2:2018, *Rolling stock* gives the rules for dimensioning vehicles;
- prEN 15273-3:2018, *Infrastructure* gives the rules for positioning the infrastructure;
- prEN 15273-4:2018, *Catalogue of gauges and associated rules* includes a non-exhaustive list of reference profiles and parameters to be used by infrastructure and rolling stock;
- prCEN/TR 15273-5:2018, *Background, explanation and worked examples*.
- introduction of absolute and comparative gauging process in parts 1, 2, 3 and 5;
- specific rules given for each defined gauge in prEN 15273-2:2018 and prEN 15273-3:2018 are replaced by a common general set of basic formulae applicable for all. The applicable reference profile and the specific associated rules are given in part 4;
- a new prEN 15273-4 gives the catalogue of gauges and associated rules coming from EN 15273-1:2013+A1:2016;
- a new prCEN/TR 15273-5:2018 gives background elements coming from EN 15273-1:2013+A1:2016 and worked examples.

prEN 15273-1:2018 (E)**Introduction**

The aim of this standard is to define the rules for the calculation and verification of the dimensions of rolling stock and infrastructure from a gauging perspective.

This standard defines gauging processes taking into account the relative movements between rolling stock and infrastructure as well as the necessary margins or clearances.

prEN 15273-1:2018 covers generic explanations and methods of gauging and is used in conjunction with the following parts:

- *Part 2: Rolling stock;*
- *Part 3: Infrastructure gauges;*
- *Part 4: Catalogue of gauges and associated rules;*
- *Part 5: Background, explanation and worked examples.*

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1 Scope

The gauges and processes included in this document have been developed for application on mainline railway networks using various track gauges. Other networks such as urban and suburban may apply the gauge rules defined in this standard but are outside of its scope.

This document contains

- the definitions and symbols for all prEN 15273 documents,
- the general explanation of various elements and phenomena affecting railway gauging,
- the general explanation of various calculation methods and processes applicable to railway,
- gauging that allow the dimensioning of the rolling stock and the infrastructure.

NOTE The rules given in this standard are not applicable to the gauges “S” and “T” referred to in 4.2.3.1. (7) & (8) for track gauge 1 520 mm of the merged TSI Loc and Pass (Commission Regulation N° 1302/2014 of 18 November 2014).

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 14067-2, *Railway applications — Aerodynamics — Part 2: Aerodynamics on open track*

EN 14067-3, *Railway applications — Aerodynamics — Part 3: Aerodynamics in tunnels*

prEN 15273-2:2018, *Railway applications — Gauges — Part 2: Rolling stock*

prEN 15273-3:2018, *Railway applications — Gauges — Part 3: Infrastructure*

prEN 15273-4:2018, *Railway applications — Gauges — Part 4: Catalogue of gauges*

prCEN/TR 15273-5:2018, *Railway applications — Gauges — Part 5: Background, complementary information and worked examples*

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

EN 15663:2017, *Railway applications — Vehicle reference masses*

EN 50367, *Railway applications — Current collection systems — Technical criteria for the interaction between pantograph and overhead line (to achieve free access)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

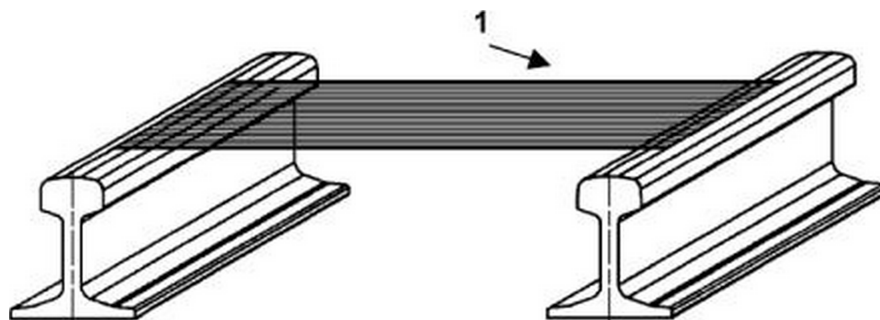
- IEC Electropedia: available at <http://www.electropedia.org/>

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— ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 gauging process
process by means of which the dimensional compatibility of rolling stock and infrastructure is determined

3.2 running plane
plane tangential to the running surface (see Figure 1)

