

BSI Standards Publication

Railway applications — Track — Road-rail machines and associated equipment

Part 1: Technical requirements for travelling and working



BS EN 15746-1:2020 BRITISH STANDARD

National foreword

This British Standard is the UK implementation of EN 15746-1:2020. It supersedes BS EN 15746-1:2010+A1:2011, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RAE/2, Railway Applications - Track.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2021 Published by BSI Standards Limited 2021

ISBN 978 0 539 00962 0

ICS 93.100

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2021.

Amendments/corrigenda issued since publication

Date Text affected

EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

EN 15746-1

December 2020

ICS 93.100

Supersedes EN 15746-1:2010+A1:2011

English Version

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.

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.

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.

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION COMITÉ EUROPÉEN DE NORMALISATION EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

© 2020 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN 15746-1:2020 E

Cont	tents	Page
Europ	ean foreword	5
Introd	luction	7
1	Scope	8
1.1	General	
1.2	Validity of this document	
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	
4.3	Machines of more than one category	
4.4	Type qualification for running in a train	
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	
5.3	Requirement for clearance of track obstacles	
5.4	Interaction with the infrastructure	
5.4.1	General	25
5.4.2	Stress induced into rail by main wheels	
5.4.3	Auxiliary wheels, auxiliary guides and working parts	
5.4.4	Loads applied to the ballast	
5.4.5	Loads applied to the formation	
5.4.6	Special equipment	
5.5	Safety against derailment	
5.5.1	General	
5.5.2	Safety against derailment for machines with a maximum travelling speed of	
	$60 \text{ km/h} < v \le 100 \text{ km/h}$	27
5.5.3	Safety against derailment for machines with a maximum travelling speed of $v \le 60 \text{ km/h}$	27
5.5.4	Safety against derailment for machines in working mode with an admissible speed	2 /
	$v \le 60 \text{ km/h}$	29
5.5.5	Dynamic tests on track for all machines	
5.5.6	Railhead clearing devices	
5.6	Stability and prevention of overturning	

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	
5.6.3	Load moment control and display device	34
5.7	Machine frame structure	
5.7.1	Design of the machine frame	36
5.7.2	Demountable modules	
5.7.3	Lifting and jacking points	37
5.8	Inter-machine couplings	37
5.8.1	General	37
5.8.2	Towing adaptor	
5.9	Running gear	38
5.9.1	General	
5.9.2	Distribution of the wheelset forces in travelling mode	
5.9.3	Machine rail wheel base	
5.9.4	Rail wheel and wheel profile in travelling mode	39
5.9.5	Rail wheel arrangements	
5.9.6	Load on rail wheels	
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
	General	
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
	Antennae	
5.16.3	Pantograph	53
5.17	Electromagnetic compatibility	53
5.17.1	Emissions from machines	
	Immunity of machines from railway environment	
	Power supply	

EN 15746-1:2020 (E)

	Failure recovery conditions	
5.19.1	Towing devices	. 54
5.19.2	Emergency device	. 54
5.20	On and off tracking	. 54
	General	
5.20.2	Use of turntables	
5.21	Setting up and packing away	. 55
	General	
	Emergency recovery of equipment	
	Mobile elevating work platform (MEWP) and excavators/loaders used as MEWPs	
5.23	Attachments	. 55
	General	
	General attachments for raising and lowering personnel	
	Attachments with rail guidance wheels	
	Environmental protection	
	General	
	Carriage and storage of fuel and oil	
5.24.3	Tanks and equipment	. 56
6	Marking and numbering of the machines	. 56
6.1	Warning signs and pictograms	
6.2	Machine identification number	
7	User information	. 57
8	Verification of the conformity to the requirements and/or particular safety	
U	measures	60
_		
	A (normative) Special national conditions	
Annex	B (normative) Check list for conformity	. 73
Annex	C (informative) Certificates	. 78
C.1	Certificate of type approval to EN 15746-1:2020	
C.2	Conformance control document for the technical requirements of EN 15746-1:2020	
C.2.1	Machine identification	. 79
C.2.2	General characteristics	. 79
Annov	D (informative) Machine numbering structure for Category 9 machines not designed	
Ailliex	to operate track signalling and control systems	Ω1
		. 01
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
ייונים		
KINIIAC	pranhy	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:

BS EN 15746-1:2020

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.

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.