



**SLOVENSKI STANDARD**  
**oSIST prEN 14033-2:2025**  
**01-januar-2025**

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**Železniške naprave - Infrastruktura - Težka tirna mehanizacija za gradnjo in vzdrževanje - 2. del: Tehnične zahteve za vožnjo in delovanje**

Railway applications - Infrastructure - Railbound construction and maintenance machines - Part 2: Technical requirements for travelling and working

Bahnanwendungen - Oberbau - Schienengebundene Bau- und Instandhaltungsmaschinen - Teil 2: Technische Anforderungen an die Versetzfahrt und die Arbeitsstellung

Applications ferroviaires - Infrastructure - Machines de construction et de maintenance empruntant exclusivement les voies ferrées - Partie 2 : Prescriptions techniques pour le déplacement et le travail

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**ICS:**

45.120	Oprema za gradnjo in vzdrževanje železnic oz. žičnic	Equipment for railway/cableway construction and maintenance
93.100	Gradnja železnic	Construction of railways

**oSIST prEN 14033-2:2025**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 14033-2**

November 2024

ICS 45.120; 93.100

Will supersede EN 14033-2:2017

English Version

## Railway applications - Infrastructure - Railbound construction and maintenance machines - Part 2: Technical requirements for travelling and working

Applications ferroviaires - Infrastructure - Machines de  
construction et de maintenance empruntant  
exclusivement les voies ferrées - Partie 2 :  
Prescriptions techniques pour le déplacement et le  
travail

Bahnanwendungen - Oberbau - Schienengebundene  
Bau- und Instandhaltungsmaschinen - Teil 2:  
Technische Anforderungen an die Versetzfahrt und die  
Arbeitsstellung

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

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## European foreword

This document (prEN 14033-2:2024) 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 14033-2:2017.

Amended clauses compared to EN 14033-2:2017 are shown in informative Annex K.

This series of standards EN 14033, Railway applications — Track — Railbound construction and maintenance machines, consists of the following parts:

- Part 1: Technical requirements for running;
- Part 2: Technical requirements for travelling and working;
- Part 3: General safety requirements;
- Part 4: Technical requirements for running, travelling and working on urban rail.

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**prEN 14033-2:2024 (E)****Introduction**

This document is the second of a series of four parts of the European Standard: *Railway applications — Track — Railbound construction and maintenance machines*:

- Part 1 covers the safety and technical requirements for the machines in running mode;
- Part 2 covers the technical requirements for the machines in working and travelling modes;
- Part 3 covers the safety requirements for the machines in working and travelling modes; this is a harmonized standard with the European Machinery Directive 2006/42/EC;
- Part 4 covers requirements for the machines in running, working and travelling modes when used on urban rail.

For deviations or special national conditions, see Annex A.

The risks that exist in all mechanical, electrical, hydraulic, pneumatic and other components of machines and that are dealt with in the relevant European Standards are not within the scope of this European Standard. If necessary, references are made to appropriate standards of this type.

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# 1 Scope

## 1.1 General

This document defines the specific technical railway requirements for travelling and working with railbound machines and other vehicles – referred to as machines – used for construction, maintenance and inspection of track, structures, track formation and fixed electric traction equipment as specified in prEN 14033-1:2024.

This document applies to all machines working exclusively on the railway (utilizing adhesion between the rail and rail wheels) and used for construction, maintenance and inspection of track, structures, infrastructure and fixed electric traction equipment.

This document applies to machines that are intended to operate signalling and control systems.

NOTE Other rail mounted railway maintenance and infrastructure inspection machines are dealt with in other European Standards, see Technical Report CEN/TR 17498:2020.

This document is applicable to 1 435 mm nominal track gauge. Some requirements may be applicable for working on infrastructures with nominal narrow track gauge or nominal broad track gauge lines, tramways, railways utilizing other than adhesion between the rail and rail wheels and underground infrastructures.

This document covers the safety requirements for the railway specific problems for travelling and working on different infrastructures. The application of these requirements will be the subject of a verification procedure, which is not part of this document. Annex I is included for information for the potential content of a verification procedure. In all cases an authorization to work is needed to access the infrastructure.

This document is also applicable for machines that in working position are partly supported on the ballast or the formation.

This document does not apply to:

- the requirements with regard to the quality of work, including the related measuring methods, and the performance of the machine;<sup>1)</sup>
- the specific requirements established by each railway infrastructure manager for the use of machines which will be the subject of negotiation between the manufacturer and the machine keeper.

This document does not deal with the following additional requirements:

- working methods;
- operation in severe working conditions requiring special measures (e.g. work in tunnels or in cuttings, extreme environmental conditions such as corrosive conditions, tropical conditions, contaminating conditions, strong magnetic fields);
- operation subject to special rules (e.g. potentially explosive atmospheres);
- hazards due to errors in software;
- hazards occurring when used to handle suspended loads which may swing freely;

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1) Parameters to evaluate the track quality are dealt with in EN 13231-1 and in the EN 13848 series.