**Key**

1 running plane

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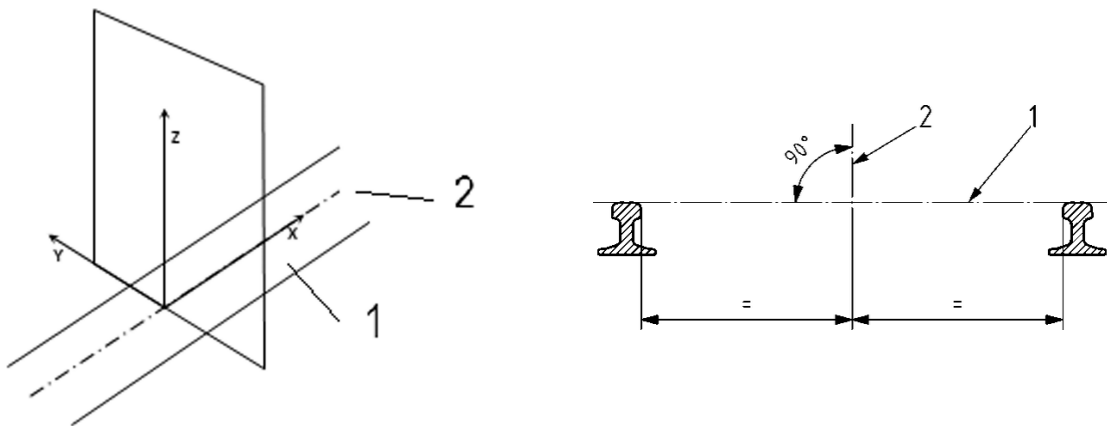
Figure 1 — Running plane

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3.3 normal co-ordinates
co-ordinates defined in a plane normal to the longitudinal centreline of the rails in nominal position on a theoretically perfect track

Note 1 to entry: One of these axes is the intersection of the normal plane with the running plane. The other axis, commonly referred to as vertical axis, is perpendicular to the running plane. For calculation purposes, the vertical axis is used as a common reference for infrastructure and rolling stock (see Figure 2).



Key

- 1 running plane (X and Y)
- 2 centreline of the vehicle and of the track

Figure 2 — Reference axes

3.4

effective track position

used during the absolute gauge process, it represents a position that the track could credibly occupy in relation to structures or an adjacent track at some points within its maintenance cycle

3.5

reference vehicles

theoretical or actual vehicles, the parameters of which are used to establish the rules associated with a reference profile to obtain a gauge

3.6

comparator vehicle

existing rolling stock already compatible and operating on a specified route to be used for the comparative gauging process

3.7

vehicle load states

load states as defined in EN 15663:2017

3.8

defined gauge

set including a reference profile and its associated calculation rules allowing definition of the outer dimensions of the rolling stock and the space to be cleared by the infrastructure

Note 1 to entry: According to the calculation method implemented, the gauge will be a “static, kinematic or dynamic one.

prEN 15273-1:2018 (E)**3.9
reference profile***CR*

virtual line related to the normal co-ordinates, specific to each defined gauge, representing a cross-section outline used as a common basis to work out the sizing rules of the infrastructure and of the rolling stock

**3.10
upper part, lower part, bottom line**

limit between the upper part and lower part of the reference profile is defined for each gauge in prEN 15273-4:2018

Note 1 to entry: The bottom line defines the horizontal limit of the lower part close to the running plane.

**3.11
geometric overthrow***dg*

distance in direction Y or Z between the track and the vehicle in a curve

Note 1 to entry: See details in Figures A.2 ; E.2 for horizontal curve and A.7 for vertical curve.

**3.12
associated rules**

set of rules associated with each reference profile in order to size the infrastructure or rolling stock

**3.13
lateral projection (“sailie”)***S*

sum of these two values: <https://standards.iteh.ai/catalog/standards/sist/2ee47124-68f4-4ccf-8090-8e999770f745/osist-pren-15273-1-2019>

- S_R , agreed between infrastructure and rolling stock based on the lateral overthrow of so-called “reference vehicles”;
- S_l , is the widening of the track gauge

Note 1 to entry: See prCEN/TR 15273-5 for more explanations.

