

STN	Železnice Koľaj Traťové stroje na stavbu a údržbu tratí Časť 3: Všeobecné požiadavky na bezpečnosť	STN EN 14033-3 28 2236
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Railway applications - Track - Railbound construction and maintenance machines - Part 3: General safety requirements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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EUROPEAN STANDARD

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English Version

Railway applications - Track - Railbound construction and maintenance machines - Part 3: General safety requirements

Applications ferroviaires - Voie - Machines de construction et de maintenance empruntant exclusivement les voies ferrées - Partie 3 : Prescriptions générales pour la sécurité

Bahnanwendungen - Oberbau - Schienengebundene Bau- und Instandhaltungsmaschinen - Teil 3: Allgemeine Sicherheitsanforderungen

This European Standard was approved by CEN on 20 February 2017.

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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European foreword

This document (EN 14033-3:2017) 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of an identical text or by endorsement, at the latest by November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.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 shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14033-3:2009+A1:2011.

Amended clauses compared to EN 14033-3:2009+A1:2011:

General	All references updated to latest issue
3.2 to 3.4	Different modes of machine defined
3.5	Definition added
4	New paragraph added as a reminder about risk assessment
5.2.3	Minimum width of walkways increased to 800mm with additional consideration for fire escape routes
5.4.7	Ventilation air requirements made per person, extra requirements deleted
5.7	Maximum pressure at which non-mesh guards are to be provided reduced to 50kPa
5.8	Additional requirements added for communication between work places
5.11	Requirements for visibility of track amended to reflect differing requirements of working and travelling modes
5.12.2	Emergency stopping devices now only required where movement presents a danger to personnel
5.12.3	New section added for emergency stopping of power sources
5.15	New section added for control systems and minimum performance level requirements
5.16.1	Additional requirement added concerning single point failures
5.22	Additional requirements added for corrosion and protective devices for fuel and hydraulic systems
5.23	Minimum noise level requirement added for travelling mode and additional requirements for working mode
5.25	Material requirements for fire protection standardised with EN 14033 parts 1 and 2; additional requirements added for fire detection and suppression systems
5.27.3	More detailed requirements added for external illumination on machines

5.28	New section added on lasers
5.29.2	Clarity added for existing requirement on warning horns
5.30	New section added on temperature range
5.33	New section added on moveable components
6.3	New requirements added for portal cranes
6.7	New section added on ballast chains
6.8	New section added on ballast dust
6.9	New section added on rail profiling
8	Information for use updated to reflect changes in standard
Annex B	Annex updated to reflect changes in standard
Annex C	Noise test code updated
Annex D	New annex for camera monitor systems
Annex E	New annex for close range surveillance systems
Annex F	New annex for vibration test code

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(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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*

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

This document is a type C standard as stated in EN ISO 12100:2010.

This document is the third 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, 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 railway specific 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.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those, which are stated in type B standards, the provisions of this type C standard take precedence over the provisions of the other standards.

1 Scope

This European Standard specifies the significant hazards, hazardous situations and events common to rail bound machines and arising due to the adaptation for their use on railways. These machines are intended for construction, maintenance and inspection of track, structures, infrastructure and fixed electric traction equipment, when they are used as intended or under conditions of misuse which are reasonably foreseeable by the manufacturer, see Clause 4.

This European Standard applies to railbound machines and other vehicles - referred to as machines - working exclusively on the railway (utilizing friction adhesion between the rail and rail wheels) but including machines that in working position are partly supported on the ballast or the formation 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 G.

This European Standard specifies the common hazards, in normal circumstances, during running, assembly and installation, commissioning, use (including setting, programming, and process changeover), operation, cleaning, fault finding, maintenance and de-commissioning of the machines. Additional safety measures can be required by exceptional circumstances, such as extreme ambient temperatures highly corrosive or contaminating environment; e.g. due to the presence of chemicals, and potentially explosive atmospheres.

Specific measures for exceptional circumstances are not dealt with in this European Standard. The specific measures for exceptional circumstances introduced by a railway infrastructure manager and requirements introduced by the manufacturer and/or machine operator as referred to in the scope are not dealt with in this European Standard. When such additional measures are necessary, they should be agreed between the manufacturer and the machine operator. The manufacturer will be responsible independently of this European Standard, for the provision of risk reduction measures for additional hazards created by any additional or alternative requirements.

NOTE This European Standard deals only with the additional hazards from the adaptation of a machine for its use on rail. Other standards specific to the particular machine as far as available will need to be used in addition to this European Standard to give the complete requirements.

The common hazards specified include the general hazards presented by the machines, and also the hazards presented by the following specific machine functions, common to two or more machine types:

- ballast excavation, ballast cleaning, ballast regulating, ballast consolidating;
- tamping;
- track renewal;
- craning;
- maintenance of the components of the infrastructure;

during commissioning, use, maintenance and servicing.

This European Standard does not deal comprehensively with specific machine functions other than the common functions listed in the previous paragraph, or with all possible hazards presented by complete machines or by the combination of functions.

For such specific functions or hazards, the use of specific European Standards is recommended.

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This European Standard does not deal with:

- requirements with regard to the quality of work and the performance of the machine;
- machines that utilize the overhead contact line for traction purposes;
- specific requirements introduced by a railway infrastructure manager;
- additional or alternative requirements introduced by the manufacturer and/or operator.

