



**SLOVENSKI STANDARD**  
**oSIST prEN 15827:2022**

**01-oktober-2022**

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**Železniške naprave - Sistemskotehnične zahteve za podstavne vozičke in tekalne sestave**

Railway applications - System Engineering requirements for bogies and running gear

Bahnanwendungen - Anforderungen an das System Engineering für Drehgestelle und Fahrwerke

Applications ferroviaires - Requis systèmes pour l'ingénierie des bogies et des organes de roulements

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**Ta slovenski standard je istoveten z: prEN 15827**

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**ICS:**

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

**oSIST prEN 15827:2022**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 15827**

August 2022

ICS 45.040

Will supersede EN 15827:2011

English Version

## Railway applications - System Engineering requirements for bogies and running gear

Applications ferroviaires - Requis systèmes pour  
l'ingénierie des bogies et des organes de roulements

Bahnanwendungen - Anforderungen an das System  
Engineering für Drehgestelle und Fahrwerke

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.

This draft European Standard was established by CEN 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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**prEN 15827:2022 (E)**

**European foreword**

This document (prEN 15827:2022) 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 will supersede EN 15827:2011.

The technical changes with respect to the previous edition are listed below:

- a) the standard is focused on system engineering requirements;
- b) the design criteria are replaced by references to specific standards.

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## Introduction

This document focusses on system engineering related to the specification, design, validation and maintenance of bogies and running gear and their interactions in one document.

System engineering requirements will ensure consistency over the complete life cycle from the specification, through design, validation, operation and maintenance.

The performance requirements for bogies and running gear fall into two related areas, covering functionality and safety. Functionality relates to such things as speed, load capacity, ride quality and operating life. Safety covers gauging, structural integrity, dynamic performance, resistance to derailment, etc. Functionality and safety are ensured by an appropriate maintenance strategy.

Accordingly, three particular areas of expertise and discipline of the engineering process are relevant and are addressed in this document, namely:

- structural requirements; Clause 6;
- dynamic requirements; Clause 7;
- maintenance requirements; Clause 10.

These clauses provide top-level information on how the overall requirements are to be achieved in these important specific areas as defined in more detail by other standards referenced in this document. This document structure is typical of the engineering process for the design, validation and maintenance support of bogies.

NOTE A bogie or running gear designed and validated in accordance with this document is likely to satisfy the Essential Requirements of the rolling stock TSIs.

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**prEN 15827:2022 (E)****1 Scope**

This document is applicable to the system engineering of bogies and running gear for rail vehicles, including those vehicles intended to operate under the Interoperability Directives.

It specifies the requirements to achieve:

- a satisfactory design of bogie or running gear
- validation of the design within its operating envelope
- a maintenance plan

to ensure the relevant performance and safety criteria are maintained.

The system engineering process addresses only the design, validation and maintenance of bogies and running gear. No requirements are set for other systems components that are attached to the bogies or running gear, except to establish that a satisfactory interface has been provided.

NOTE Specifications that relate to bogies and running gear can only be considered in the context of a specific vehicle application. Therefore, the performance, including safety, can relate only to the bogies and running gear as part of a vehicle configuration and not to the individual elements of the bogies or running gear.

**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 12080, *Railway applications - Axleboxes - Rolling bearings*

EN 12081, *Railway applications - Axleboxes - Lubricating greases*

EN 12082, *Railway applications. Axleboxes. Performance testing*

EN 12299, *Railway applications - Ride comfort for passengers - Measurement and evaluation*

EN 12663 (all parts), *Railway applications. Structural requirements of railway vehicle bodies*

EN 13103-1, *Railway applications - Wheelsets and bogies - Part 1: Design method for axles with external journals*

EN 13260, *Railway applications - Wheelsets and bogies - Wheelsets - Product requirements*

EN 13261, *Railway applications - Wheelsets and bogies - Axles - Product requirements*

EN 13262, *Railway applications - Wheelsets and bogies - Wheels - Product requirements*

EN 13298, *Railway applications - Suspension components - Helical suspension springs, steel*

EN 13597, *Railway applications - Rubber suspension components - Rubber diaphragms for pneumatic suspension springs*

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

EN 13749, *Railway applications - Wheelsets and bogies - Method of specifying the structural requirements of bogie frames*



