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Bahnanwendungen - Oberbau Zweiwege-Maschinen und zugehörige Ausrüstungen - Teil 1: Technische Anforderungen an die Versetzfahrt und den Arbeitseinsatz

Applications ferroviaires - Voie - Machines rail-route et équipements associés - Partie 1 : Exigences techniques pour le déplacement et le travail

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Railway applications - Track - Road-rail machines and associated equipment - Part 1: Technical requirements for travelling and working

Applications ferroviaires - Voie - Machines rail-route et équipements associés - Partie 1 : Prescriptions techniques pour le déplacement et le travail

Bahnanwendungen - Oberbau - Zweiwege-Maschinen und zugehörige Ausrüstungen - Teil 1: Technische Anforderungen an die Versetzfahrt und den Arbeitseinsatz

This European Standard was approved by CEN on 5 May 2019.

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Contents	Page
European foreword.....	5
Introduction	7
1 Scope	8
1.1 General.....	8
1.2 Validity of this document	9
2 Normative references.....	9
3 Terms and definitions	11
4 Machine categorization.....	15
4.1 Categories	15
4.1.1 General.....	15
4.1.2 Example of Category 8 machine	16
4.1.3 Examples of Category 9 A machines	17
4.1.4 Examples of Category 9 B machines	17
4.1.5 Examples of Category 9 C machines	18
4.2 Type approval and categories.....	20
4.3 Machines of more than one category.....	20
4.4 Type qualification for running in a train.....	20
5 Railway specific safety requirements and/or measures	20
5.1 General.....	20
5.2 Rolling stock gauge.....	20
5.2.1 Travelling gauge.....	20
5.2.2 Machine in travelling mode.....	22
5.2.3 Working limit.....	22
5.2.4 Determination of lateral limit of exceedance allowed on curves in working mode.....	23
5.2.5 Limits in lower area in working and travelling mode	24
5.2.6 Working limit in the upper area	24
5.3 Requirement for clearance of track obstacles.....	25
5.4 Interaction with the infrastructure	25
5.4.1 General.....	25
5.4.2 Stress induced into rail by main wheels.....	25
5.4.3 Auxiliary wheels, auxiliary guides and working parts	26
5.4.4 Loads applied to the ballast.....	26
5.4.5 Loads applied to the formation	26
5.4.6 Special equipment	27
5.5 Safety against derailment	27
5.5.1 General.....	27
5.5.2 Safety against derailment for machines with a maximum travelling speed of 60 km/h < v ≤ 100 km/h.....	27
5.5.3 Safety against derailment for machines with a maximum travelling speed of v ≤ 60 km/h	27
5.5.4 Safety against derailment for machines in working mode with an admissible speed v ≤ 60 km/h	29
5.5.5 Dynamic tests on track for all machines.....	30
5.5.6 Railhead clearing devices.....	30
5.6 Stability and prevention of overturning.....	30

5.6.1	Proof of stability against overturning, machine stationary in rail configuration.....	30
5.6.2	Proof of stability when moving along the track in working mode.....	33
5.6.3	Load moment control and display device.....	34
5.7	Machine frame structure	36
5.7.1	Design of the machine frame	36
5.7.2	Demountable modules.....	36
5.7.3	Lifting and jacking points	37
5.8	Inter-machine couplings.....	37
5.8.1	General	37
5.8.2	Towing adaptor.....	38
5.9	Running gear	38
5.9.1	General	38
5.9.2	Distribution of the wheelset forces in travelling mode	39
5.9.3	Machine rail wheel base.....	39
5.9.4	Rail wheel and wheel profile in travelling mode	39
5.9.5	Rail wheel arrangements.....	41
5.9.6	Load on rail wheels.....	41
5.9.7	Load on rail wheels in working configuration	43
5.9.8	Operation of spring loaded points.....	44
5.9.9	Ratio of wheel load on guiding wheels to road axle load	44
5.10	Rail wheel suspension.....	45
5.10.1	Rail wheel suspension systems	45
5.10.2	Positively locked suspension	46
5.10.3	Active suspension.....	46
5.10.4	All suspension systems.....	46
5.11	Braking.....	46
5.11.1	General braking requirements.....	46
5.11.2	Requirements for Category 9 machines in travelling and working modes	46
5.12	Driving and working cabs and places.....	48
5.13	Controls	48
5.14	Visibility and audibility of the machine.....	48
5.14.1	General	48
5.14.2	Marker lights in travelling mode	48
5.14.3	Lighting with failed engine.....	49
5.14.4	Lamp brackets	49
5.14.5	Light switching arrangements	51
5.14.6	Head lights.....	51
5.14.7	Lighting in working mode.....	51
5.14.8	Warning horns	51
5.14.9	Colour of the machine	51
5.15	Warning systems for personnel of traffic on adjacent track.....	52
5.15.1	General	52
5.15.2	Permanently mounted acoustic warning systems.....	52
5.15.3	Permanently mounted optical warning systems.....	52
5.15.4	Designated space for mobile warning devices	52
5.16	Electrical equipment and equipotential bonding	53
5.16.1	Equipotential bonding	53
5.16.2	Antennae.....	53
5.16.3	Pantograph.....	53
5.17	Electromagnetic compatibility	53
5.17.1	Emissions from machines.....	53
5.17.2	Immunity of machines from railway environment	53
5.18	Power supply.....	54