**3.14
vertical projection (“sailie”)***S_v*

value agreed between infrastructure and rolling stock based on the vertical overthrow of so-called “reference vehicles” outside the reference profile

**3.15
absolute gauge**

gauging process taking into account obstacles and a profile determined at a specific site

**3.16
absolute gauging process**

set of rules allowing the comparison of the swept envelope of a vehicle with infrastructure profiles on a given route

3.17**comparative gauging process**

set of rules allowing the comparison of the swept envelopes of a candidate vehicle to a comparator vehicle in order to assess route compatibility

3.18**swept envelope**

cross sections perpendicular to the running plane encompassing all the points swept by the vehicle under consideration with its dynamic displacements in any possible position combined with running and operating conditions on a track of a given quality

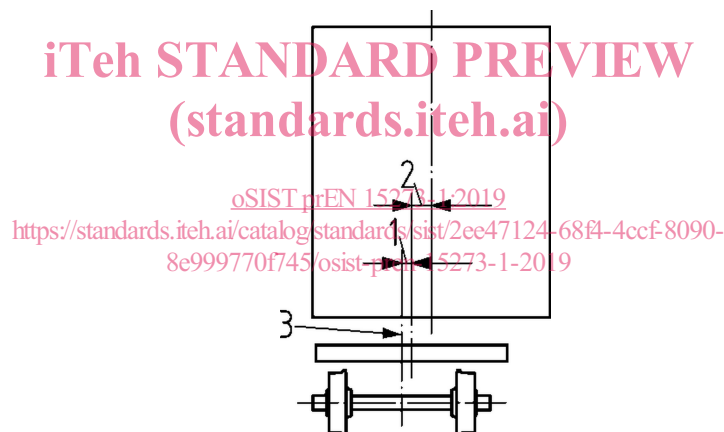
3.19**clearance between wheelsets and track**

lateral displacement of the wheelset in the running plane with respect to the track centre

3.20**lateral clearance between wheelset and body**

sum of the amount q at the level of the axle boxes and of the amount w between the bogie frame and the body

Note 1 to entry: See Figure 3.

**Key**

- 1 lateral clearance q
- 2 lateral clearance w
- 3 centre of wheelset

Figure 3 — Lateral clearances q and w

Note 2 to entry: The value of all these clearances is considered level with the axle or pivots, with all parts at wear limit.

3.21**displacement coefficient**

A

parameter that takes into account the orientation of the bogie and body position as a result of the wheelset position on the track

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3.22

quasi-static roll

movement resulting from the inclination of the suspended parts under the influence of gravity (canted track) and/or centrifugal acceleration (curved track) without taking account of any additional dynamic effects

3.23

roll centre*C*

rotational centre of the body

3.24

cant*D*

difference in height between the tops of the two rails of a track

3.25

equilibrium cant*D_{eq}*

equilibrium cant at a given velocity in a curve is the cant for which the resultant of the centrifugal acceleration and gravity is perpendicular to the running plane

3.26

cant excess

difference between applied cant and a lower equilibrium cant

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Note 1 to entry: See prCEN/TR 15273-5 for details.

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3.27

cant deficiency*I*

difference between applied cant and a higher equilibrium cant

Note 1 to entry: See prCEN/TR 15273-5 for details.

3.28

cant transition

part of track where cant changes

3.29

cross level

cant measured on the track

3.30

flexibility coefficient*S*

ratio of the angle η (angle between the vertical axis of the carbody tilted on its suspensions and the plane perpendicular to the running plane) to the angle δ (between the running plane and the horizontal plane) with the standstill vehicle on a canted track

Note 1 to entry: See detailed explanation in Annex A.

3.31 dissymmetry

 η_0

angle η_0 between the centreline of the body of a stationary vehicle on a level track and the vertical axis

Note 1 to entry: The dissymmetry may come from construction tolerance or decentred loading. See detailed explanation in Annex A.

3.32 random dynamic movements

additional oscillations of the vehicle, in relation to its quasi-static position, generated by the interaction of the rolling stock due to some environmental factors such as

- track irregularities,
- sudden track alignment variations in the vicinity of switches and crossings,
- elastic deformation and the degradation of track due to traffic,
- a sequence of rail joints generating resonance phenomena,
- effects of cross winds and aerodynamic phenomena

3.33 pantograph gauges and interface with the overhead contact line system

specific reference profile combined with specific associated rules allowing to verify that the pantograph head remains inside the allotted space, and that the infrastructure is situated at a sufficient mechanical and electrical distance according to the pantograph head type (used with live or insulated parts)

3.34 pantograph gauges for infrastructure

reference profile with its associated rules allowing to verify that the pantograph head in a raised position remains within the allocated space

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