

Nederlandse norm

NEN-EN 14033-2+A1

(en)

Railway applications - Track - Railbound construction and maintenance machines - Part 2: Technical requirements for working

Vervangt NEN-EN 14033-2:2008;
NEN-EN 14033-2:2008/Ontw. A1:2011

ICS 45.120; 93.100
december 2011

Als Nederlandse norm is aanvaard:
- EN 14033-2:2008+A1:2011, IDT

VOORBEELD
Preview

Normcommissie 345051 "Spoorweden"



THIS PUBLICATION IS COPYRIGHT PROTECTED

DEZE PUBLICATIE IS AUTEURSRECHTELIJK BESCHERMD

Apart from exceptions provided by the law, nothing from this publication may be duplicated and/or published by means of photocopy, microfilm, storage in computer files or otherwise, which also applies to full or partial processing, without the written consent of the Netherlands Standardization Institute.

The Netherlands Standardization Institute shall, with the exclusion of any other beneficiary, collect payments owed by third parties for duplication and/or act in and out of law, where this authority is not transferred or falls by right to the Reproduction Rights Foundation.

Auteursrecht voorbehouden. Behoudens uitzondering door de wet gesteld mag zonder schriftelijke toestemming van het Nederlands Normalisatie-instituut niets uit deze uitgave worden verveelvoudigd en/of openbaar gemaakt door middel van fotokopie, microfilm, opslag in computerbestanden of anderszins, hetgeen ook van toepassing is op gehele of gedeeltelijke bewerking.

Het Nederlands Normalisatie-instituut is met uitsluiting van ieder ander gerechtigd de door derden verschuldigde vergoedingen voor verveelvoudiging te innen en/of daartoe in en buiten rechte op te treden, voor zover deze bevoegdheid niet is overgedragen c.q. rechtens toekomt aan de Stichting Reprorecht.

Although the utmost care has been taken with this publication, errors and omissions cannot be entirely excluded. The Netherlands Standardization Institute and/or the members of the committees therefore accept no liability, not even for direct or indirect damage, occurring due to or in relation with the application of publications issued by the Netherlands Standardization Institute.

Hoewel bij deze uitgave de uiterste zorg is nagestreefd, kunnen fouten en onvolledigheden niet geheel worden uitgesloten. Het Nederlands Normalisatie-instituut en/of de leden van de commissies aanvaarden derhalve geen enkele aansprakelijkheid, ook niet voor directe of indirecte schade, ontstaan door of verband houdend met toepassing van door het Nederlands Normalisatie-instituut gepubliceerde uitgaven.

Nederlands voorwoord

Voor de in deze norm vermelde normatieve verwijzingen bestaan in Nederland de volgende equivalenten:

<u>vermelde norm</u>	<u>Nederlandse norm</u>	<u>titel</u>
EN 3-7:2004+A1 EN 280	- NEN-EN 280+A2	- Hoogwerkers - Ontwerpberekeningen - Stabiliteitscriteria - Constructie - Veiligheid - Inspecties en beproevingen
EN 791 EN 12077-2:1998	NEN-EN 791+A1 NEN-EN 12077-2:1998	Boorinstallaties - Veiligheidseisen Veiligheid van hijskranen - Eisen voor gezondheid en veiligheid - Deel 2: Begrenzings- en aanwijsinrichtingen
EN 12999 EN 14033-1:2011	NEN-EN 12999 NEN-EN 14033-1:2011	Hijskranen - Laadkranen Railtoepassingen - Bovenbouw - Railgebonden constructie- en onderhoudsmachines - Deel 1: Technische eisen voor loopgedrag
EN 14363:2005	NEN-EN 14363:2005	Railtoepassingen - Afnameproeven voor de loopkarakteristieken van railvoertuigen - Beproeving van het loopgedrag en stationaire beproevingen
EN 50122-1	NEN-EN 50122-1	Spoorwegen en soortgelijk geleid vervoer - Vaste installaties - Elektrische veiligheid, aarding en retourstromen - Deel 1: Eisen in verband met bescherming tegen elektrische schok
EN 50153:2002	NEN-EN 50153:2002	Railtoepassingen - Rollend materieel - Beschermdende maatregelen met betrekking tot elektrische veiligheid
EN ISO 7731	NEN-EN-ISO 7731	Ergonomie - Gevaarsignalen voor openbare- en werkruimten - Akoestische gevaarsignalen
EN ISO 12100-2	NEN-EN-ISO 12100-2	Veiligheid van machines - Basisbegrippen, algemene ontwerpbeginselen - Deel 2: Technische beginselen
ISO 4305 ISO 4310	- -	- -

Voorbeeld
Preview

EUROPEAN STANDARD

EN 14033-2:2008+A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2011

ICS 45.120; 93.100

Supersedes EN 14033-2:2008

English Version

Railway applications - Track - Railbound construction and maintenance machines - Part 2: Technical requirements for working

