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Railway applications - Track - Road-rail machines and associated equipment - Part 2: General safety requirements

Applications ferroviaires - Voie - Machines rail route et équipements associés - Partie 2 : Prescriptions générales pour la sécurité

Bahnwendungen - Oberbau - Zweiwege-Maschinen und zugehörige Ausrüstungen - Teil 2: Allgemeine Sicherheitsanforderungen

This European Standard was approved by CEN on 9 November 2020.

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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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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EN 15746-2:2020 (E)**European foreword**

This document (EN 15746-2:2020) 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of an identical text or by endorsement, at the latest by June 2021, and conflicting national standards shall be withdrawn at the latest by June 2021.

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 15746-2:2010+A1:2011.

Principal amended clauses compared to EN 15746-2:2010+A1:2011:

- general All references updated to latest issue;
- 5.2.3 Requirements for walkways simplified;
- 5.4.6 Visibility requirements separated for running, travelling and working modes;
- 5.6.2 New requirements for risk of falling;
- 5.11.3 New requirements for operator protection;
- 5.12 Greater clarity provided for emergency stopping devices;
- 5.14.2 Requirements for control systems enhanced;
- 5.16.8 Alternative requirements for equipotential bonding on urban rail added;
- 5.18 Requirements for emissions enhanced;
- 5.20 Requirements for tanks enhanced;
- 5.23 Protection from risk of fire revised;
- 5.24 Braking requirements amended to accommodate urban rail;
- 5.29 New requirements for moveable components;
- 5.30 New requirements for environment;
- 5.31 New requirements for substances hazardous to health;
- 6.5 New requirements for rail profiling machines;
- Annexes All annexes reviewed and updated;
- Annex C Noise test code amended;
- Annex D New annex for vibration test.

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.

EN 15746, *Railway applications — Track — Road-rail machines and associated equipment*, is currently composed with the following parts:

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

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 15746-2:2020 (E)

Introduction

This document is the second of a series of four parts of the European Standard: *Railway applications — Track — Road-rail machines and associated equipment*, dealing with railway specific risks of the road-rail machines when running, travelling and working on railway infrastructures:

- Part 1 covers the technical requirements for the machines in travelling and working modes, and is applicable for all machines.
- Part 2 covers the safety requirements for the machines in travelling and working modes; this is a document harmonized with the European Machinery Directive 2006/42/EC.
- Part 3 covers the essential requirements for the machines that have a running mode and run on tracks within the scope of the Railway Directive 2007/58/EC; this is a document harmonized with the Railway Interoperability Directive 2008/57/EC and its associated Technical Specifications for Interoperability (TSI).
- Part 4 covers the technical requirements for the machines that have a running mode on urban rail and/or for machines intended to have travelling and working modes on urban rail.

Part 1 defines requirements for approval of the machine for use on the railway. Depending on the decision of the Infrastructure Manager or National rules, the assessment of conformance could be by the Infrastructure Manager concerned, by a third party assessor or declaration of conformity by the manufacturer.

Part 2 defines requirements for the machine to be declared conformant by the manufacturer, except in the case of machines classified under Annex 4 of the Machinery Directive, which requires a conformity check in conjunction with a notified body.

Part 3 defines requirements for running on the European railway network. Assessment of conformity is by a notified body as prescribed in the Railway Interoperability Directive.

Part 4 defines requirements for approval of the machine for use on urban rail. Depending on the decision of the Urban Rail Manager or National rules the assessment of conformance could be by the Urban Rail Manager concerned, by a third party assessor or declaration of conformity by the manufacturer.

This document is a type C standard as stated in EN ISO 12100:2010. This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate in the drafting process of this document.

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, for machines that have been designed and built according to the provisions of this type C standard.

As far as possible this document sets out only the requirements that materials and equipment need to meet in the interest of safety, and it is assumed that persons operating machines are adequately trained.

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EN 15746-2:2020 (E)**1 Scope**

This document specifies the significant hazards, hazardous situations and events, common to self-propelled road-rail machines – henceforward referred to as machines – and associated equipment, arising due to the adaptation for their use on railway networks and urban rail networks. These machines are intended for construction, maintenance and inspection of the railway infrastructure, shunting and emergency rescue vehicles, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer; see Clause 4.

This document deals with the common hazards during assembly and installation, commissioning, travelling on and off track, use including setting, programming, and process changeover, operation, cleaning, fault finding, maintenance and de-commissioning of the machines.

NOTE Specific measures for exceptional circumstances are not dealt with in this document. They can be subject to negotiation between manufacturer and the machine operator.

