

# SLOVENSKI STANDARD

## SIST EN 14033-2:2017

01-september-2017

Nadomešča:

SIST EN 14033-2:2008+A1:2012

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

Railway applications - Track - 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 - Voies - Machines de construction et de maintenance empruntant exclusivement les voies ferrées - Partie 2: Prescriptions techniques pour le déplacement et le travail

**Ta slovenski standard je istoveten z: EN 14033-2:2017**

**ICS:**

45.120	Oprema za gradnjo in vzdrževanje železnic oz. žičnic	Equipment for railway/cableway construction and maintenance
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**SIST EN 14033-2:2017**

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EUROPEAN STANDARD

**EN 14033-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2017

ICS 45.120; 93.100

Supersedes EN 14033-2:2008+A1:2011

English Version

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

Applications ferroviaires - Voie - 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 European Standard was approved by CEN on 3 September 2016.

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.

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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.

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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## European foreword

This document (EN 14033-2:2017) 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 November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14033-2:2008+A1:2011.

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.*

Amended clauses compared to EN 14033-2:2008+A1:2011:

General	Addition of travelling mode for machines, when moving between sites and not in running mode
General	All references updated to latest issue
5.1.2	Additional diagram added to clarify stress points
5.2.1.1	Devices attached to rail to prevent overturning have been forbidden
5.2.1.2	No longer permitted to exempt proof of stability by testing
5.2.2	New subclause for prevention of derailment in running mode
5.2.3.2.1	New Table 6 to show comparison between track parameters in EN 14363 and degraded working track
5.2.3.3	Rules for deviating from prevention of derailment extended for rail cranes
5.3.1	Requirements for gauge in travelling mode added
5.3.2.2.1	Lateral limit conditions in working mode clarified
5.3.2.2.2	More than one lateral working limit now permitted
5.3.2.2.4	Warning light colour changed from red to orange
5.3.3	Previous requirement for working limit in lower area withdrawn and replaced by general requirement about exceeding gauge
5.4.2	New requirement for work surface added
5.5.2	Requirement for steps and handrails added

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5.8.2	Reminder for size of electrical bonding added
5.8.6	New section for pantographs added
5.9.1	Material requirements updated
5.9.2	New section for fire detection and extinguishing systems added
5.11	Additional requirements for marker lights added
5.12.1	Additional requirement for travelling and working brake added
5.12.2	Relaxation permitted for stopping distance at slow speed, with additional requirements for brake architecture
5.12.3	Requirement for all potentially independent vehicles to have parking brake
5.13.2	Additional requirement for warning horn in travelling mode added
5.14	Recovery conditions deleted because duplicate to running mode
5.15	New section on data recorders added
5.16	New section on compatibility with ground based systems added
5.17	New section on traction equipment added
5.18	New section on laser equipment added
5.19	New section on remote control added
Clause 8	Service number requirements deleted because duplicate to running mode
Annexes	All annexes reviewed and updated
	Annex for certification withdrawn
Annex L	New annex on earthing pantographs added

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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

This European Standard was prepared to meet the basic requirements of EU Directives to facilitate an open market for goods and services.

This document is the second of a series of three 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; this is a harmonized standard with the Technical Specification for Interoperability (TSI) for Locomotives and Passenger Rolling Stock Commission decision 2011/291/EU, which itself meets the essential requirements to ensure the interoperability of the rail system as described in Article 1 of European Directive 2008/57/EC;
- 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.

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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## EN 14033-2:2017 (E)

### 1 Scope

#### 1.1 General

This European Standard defines the specific technical railway requirements for travelling and working with machines and other vehicles used for construction, maintenance and inspection of track, structures, track formation and fixed electric traction equipment as specified in EN 14033-1.

This European Standard applies to all railbound machines and other vehicles – referred to as 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 European Standard applies to machines that are intended to operate signalling and control systems. Other similar machines are dealt with in other European Standards, see Annex M.

This European Standard 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 European Standard covers the safety requirements for the railway specific problems for travelling and working on different infrastructures. The application of these requirements is the object of a verification procedure, which does not form part of this European Standard, but an Annex I is included for information. In all cases an authorization to work is needed to access the infrastructure.

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

This European Standard 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 European Standard 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 high or low temperatures, corrosive environment, tropical environment, contaminating environments, 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 for the measurement of track quality are dealt with in EN 13848-3.

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

## 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 280, *Mobile elevating work platforms — Design calculations — Stability criteria — Construction — Safety — Examinations and tests*

EN 1991-2, *Eurocode 1: Actions on structures — Part 2: Traffic loads on bridges*

EN 12077-2, *Cranes safety — Requirements for health and safety — Part 2: Limiting and indicating devices*

EN 12999, *Cranes — Loader cranes*

EN 14033-1:2017, *Railway applications — Track — Railbound construction and maintenance machines — Part 1: Technical requirements for running*

EN 14033-3:2017, *Railway applications — Track — Railbound construction and maintenance machines — Part 3: General safety requirements*

EN 14363:2016, *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, *Railway applications — Marking on railway vehicles — Part 1: Freight wagons*

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

EN 45545-2:2013+A1:2015, *Railway applications — Fire protection on railway vehicles — Part 2: Requirements for fire behaviour of materials and components*

EN 50121-3-2, *Railway applications — Electromagnetic compatibility — Part 3-2: Rolling stock — Apparatus*

EN 50153:2014, *Railway applications — Rolling stock — Protective provisions relating to electrical hazards*

EN 50317, *Railway applications — Current collection systems — Requirements for and validation of measurements of the dynamic interaction between pantograph and overhead contact line*

EN ISO 7010:2012, *Graphical symbols — Safety colours and safety signs — Registered safety signs (ISO 7010:2011)*

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EN ISO 7731, *Ergonomics — Danger signals for public and work areas — Auditory danger signals (ISO 7731)*

ISO 4305:2014, *Mobile cranes — Determination of stability*

ISO 4310, *Cranes — Test code and procedures*

ISO 16754, *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 given in EN 14033-1:2017 and the following apply.

**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

**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****working track**

track that is being maintained for which one or several of the geometrical parameters may reach the limiting values as specified for operating

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

track that is degraded compared to the operating track and 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**

body appointed by the infrastructure manager

**3.7****working agreement**

procedure that enables a machine to work on the network of one railway infrastructure manager

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

- 1) the proof of conformity with the safety requirements, as specified in EN 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.

### 3.8

#### 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 latter (method of work, quality, output)

## 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.

## 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 technical documentation, see Annex E, and in the instruction handbook.

#### 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 manufacturer shall state the limitations of use for both these rail types.

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