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 2, *Classification of fires*

EN 3 (all parts), *Portable fire extinguishers*

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

EN 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 474-1:2006+A4:2013, *Earth-moving machinery - Safety - Part 1: General requirements*

EN 547-1, *Safety of machinery — Human body measurements — Part 1: Principles for determining the dimensions required for openings for whole body access into machinery*

EN 547-2, *Safety of machinery — Human body measurements — Part 2: Principles for determining the dimensions required for access openings*

EN 547-3, *Safety of machinery — Human body measurements — Part 3: Anthropometric data*

EN 614-1, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 614-2, *Safety of machinery — Ergonomic design principles — Part 2: Interactions between the design of machinery and work tasks*

EN 618, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of bulk materials except fixed belt conveyors*

EN 619, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads*

EN 620, *Continuous handling equipment and systems — Safety and EMC requirements for fixed belt conveyors for bulk materials*

EN 842, *Safety of machinery — Visual danger signals — General requirements, design and testing*

EN 894-1, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*

- EN 894-2, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*
- EN 894-3, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*
- EN 981, *Safety of machinery — System of auditory and visual danger and information signals*
- EN 1032, *Mechanical vibration — Testing of mobile machinery in order to determine the vibration emission value*
- EN 1037:1995+A1:2008, *Safety of machinery - Prevention of unexpected start-up*
- EN 1837, *Safety of machinery — Integral lighting of machines*
- EN 12096:1997, *Mechanical vibration - Declaration and verification of vibration emission values*
- EN 12999, *Cranes — Loader cranes*
- EN 13000, *Cranes — Mobile cranes*
- EN 13135:2013, *Cranes - Safety - Design - Requirements for equipment*
- EN 14033-1:2017, *Railway applications — Track — Railbound construction and maintenance machines — Part 1: Technical requirements for running*
- EN 14033-2:2017, *Railway applications — Track — Railbound construction and maintenance machines — Part 2: Technical requirements for travelling and working*
- EN 15153-2, *Railway applications - External visible and audible warning devices for trains - Part 2: Warning horns*
- EN 16507, *Railway applications - Ground based service - Diesel refuelling equipment*
- EN 16704-2-1:2016, *Railway applications - Track - Safety protection on the track during work - Part 2-1: Common solutions and technologies - Technical requirements for Track Warning Systems (TWS)*
- EN 28662-1, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 1: General (ISO 8662-1)*
- EN 50155 *Railway applications - Electronic equipment used on rolling stock*
- EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*
- EN 60204-32, *Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines*
- EN 60529, *Degrees of protection provided by enclosures (IP Code)*
- EN 60825-1:2014, *Safety of laser products - Part 1: Equipment classification and requirements*
- EN 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1)*

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EN 61310-2, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking (IEC 61310-2)*

EN 61310-3, *Safety of machinery - Indication, marking and actuation - Part 3: Requirements for the location and operation of actuators (IEC 61310-3)*

EN 61496-1, *Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests*

EN 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

EN 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

EN ISO 2860, *Earth-moving machinery - Minimum access dimensions (ISO 2860)*

EN ISO 2867:2011, *Earth-moving machinery - Access systems (ISO 2867:2011)*

EN ISO 3411:2007, *Earth-moving machinery - Physical dimensions of operators and minimum operator space envelope (ISO 3411:2007)*

EN ISO 3471, *Earth-moving machinery - Roll-over protective structures - Laboratory tests and performance requirements (ISO 3471)*

EN ISO 3744:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 4413, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413)*

EN ISO 4414, *Pneumatic fluid power - General rules and safety requirements for systems and their components (ISO 4414)*

EN ISO 4871:2009, *Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 5353, *Earth-moving machinery, and tractors and machinery for agriculture and forestry - Seat index point (ISO 5353)*

EN ISO 6682, *Earth-moving machinery - Zones of comfort and reach for controls (ISO 6682)*

EN ISO 6683, *Earth-moving machinery - Seat belts and seat belt anchorages - Performance requirements and tests (ISO 6683)*

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

EN ISO 11201:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*

EN ISO 11688-1, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1)*

EN ISO 12001:2009, *Acoustics - Noise emitted by machinery and equipment - Rules for the drafting and presentation of a noise test code (ISO 12001:1996)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13732-1, *Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1)*

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13849-2, *Safety of machinery - Safety-related parts of control systems - Part 2: Validation (ISO 13849-2)*

EN ISO 13850, *Safety of machinery — Emergency stop — Principles for design (ISO 13850)*

EN ISO 13855, *Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855)*

EN ISO 13857, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857)*

EN ISO 14122-2, *Safety of machinery - Permanent means of access to machinery - Part 2: Working platforms and walkways (ISO 14122-2)*

EN ISO 14122-3:2016, *Safety of machinery - Permanent means of access to machinery - Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2016)*

EN ISO 14119, *Safety of machinery - Interlocking devices associated with guards - Principles for design and selection (ISO 14119)*

EN ISO 14120, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards (ISO 14120)*

ISO 3795, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*

ISO 3864-1, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

ISO 5006:2006, *Earth-moving machinery — Operator's field of view — Test method and performance criteria*

ISO 7000, *Graphical symbols for use on equipment — Registered symbols*

ISO/TR 9953, *Earth-moving machinery – Warning devices for slow-moving machines – Ultrasonic and other systems*

ISO 10263-2, *Earth-moving machinery — Operator enclosure environment — Part 2: Air filter element test method*

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ISO 10263-3, *Earth-moving machinery — Operator enclosure environment — Part 3: Pressurization test method*

ISO 10263-5, *Earth-moving machinery — Operator enclosure environment — Part 5: Windscreen defrosting system test method*

ISO 11112:1995+A1:2001, *Earth-moving machinery — Operator's seat — Dimensions and requirements*

ISO 12508, *Earth-moving machinery — Operator station and maintenance areas — Bluntness of edges*

ISO 16001:2008, *Earth-moving machinery — Hazard detection systems and visual aids — Performance requirements and tests*

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