The common hazards dealt with include the general hazards presented by the machines, also the hazards presented by the following specific machine functions:

- a) excavation;
- b) ballast tamping, ballast cleaning, ballast regulating, ballast consolidating;
- c) track construction, renewal, maintenance and repair;
- d) lifting;
- e) overhead contact line system renewal / maintenance;
- f) maintenance of the components of the infrastructure;
- g) inspection and measurement of the components of the infrastructure;
- h) working in tunnels;
- i) shunting;
- j) vegetation control;
- k) emergency rescue and recovery;

during commissioning, use, maintenance and servicing.

For a road-rail machine it is assumed that an EU road permissible host vehicle will offer an accepted safety level for its designed basic functions before conversion. Unless explicitly stated otherwise in a particular clause this specific aspect is not dealt with in this document.

This document does not deal with:

- 1) requirements with regard to the quality of work and the performance of the machine;
- 2) machines that utilize the contact line system for traction purposes;
- 3) specific requirements established by a railway Infrastructure Manager or Urban Rail Manager;
- 4) negotiations between the manufacturer and the machine operator for additional or alternative requirements;

- 5) requirements for use and travel of the machine on public highway;
- 6) hazards due to air pressure caused by the passing of high-speed trains at more than 190 km/h;
- 7) requirements which could be necessary in case of use in extreme conditions, such as extreme ambient temperatures (tropical or polar); see 5.30;
- 8) highly corrosive or contaminating environment, e.g. due to the presence of chemicals;
- 9) potentially explosive atmospheres.

Other special machines used on railway tracks are dealt with in other European Standards, see Annex E.

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 2:1992, *Classification of fires*

EN 3-7:2004+A1:2007, *Portable fire extinguishers — Part 7: Characteristics, performance requirements and test methods*

EN 280:2013+A1:2015, *Mobile elevating work platforms — Design calculations — Stability criteria — Construction - Safety - Examinations and tests*

EN 403:2004, *Respiratory protective devices for self-rescue — Filtering devices with hood for escape from fire — Requirements, testing, marking*

EN 474-1:2006+A6:2019, *Earth-moving machinery — Safety — Part 1: General requirements*

EN 547-1:1996+A1:2008, *Safety of machinery — Human body measurements — Part 1: Principles for determining the dimensions required for openings for whole body access into machinery*

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EN 547-3:1996+A1:2008, *Safety of machinery — Human body measurements — Part 3: Anthropometric data*

EN 614-1:2006+A1:2009, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

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EN 618:2002+A1:2010, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of bulk materials except fixed belt conveyors*

EN 619:2002+A1:2010, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads*

EN 620:2002+A1:2010, *Continuous handling equipment and systems — Safety and EMC requirements for fixed belt conveyors for bulk materials*

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EN 842:1996+A1:2008, *Safety of machinery — Visual danger signals — General requirements, design and testing*

EN 894-1:1997+A1:2008, *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*

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EN 1032:2003+A1:2008, *Mechanical vibration — Testing of mobile machinery in order to determine the vibration emission value*

EN 1837:1999+A1:2009, *Safety of machinery — Integral lighting of machines*

EN 12999:2011+A2:2018, *Cranes — Loader cranes*

EN 13000:2010+A1:2014, *Cranes — Mobile cranes*

EN 13135:2013+A1:2018, *Cranes — Safety — Design — Requirements for equipment*

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

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EN 14033-2:2017, *Railway applications — Track — Railbound construction and maintenance machines — Part 2: Technical requirements for travelling and working*

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

EN 15153-2:2020, *Railway applications — External visible and audible warning devices — Part 2: Warning horns for heavy rail*

EN 15746-1:2020, *Railway applications — Track — Road-rail machines and associated equipment — Part 1: Technical requirements for travelling and working*

EN 15746-3:2020, *Railway applications — Track — Road-rail machines and associated equipment — Part 3: Technical requirements for running*

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

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 28662-1:1992, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 1: General (ISO 8662-1:1988)*

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

EN 50153:2014,¹ *Railway applications — Rolling stock — Protective provisions relating to electrical hazards*

EN 60204-1:2018, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2016)*

EN 60204-32:2008, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines (IEC 60204-32:2008)*

EN 60529:1991,² *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61310-1:2008, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2007)*

EN 61310-2:2008, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking (IEC 61310-2:2007)*

EN 61310-3:2008, *Safety of machinery — Indication, marking and actuation — Part 3: Requirements for the location and operation of actuators (IEC 61310-3:2007)*

EN 61496-1:2013, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2012)*

EN 61508-3:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 3: Software requirements (IEC 61508-3:2010)*

EN 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code) (IEC 62262:2002)*

EN ISO 2860:2008, *Earth-moving machinery — Minimum access dimensions (ISO 2860:1992)*

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 3471:2008, *Earth-moving machinery — Roll-over protective structures — Laboratory tests and performance requirements (ISO 3471:2008)*

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)*

¹ As impacted by EN 50153:2014/A1:2017.

² As impacted by EN 60529:1991/AC:2006-12, EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/A2:2013/AC:2019-02.