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

Bahnanwendungen - Oberbau - Zwei-Wege Maschinen und zugehörige Ausstattung - Teil 2: Allgemeine Sicherheitsanforderungen

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European foreword

This document (prEN 15746-2:2015) 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 15746-2:2010+A1:2011.

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 Directives.

For relationship with EU Directives, see informative Annexes ZA, ZB, or ZC, which are 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 running and working*;

— *Part 2: General safety requirements*;

— *Part 3: Technical requirements for running* [currently at Enquiry stage];

— *Part 4: Technical requirements for running, travelling and working on urban rail* [currently at Enquiry stage].

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 working and travelling modes, and is applicable for all machines.

— Part 2 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 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 harmonized standard 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 working and travelling 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 require 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 controller of the network or National rules the assessment of conformance could be by the urban rail controller concerned, by a third party assessor or declaration of conformity by the manufacturer.

This European Standard is a type C standard as stated in EN ISO 12100.

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

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.

1 Scope

1.1 General

This European Standard specifies the significant hazards, hazardous situations and events, common to self-propelled road-rail machines – henceforward referred to as machines – and attachments as defined in prEN 15746-1:2015, 3.5 and 3.6, and arising due to the adaptation for their use on rail. 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 European Standard deals with the common hazards during running, 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 European Standard. 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, and 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) craning;

e) catenary renewal / maintenance;

f) maintenance of the components of the infrastructure;

g) inspection and measurement of the components of the infrastructure;

h) tunnel inspection / ventilation;

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 European Standard.

A manufacturer should carry out an appropriate risk assessment for the complete machine. Irrespective of whether a harmonized standard exists for the machine in road configuration, this should identify any additional hazards arising from the particular application of the chassis and the protective measures required to adequately deal with them.

This European Standard does not deal with:

1) requirements with regard to the quality of work and the performance of the machine;

2) machines that utilize the catenary for traction purposes;

3) specific requirements established by a railway infrastructure 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 vehicles used on railway tracks are dealt with in other European Standards, see Annex E.

1.2 Validity of this European Standard

This European Standard applies to all machines that are ordered one year after the publication date by CEN of this 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 2, *Classification of fires*

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

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

EN 294, *Safety of machinery — Safety distance to prevent danger zones being reached by the upper limbs*

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

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

EN 474 (all parts), *Earth-moving machinery — Safety*

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 811, *Safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs*

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 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 981, *Safety of machinery — System of auditory and visual danger and information signals*

EN 982, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 983, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*

EN 999, *Safety of machinery — The positioning of protective equipment in respect of approach speeds of parts of the human body*

CR 1030-1, *Hand-arm vibration — Guidelines for vibration hazards reduction — Part 1: Engineering methods by design of machinery*

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 1088, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

EN 1837, *Safety of machinery — Integral lighting of machines*

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

EN 12999, *Cranes — Loader cranes*

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

EN 13001-1, *Cranes — General design — Part 1: General principles and requirements*

EN 13135-1:2003+A1:2010, *Cranes — Safety — Design — Requirements for equipment — Part 1: Electrotechnical equipment*

EN 13135-2:2004+A1:2010, *Cranes — Equipment — Part 2: Non-electrotechnical equipment*

EN 14033-1:2011, *Railway applications — Track — Railbound construction and maintenance machines — Part 1: Technical requirements for running*

EN 14033-2:2008+A1:2011, *Railway applications — Track — Railbound construction and maintenance machines — Part 2: Technical requirements for working*

prEN 14033-3:2014, *Railway applications — Track — Railbound construction and maintenance machines — Part 3: General safety requirements*

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

CEN/TR 15172-1, *Whole-body vibration — Guidelines for vibration hazards reduction — Part 1: Engineering methods by design of machinery*

prEN 15746-1:2015*Railway applications — Track — Road-rail machines and associated equipment — Part 1: Technical requirements for travelling and working*

prEN 15746–3:2015, *Railway applications — Track — Road-rail machines and associated equipment — Part 3: Technical requirements for running*

prEN 15746-4:2015, *Railway applications — Track — Road-rail machines and associated equipment — Part 4: Technical requirements for running, travelling and working on urban rail*

prEN 16704-2-1:2014, *Railway applications — Track — Safety protection on the track during work — Part 2-1: Common solutions and technology — 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 8662-1:1988)*

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

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

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

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

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

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

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 (IEC 61496-1)*

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

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

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

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

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 3744:2009, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)*

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 11201:2009, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995, including Cor 1:1997)*

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 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

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 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 14122-3:2001[1)], *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

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

ISO 3864 (all parts), *Graphical symbols —– Safety colours and safety signs*

ISO 4305, *Mobile cranes — Determination of stability*

ISO 4310, *Cranes — Test code and procedures*

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

ISO 6405-1, *Earth-moving machinery — Symbols for operator controls and other displays — Part 1: Common symbols*

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

1) This document is impacted by the amendment EN ISO 14122-3:2001/A1:2010.