EN 15746-1:2020 (E)

5.19	Failure recovery conditions	54
5.19.1	Towing devices.....	54
5.19.2	Emergency device	54
5.20	On and off tracking	54
5.20.1	General.....	54
5.20.2	Use of turntables	55
5.21	Setting up and packing away.....	55
5.21.1	General.....	55
5.21.2	Emergency recovery of equipment.....	55
5.22	Mobile elevating work platform (MEWP) and excavators/loaders used as MEWPs	55
5.23	Attachments	55
5.23.1	General.....	55
5.23.2	General attachments for raising and lowering personnel	56
5.23.3	Attachments with rail guidance wheels	56
5.24	Environmental protection	56
5.24.1	General.....	56
5.24.2	Carriage and storage of fuel and oil.....	56
5.24.3	Tanks and equipment.....	56
6	Marking and numbering of the machines	56
6.1	Warning signs and pictograms.....	56
6.2	Machine identification number	57
7	User information	57
8	Verification of the conformity to the requirements and/or particular safety measures.....	60
Annex A	(normative) Special national conditions.....	61
Annex B	(normative) Check list for conformity.....	73
Annex C	(informative) Certificates.....	78
C.1	Certificate of type approval to EN 15746-1:2020	78
C.2	Conformance control document for the technical requirements of EN 15746-1:2020	79
C.2.1	Machine identification	79
C.2.2	General characteristics	79
Annex D	(informative) Machine numbering structure for Category 9 machines not designed to operate track signalling and control systems.....	81
Annex E	(informative) Machine identification plate for Category 9 machines not designed to operate track signalling and control systems.....	84
Annex F	(informative) Structure of European Standards for track construction and maintenance machines	85
Bibliography	87

European foreword

This document (EN 15746-1:2020) 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 15746-1:2010+A1:2011.

Principal amended clauses compared to EN 15746-1:2010+A1:2011:

- general All references updated to latest issue;
- running, travelling and working modes adopted;
- requirements solely for running mode moved to new EN 15746-3:2020;
- 4.3 New clause;
- 5.5 Clause on safety against derailment enhanced to provide greater clarity and increased options for testing;
- 5.6 Specific requirements for prevention of overturning moved from EN 15746-2:2010+A1:2011, 5.11 with enhanced requirements for RCI/RCL and data recording;
- 5.7 Requirements for frame structure simplified;
- requirements for demountable modules added;
- 5.8 Requirements for couplings made more specific for road-rail machines;
- 5.14 Requirements for lighting amended;
- 5.16 Requirements for pantographs enhanced;
- 5.24 New clause for environmental protection;
- Annexes All annexes reviewed and updated;
- Annex C Now informative;
- Annex D Now informative and the identification number changed to commence ZZ;
- Annex E Now informative.

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

EN 15746-1:2020 (E)

- *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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Introduction

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

This document is the first 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 running, travelling and/or working mode 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 manager of the network 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.

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

EN 15746-1:2020 (E)**1 Scope****1.1 General**

This document deals with the technical requirements to minimize the specific railway hazards of self-propelled road-rail machines – henceforward referred to as machines – and associated equipment, which can arise during the commissioning, operation and maintenance of the machines when carried out in accordance with the specification given by the manufacturer or his authorized representative.