Applications ferroviaires - Voie - Machines de construction et de maintenance empruntant exclusivement les voies ferrées - Partie 2: Prescriptions techniques pour le travail

Bahnwendungen - Oberbau - Schienengebundene Bau- und Instandhaltungsmaschinen - Teil 2: Technische Anforderungen an den Arbeitseinsatz

This European Standard was approved by CEN on 11 August 2007 and includes Amendment 1 approved by CEN on 8 November 2011.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	5
Introduction.....	6
1 Scope.....	7
1.1 General.....	7
1.2 Validity of this European Standard.....	8
2 Normative references.....	8
3 Terms and definitions.....	9
3.1 General terms and definitions.....	9
3.2 Additional terms and definitions.....	9
4 Field of use of machines.....	10
5 Specific railway requirements and/or measures.....	10
5.1 Interaction with the Infrastructure.....	10
5.1.1 General.....	10
5.1.2 Stress induced into the rails.....	11
5.1.3 Auxiliary wheels, auxiliary guides and working parts.....	11
5.1.4 Maximum wheel loads.....	11
5.1.5 Loads applied to the ballast.....	13
5.1.6 Loads applied to the formation.....	14
5.1.7 Loads on structures.....	14
5.2 Stability and safety against derailment.....	14
5.2.1 Proof of overturning stability, machine stationary.....	14
5.2.2 Prevention of derailment during working movements.....	16
5.3 Working limit contour.....	18
5.3.1 General.....	18
5.3.2 Lateral limit of working zone.....	18
5.3.3 Working limit in the lower area.....	19
5.3.4 Working limit in the upper area.....	19
5.4 Working places.....	19
5.4.1 General.....	19
5.4.2 Arrangement of working places.....	19
5.4.3 Work positions – Visibility.....	19
5.4.4 Cabin windows used solely for working.....	20
5.5 Access to places of work.....	20
5.5.1 General.....	20
5.5.2 Access to work cabins.....	20
5.6 Influences on the environment.....	20
5.6.1 Exhaust gases.....	20
5.6.2 Noise levels outside the machine.....	20
5.7 Electromagnetic compatibility.....	20
5.8 Protection from risks due to electric traction equipment.....	20
5.8.1 General.....	20
5.8.2 Protection from live overhead lines.....	21
5.8.3 Minimum safety distance between machine parts and catenary.....	21
5.8.4 Minimum safety distance between machine parts and conductor rail.....	21
5.8.5 Special earthing devices and/or protection from return traction currents.....	22
5.9 Protection from the risks of fire.....	22
5.9.1 Fire detection and extinguishing systems.....	22
5.9.2 Fire extinguishing outside of the machine.....	22
5.10 Lighting for work.....	22

5.11	Visibility of machines	22
5.12	Braking	22
5.12.1	General	22
5.12.2	Stopping distances	22
5.12.3	Holding on gradients	23
5.13	A1) Warning systems	23
5.13.1	System for warning personnel of traffic on adjacent tracks	23
5.14	Recovery conditions	24
5.14.1	Emergency towing devices	24
5.14.2	Devices for packing away movable machine-parts	24
6	Verification of the conformity to the requirements and/or particular safety measures	24
6.1	General	24
6.2	Methods of testing	24
6.2.1	General	24
6.2.2	Visual check	24
6.2.3	Measurement	24
6.2.4	Functional test	24
6.2.5	Load test(s)	25
6.2.6	Specific verification/measurements	25
7	User information	25
7.1	General	25
7.1.1	Instructions	25
7.1.2	Special operating instructions	25
7.1.3	Maintenance information	26
7.2	Warning signs and pictograms	27
8	Marking and numbering of machines	27
8.1	Machine marking	27
8.2	Service number of the machine	27
Annex A (informative) Special national conditions		28
Annex B (normative) Check list for conformity		31
Annex C (normative) Warning plate		34
Annex D (normative) Working gauge		35
D.1	General	35
D.1.1	Introduction	35
D.1.2	Scope	35
D.1.3	List of symbols used	35
D.2	Determination of the horizontal working limit	38
D.2.1	General	38
D.2.2	Characteristics of the working track and the machine	39
D.2.3	Characteristics of a standard vehicle travelling on the adjacent line in service	39
D.3	Calculation of the reductions for the limit line of Figure D.2, applicable to the critical parts of the machine	39
D.4	Determination of clearance of the working parts	40
D.4.1	General	40
D.4.2	Method of calculation	41
D.4.3	Addition for curvature, for working parts (Z_b)	41
D.4.4	Addition for cant (Z_u)	41
D.4.5	Addition for safety (z_s)	42
D.4.6	Kinematic clearance necessary for a standard vehicle on the track in service (RB_k)	42
D.4.7	Possible exterior clearance for a working part (AW_z)	42
Annex E (normative) Technical documentation		48
E.1	General	48
E.2	General notices on the machine	48

EN 14033-2:2008+A1:2011 (E)