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- hazards due to wind pressure greater than normal e.g. pressures caused by the passing of trains at speed in excess of 190 km/h.

**1.2 Validity of this European Standard**

This document applies to all machines that are ordered one year after the publication date of this European Standard.

**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 280-1:2022, *Mobile elevating work platforms - Part 1: Design calculations - Stability criteria - Construction - Safety - Examinations and tests*

EN 280-2:2022, *Mobile elevating work platforms - Part 2: Additional safety requirements for load lifting appliances on the extending lifting structure and work platform*

EN 1991-2:2023, *Eurocode 1 - Actions on structures - Part 2: Traffic loads on bridges and other civil engineering works*

EN 12077-2:1998+A1:2008, *Cranes safety - Requirements for health and safety - Part 2: Limiting and indicating devices*

EN 12999:2020, *Cranes - Loader cranes*

EN 13848-5:2017, *Railway applications - Track - Track geometry quality - Part 5: Geometric quality levels - Plain line, switches and crossings*

prEN 14033-1:2024, *Railway applications — Track — Railbound construction and maintenance machines — Part 1: Technical requirements for running*

prEN 14033-3:2024, *Railway applications — Track — Railbound construction and maintenance machines — Part 3: General safety requirements*

EN 14363:2016+A2:2022, *Railway applications - Testing and Simulation for the acceptance of running characteristics of railway vehicles - Running Behaviour and stationary tests*

EN 15273-2:2013+A1:2016, *Railway applications - Gauges - Part 2: Rolling stock gauge*

EN 15877-1:2012+A1:2018, *Railway applications - Marking on railway vehicles - Part 1: Freight wagons*

EN 17343:2023, *Railway applications - General terms and definitions*

EN 45545-1:2013, *Railway applications - Fire protection on railway vehicles - Part 1: General*

EN 45545-2:2020+A1:2023, *Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materials and components*

EN 50121-3-1:2017,<sup>2</sup> *Railway applications — Electromagnetic compatibility — Part 3-1: Rolling stock — Train and complete vehicle*

EN 50121-3-2:2016,<sup>3</sup> *Railway applications — Electromagnetic compatibility — Part 3-2: Rolling stock — Apparatus*

EN 50125-1:2014, *Railway applications - Environmental conditions for equipment - Part 1: Rolling stock and on-board equipment*

EN 50153:2014,<sup>4</sup> *Railway applications — Rolling stock — Protective provisions relating to electrical hazards*

EN 50317:2012,<sup>5</sup> *Railway applications — Current collection systems — Requirements for and validation of measurements of the dynamic interaction between pantograph and overhead contact line*

EN 60077 (series), *Railway applications — Electrical equipment for rolling stock*

EN ISO 7010:2020,<sup>6</sup> *Graphical symbols — Safety colours and safety signs — Registered safety signs (ISO 7010:2011)*

EN ISO 7731:2008, *Ergonomics - Danger signals for public and work areas - Auditory danger signals (ISO 7731:2003)*

ISO 4305:2014,<sup>7</sup> *Mobile cranes — Determination of stability*

ISO 4310:2009, *Cranes — Test code and procedures*

ISO 16754:2008, *Earth-moving machinery — Determination of average ground contact pressure for crawler machines*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions in prEN 14033-1:2024, EN 17343:2023 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

##### working places

working cabs, combined working and driving cabs, operator's places situated outside cabs, welfare areas, locations where staff are permitted on the machine and places situated at control or maintenance locations

<sup>2</sup> As impacted by EN 50121-3-1:2017/A1:2019.

<sup>3</sup> As impacted by EN 50121-3-2:2016/A1:2019.

<sup>4</sup> As impacted by EN 50153:2014/A1:2017 and EN 50143:2014/A2:2020.

<sup>5</sup> As impacted by EN 50317:2012/A1:2022 and EN 50317:2012/AC:2012.

<sup>6</sup> As impacted by EN ISO 7010:2020/A1:2020, EN ISO 7010:2020/A2:2022, EN ISO 7010:2012/A3:2022, EN ISO 7010:2012/A4:2023, EN ISO 7010:2012/A5:2023, EN ISO 7010:2012/A6:2023.

<sup>7</sup> As impacted by ISO 4305:2014/A1:2016.

**prEN 14033-2:2024 (E)****3.2****working gauge**

limit in which a machine can work without interfering with the kinematic envelope of vehicles on adjacent operating tracks

**3.3****operating track**

track corresponding to the criteria of the infrastructure manager on which vehicles may run under normal signalling arrangements (with or without a speed limit)

**3.4****track closed for work**

track used only by machines and engineering trains under special operating conditions, closed for normal passenger and freight trains

**3.5****degraded working track**

track that is being maintained for which one or several of the geometrical parameters may reach the limiting values as specified in Annex F and for which special operational restrictions may apply

**3.6****authorized acceptance body**

organisation appointed by the infrastructure manager

**3.7****authorization to work**

authorization which is given by the infrastructure manager and which permits a machine to work on the railway infrastructure in accordance with the specific requirements of the infrastructure manager (method of work, quality, output)

**3.8****working agreement**

procedure that enables a machine to work on each railway infrastructure manager's network

Note 1 to entry: This procedure consists of two parts:

- 1) the proof of conformity with the safety requirements, as specified in prEN 14033-3 (EC declaration of conformity), given by the manufacturer;
- 2) the authorization to work that is given at the end of the working agreement. It is also permissible to give a preliminary authorization to work if some requirements are not yet fulfilled or have yet to be proved that they are fulfilled.