- EN 13802, *Railway applications - Suspension components - Hydraulic dampers*
- EN 13913, *Railway applications - Rubber suspension components - Elastomer-based mechanical parts*
- EN 13979-1, *Railway applications - Wheelsets and bogies - Monobloc Wheels - Technical approval procedure - Part 1: Forged and rolled wheels*
- EN 14200, *Railway applications - Suspension components - Parabolic springs, steel*
- EN 14363:2016+A1:2018, *Railway applications - Testing and Simulation for the acceptance of running characteristics of railway vehicles - Running Behaviour and stationary tests*
- EN 14817, *Railway applications - Suspension components - Air spring control elements*
- EN 15049, *Railway applications - Suspension components - Torsion bar, steel*
- EN 15085 (all parts), *Railway applications. Welding of railway vehicles and components*
- EN 15227, *Railway applications - Crashworthiness requirements for rail vehicles*
- EN 15273 (all parts), *Railway applications. Gauges*
- EN 15313, *Railway applications - In-service wheelset operation requirements - In-service and off-vehicle wheelset maintenance*
- EN 15437 (all parts), *Railway applications. Axlebox condition monitoring. Interface and design requirements*
- EN 15663, *Railway applications. Definition of vehicle reference masses*
- EN 15839, *Railway applications. Testing for the acceptance of running characteristics of railway vehicles. Freight wagons. Testing of running safety under longitudinal compressive forces*
- EN 15892:2011, *Railway applications. Noise emission. Measurement of noise inside driver's cabs*
- EN 16235:2013, *Railway application - Testing for the acceptance of running characteristics of railway vehicles - Freight wagons - Conditions for dispensation of freight wagons with defined characteristics from on-track tests according to EN 14363*
- EN 16404, *Railway applications - Re-railing and recovery requirements for railway vehicles*
- EN 17023, *Railway applications - Railway vehicle maintenance - Creation and modification of maintenance plan*
- EN 50125-1, *Railway applications - Environmental conditions for equipment - Part 1: Rolling stock and on-board equipment*
- EN ISO 3095, *Acoustics - Railway applications - Measurement of noise emitted by railbound vehicles (ISO 3095:2013)*
- EN ISO 9712, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712:2021)*

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

#### 3.1

##### **validation**

process of demonstrating by analysis and/or test that the system under consideration meets in all respects the specification, including requirements due to regulations, for that system

Note 1 to entry: When applied to a numerical model, validation is the process of demonstrating that the model of the system responds in the manner of the actual system to a sufficient level of accuracy for its purpose.

#### 3.2

##### **verification**

process of demonstrating by comparison or testing that an analytical result or estimated value is of an acceptable level of accuracy

#### 3.3

##### **requirements specification**

compilation of detailed performance requirements to be satisfied during the validation process

#### 3.4

##### **technical specification**

document defining other or additional requirements not defined in this standard

Note 1 to entry: Usually this is produced by and agreed between the Customer and/or the Manufacturer (sometimes called the Supplier) or even a Railway Undertaking and can be an accompaniment to Contractual requirements.

#### 3.5

##### **analysis**

assessment of performance by calculation, comparison or simulation that does not require the presence of an actual product (though it may use the results of physical measurements or testing)

#### 3.6

##### **testing**

subjecting a sample (or samples) of a product to a selection of specified inputs and measuring and recording its responses

#### 3.7

##### **partial factor**

factor applied during the strength assessment which makes an allowance for a combination of the uncertainties and the safety criticality

#### 3.8

##### **reverse curve**

two curves with alternating direction, with shortest possible distance between them in accordance with track design conditions, including EN 14363 S-curves

### 3.9

#### **regulations**

requirements stipulated by legislation or rules and conditions mandated by legislation or prescribed by an infrastructure controller or relevant industry body, or similar

### 3.10

#### **operating envelope**

envelope of safe operation determined by the product validation process expressed in terms of the relevant parameters

### 3.11

#### **load case**

set of loads or combinations of loads that represents a loading condition to which a structure or component is subjected

### 3.12

#### **permanent deformation**

residual plastic deformation of ductile material, that is not recoverable when the applied load is removed

### 3.13

#### **significant permanent deformation**

permanent deformation of an amount that infringes on the functionality of the structure by exceeding the component geometric tolerances

### 3.14

#### **pitch**

rotational motion about a lateral axis

### 3.15

#### **simulation**

numerical method that uses a set of parameters and rules to describe a system (product or component) in a manner that enables a representative response to be determined from a given set of inputs

### 3.16

#### **roll**

rotational motion about a longitudinal axis, parallel to the axis of the running rail

### 3.17

#### **track testing**

performing of tests under expected service conditions, on railway infrastructure that represents the actual operating environment, and monitoring and recording the responses

Note 1 to entry: This is different to on-track testing as required by EN 14363:2016+A1:2018, which requires the test track to have specific characteristics of track layout and the test to cover the planned speed range and cant deficiency applicable to the vehicle.

### 3.18

#### **laboratory testing**

performing of tests within a building or restricted area where there is the capability of applying the required inputs and with the equipment capable of monitoring and recording the response