These risks are normally common regardless of the track gauge. However, additional requirements can apply for travelling and working on infrastructures with narrow gauge or broad gauge lines, railways utilizing other than adhesion between the rail and rail wheels and underground infrastructures.

This document is also applicable for machines and associated equipment that in working configuration are partly supported on the ballast or the formation. Such machines are capable of independent self-propelled movement on the ground.

This document does not apply to the following:

- the requirements for quality of the work or performance of the machine;
- the specific requirements established by the machine operator for the use of machines, which will be the subject of negotiation between the manufacturer and the Infrastructure Manager;
- moving and working while not on rails;
- separate machines temporarily mounted on machines and associated equipment;
- demountable machines as defined in 3.2;
- trailers as defined in 3.3, including road-rail trailers.

Vehicles which are not track-guided themselves but have attachments that are track-guided are not road-rail machines.

The requirements within this document are amended and added to by the requirements in EN 15746-4 for machines designed and intended to use urban rail.

This document does not establish the additional requirements for the following:

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

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.

Other track construction and maintenance machines used on railway tracks are dealt with in other European Standards, see Annex F.

1.2 Validity of this document

This document applies to all machines which are ordered one year after the publication date by CEN of this document.

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

EN 286-3, *Simple unfired pressure vessels designed to contain air or nitrogen — Part 3: Steel pressure vessels designed for air braking equipment and auxiliary pneumatic equipment for railway rolling stock*

EN 286-4, *Simple unfired pressure vessels designed to contain air or nitrogen — Part 4: Aluminium alloy pressure vessels designed for air braking equipment and auxiliary pneumatic equipment for railway rolling stock*

EN 13309, *Construction machinery — Electromagnetic compatibility of machines with internal power supply*

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EN 13715, *Railway applications — Wheelsets and bogies — Wheels — Tread profile*

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 14363:2016+A1:2018, *Railway applications — Testing and Simulation for the acceptance of running characteristics of railway vehicles — Running Behaviour and stationary tests*

EN 14601, *Railway applications — Straight and angled end cocks for brake pipe and main reservoir pipe*

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

EN 15528, *Railway applications — Line categories for managing the interface between load limits of vehicles and infrastructure*

EN 15566, *Railway applications — Railway rolling stock — Draw gear and screw coupling*

EN 15746-2:2020, *Railway applications — Track — Road-rail machines and associated equipment — Part 2: General safety requirements*

EN 15746-1:2020 (E)

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

EN 15746-4:2020, *Railway applications — Track — Road-rail machines and associated equipment — Part 4: Technical requirements for running, travelling and working on urban rail*

EN 15954-1:2013, *Railway applications — Track — Trailers and associated equipment — Part 1: Technical requirements for running and working*

EN 15954-2, *Railway applications — Track — Trailers and associated equipment — Part 2: General safety requirements*

EN 15807, *Railway applications — Pneumatic half couplings*

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

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

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

EN 50122-1:2011,³ *Railway applications — Fixed installations — Electrical safety, earthing and the return circuit — Part 1: Protective provisions against electric shock*

EN 50206-1, *Railway applications — Rolling stock — Pantographs: Characteristics and tests — Part 1: Pantographs for main line vehicles*

EN 50206-2, *Railway applications — Rolling stock — Pantographs: Characteristics and tests — Part 2: Pantographs for metros and light rail vehicles*

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

EN 50318, *Railway applications — Current collection systems — Validation of simulation of the dynamic interaction between pantograph and overhead contact line*

EN 50367, *Railway applications — Current collection systems — Technical criteria for the interaction between pantograph and overhead line (to achieve free access)*

EN 50405, *Railway applications — Current collection systems — Pantographs, testing methods for contact strips*

EN 60947 (all parts), *Low-voltage switchgear and controlgear (IEC 60947, all parts)*

¹ As impacted by EN 50121-3-1:2017/A1:2019.

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

³ As impacted by EN 50122-1:2011/A1:2011, EN 50122-1:2011/A2:2016, EN 50122-1:2011/A3:2017 and EN 50122-1:2011/A4:2017.