**4 Field of use of machines**

Machines shall in accordance with their proper use either:

— be designed to travel and work on all tracks within the geometric limits as specified in Annex F;

or

— travel and work on tracks within the geometric limits of the operating track only and shall then display at each operating position the warning plate as shown in Annex C. This shall be shown in the documentation, see 7.4, Table 12, line a).

## 5 Specific railway requirements and/or measures

### 5.1 Interaction with the infrastructure

#### 5.1.1 General

The wheels, supports and working tools shall not generate harmful stresses in the infrastructure components, e.g. rail, fastenings, sleepers, ballast, structures and formation.

Furthermore, it is necessary to take into consideration the maximum wheel load onto the rail, the permissible bending of the rail, the transverse forces on the sleeper fastenings, the surface pressure on the ballast as well as the load carrying ability of the formation and structures.

If the machine contains devices for levelling and lining of the track the maximum forces generated by these devices shall be stated in the documentation, see 7.2 Table 10, line a).

#### 5.1.2 Stress induced into the rails

Any tool shall not generate stresses in the rail higher than the following values given in Table 1 expressed as a percentage of the minimum ultimate tensile strength of the rail.

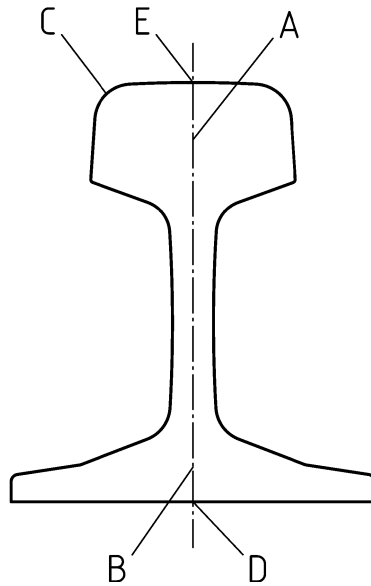
The calculations shall be based on a 60E1 rail section with a maximum tensile strength of 880 N/mm<sup>2</sup> and a 49E1 rail section with a maximum tensile strength of 680 N/mm<sup>2</sup>. The documentation shall state the limitations of use for both these rail types, see 7.4, Table 12, line b).

The limits a) and b) in Table 1 are permitted to be exceeded in machines specifically designed for straightening or bending rails.

**Table 1 — Stress limit in the rails**

Bending stress	Measure points	Ultimate tensile strength of the rail %
a) Maximum permissible tensile bending stress	middle of the head <sup>(A)</sup> and middle of the foot <sup>(B)</sup> of the rail	45
	at the corner of the head <sup>(C)</sup> of the rail	50
	at the foot <sup>(D)</sup> of the rail	60
b) Maximum permissible compressive bending stress	head <sup>(E)</sup> and foot <sup>(D)</sup> of the rail	65
(A) to (E) are shown diagrammatically in Figure 1.		

The values above allow for safety in particular conditions, e.g. heavy rail use, joints with big gaps, non-standard sleeper spacing, residual stresses in the rails.

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**Figure 1 — Cross section of rail showing stress points given in Table 1**

### 5.1.3 Auxiliary wheels, auxiliary guides and working parts

The auxiliary wheels and guides referred to in this clause are for the support and guidance of assemblies associated with the operation of the machine and not for running.

The construction and positioning of any auxiliary wheels and/or guides shall provide satisfactory guidance on rails and shall not cause damage to the rail or any associated part of the railway infrastructure.

The devices for the vertical and lateral positioning of the rails not placed on sleepers, e.g. guiding rollers, rail hooks, shall be designed in order to prevent dangerous movements of rail in case of fracture of the rails or fishplates.

Any additional supporting elements necessary to ensure stability or assist the work process shall also comply with the above requirements.

### 5.1.4 Maximum wheel loads

#### 5.1.4.1 General

The wheels referred to in this clause are the wheels used for travelling and working.

#### 5.1.4.2 Machines without wheel load control devices

Wheel loads  $Q_{max}$  of the main wheels or auxiliary wheels in relation to the diameter of the wheel and the rail material are given in Table 2 or are able to be calculated as shown in Annex J.

The calculation of the vertical loads applied to the wheels shall take into account all the factors that can produce variations, i.e.:

- a) due to the machine:
  - 1) eccentricity of the centre of gravity;
  - 2) torsional flexibility;
  - 3) hysteresis of the suspension;