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

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

ISO 8755, *Commercial road vehicles — 40 mm drawbar eye — Interchangeability*

DIN 74054 (all parts), *Mechanical connections between towing vehicles and trailers*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

3.1

road-rail machine

self-propelled machine that can move on rails and ground

Note 1 to entry It is normally a road vehicle adapted for moving on rail also, but can be a specially designed rail vehicle for moving on the ground also.

Note 2 to entry It does not imply that the machine is suitable for use on the public road.

3.2

demountable machine

machine that can travel and work only on rail and which is not intended to operate track signalling and control systems, but is not able to travel on the ground

Note 1 to entry Such a machine is designed to get on and off track by its own means or with other lifting equipment. In the case of demounting by its own means these are not intended for operating on the ground.

Note 2 to entry Such a machine is permitted to work on the railway only under special operating conditions granted by the Infrastructure Manager and travel under special conditions granted by the authorized body and/or the Infrastructure Manager.

3.3

trailer

non-self-propelled machine that can be hauled on rail wheels

Note 1 to entry: Trailers are not intended to operate track signalling and control systems and are not designed to be transported between work areas on their rail wheels.

3.4

mobile elevating work platform

MEWP

mobile machine intended to move persons to working positions where they carry out work from the work platform with the intention that persons get on and off the work platform at one defined access position, and which consists as a minimum of a work platform with controls, an extending structure and a chassis

EN 15746-1:2020 (E)**3.5****lifting accessory**

loose lifting tackle, i.e. components or equipment not attached to the machine and placed between the machinery and the load or on the load in order to attach it

3.6**host vehicle**

basic road vehicle or machine which is converted to operate additionally on rails; this vehicle is either EU road permissible or CE marked

3.7**manufacturer**

body that designs and constructs a road-rail machine, or converts the original machine/vehicle to a road-rail machine

3.8**running mode**

machine configuration that allows movement along the track, all parts stowed and locked with everything within the applicable gauge, whilst the machine interrelates with the signalling and control systems for normal railway traffic

Note 1 to entry: The mode only relates to the technical configuration of the machine independent of the operational mode (e.g. movements during shunting and regular train running). The operational mode is defined by the Infrastructure Manager.

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3.9**travelling mode**

machine configuration that allows movement along the track, all parts stowed with everything within the applicable gauge, whilst the machine does not require to interrelate with the signalling and control systems (in this condition there is no need to ensure operation of signalling systems or for cab based signalling equipment), and which as a mode also includes shunting

Note 1 to entry: A machine in travelling mode does not need to meet the operational requirements for the movement of trains on the railway network.

Note 2 to entry: The mode only relates to the technical configuration of the machine independent of the operational mode (e.g. movements during shunting and regular train running). The operational mode is defined by the Infrastructure Manager.

3.10**working mode**

mode by which the machine is used to perform any of its permitted design tasks, as soon as any part of the machine is un-stowed it is in working mode

3.11**shunting**

movement along the track, controlled by operational signals, or radio, of self-propelled machines, either on its own or towing or propelling one or more vehicles or machines

3.12**on and off tracking mode**

mode of the machine when it is in a state that enables it to be on or off tracked

3.13**running**

moving the machine in running mode along the track

3.14**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)

3.15**working track**

track not open for normal traffic

3.16**degraded working track**

track being maintained for which the geometrical parameters may reach the limiting values and for which special operational restrictions may apply

Note 1 to entry: The limiting values as specified in EN 14033-2:2017, Annex F.

3.17**railway infrastructure**

all installations required for the running of railway vehicles

EXAMPLE Tracks, level crossings, overhead contact line systems, signals.

3.18**machine operator**

private or public undertaking which operates machines for the construction and maintenance of the infrastructure

3.19**operator**

person who handles the controls of a machine in order to perform the functions of the machine

3.20**driver**

person who handles the controls of a machine in order to control the machine when moving along the track

Note 1 to entry: The driver and operator can be the same.

3.21**train**

self-propelled machine or assembly of vehicles/machines attached by couplings conforming to the relevant regulations of the authorized body and/or Infrastructure Manager

Note 1 to entry: This is only relevant to Category 8 machines and category 9 machines with a running mode.

Note 2 to entry: This does not exclude Category 9 machines from shunting conventional rail vehicles, where permitted by the Infrastructure Manager