E.3	Assembly drawing indicating the following:.....	48
E.4	Detailed drawings indicating the following:.....	48
E.5	Detailed drawings with the following indications.....	49
E.6	Technical details	49
E.7	Possible functions of the working parts.....	49
Annex F (normative) Limiting geometric parameters of the working track		50
Annex G (normative) Pictograms		51
G.1	Pictogram "Forbidden to climb if there is a catenary"	51
G.2	Pictogram "Working direction"	52
Annex H (informative) Certificates		53
H.1	Certificate of conformity for EN 14033-2	53
H.2	Working authorisation for the machine	54
H.2.1	Machine identification	54
H.2.2	General working characteristics (Assembly drawing to be enclosed, see E.3).....	55
H.2.3	Declaration of the authorised body.....	55
Annex I (informative) Method of calculating safety from derailment		56
I.1	Calculation of the safety against derailment.....	56
I.1.1	General.....	56
I.1.2	Calculation of the vehicle testing twist.....	57
I.1.3	Limit value of the safety against derailment	58
I.1.4	Guiding force and vertical wheel-load of the leading wheel	58
I.1.5	Guiding force and vertical wheel-load of the leading wheel in the working load case	59
I.1.6	Calculation of the torsional stiffness of the vehicle.....	59
Annex J (informative) Procedure for working authorisation.....		63
J.1	General.....	63
J.2	Validity and application of the authorisation to work	63
J.2.1	Validity.....	63
J.2.2	Field of application.....	63
J.2.3	Enlargement of field of application	63
J.2.4	Withdrawal of the authorisation to work	63
J.2.5	Renewal of the authorisation to work	64
J.3	Applications for authorisation to work.....	64
J.4	Submission of the technical documentation	64
J.5	Type testing	64
J.6	Quality testing	64
J.7	Type approval.....	65
J.8	Examining the finished machine.....	65
J.9	Authorisation to work for machines identical to a machine that has received type approval	65
J.10	Refusal of working authorisation	65
J.11	Validity of working authorisation	65
J.12	Procedure for working agreement	67
J.13	Infrastructure managers and authorised bodies (non-exhaustive list).....	68
Annex K (informative) Basis of calculations.....		71
K.1	General.....	71
K.2	Machines without load control devices	71
K.3	Machines with load control devices.....	72
Annex L (informative) Instruction handbook.....		73
Annex M (informative) ^(A) Structure of European Standards for track construction and maintenance machines ^(A)		74
Bibliography		76

Foreword

This document (EN 14033-2:2008+A1:2011) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2012 and conflicting national standards shall be withdrawn at the latest by June 2012.

This document includes Amendment 1, approved by CEN on 2011-11-08.

This document supersedes EN 14033-2:2008.

The start and finish of text introduced or altered by amendment is indicated in the text by tags $\boxed{A1}$ $\boxed{A1}$.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

Special National Conditions are given in Annex A.

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 working*
- *Part 3: General safety requirements*

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

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

Railway machines used for construction and maintenance form the object of this European Standard.

This European Standard deals with railway specific risks of the machines, as specified in 1.1, when working on railway infrastructures.

For safety requirements in relation to the Machinery Directive, see  EN 14033-3 .

For deviations or special national conditions, see Annex A.

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. If necessary, references are made to appropriate standards of this type.

If the provisions of this type C standard are different from those which are stated in type A or B standards, the provision of this type C standard take precedence.

1 Scope

1.1 General

This European Standard defines the specific technical railway requirements for working with machines and other vehicles used for construction, maintenance and inspection of track, structures, track formation and fixed electric traction equipment as specified in EN 14033-1.

This European Standard applies to all railbound machines and other vehicles - referred to as machines - working exclusively on the railway (utilising adhesion between the rail and rail wheels) 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 M.

Additional requirements can apply for working on infrastructures with narrow gauge or broad gauge lines, lines of tramways, railways utilising other than adhesion between the rail and rail wheels and underground infrastructures.

This European Standard is applicable to 1 435 mm nominal track gauge. Some requirements may be applicable for working on infrastructures with nominal narrow track gauge or nominal broad track gauge lines, lines of tramways, railways utilising other than adhesion between the rail and rail wheels and underground infrastructures.

This European Standard covers the safety requirements for the railway specific problems for working on different infrastructures. The application of these requirements is the object of a verification procedure, which does not form part of this European Standard, but an Annex J is included for information. In all cases an authorisation to work is required to access the infrastructure.

This European Standard is also applicable for machines that in working position are partly supported on the ballast or the formation.

This European Standard does not apply to

- the requirements with regard to the quality of work, including the related measuring methods, and the performance of the machine;¹⁾
- the specific requirements established by each railway infrastructure manager for the use of machines which will be the subject of negotiation between the manufacturer and the infrastructure manager.

This European Standard does not deal with the following additional requirements.

- working methods;
- operation in severe working conditions requiring special measures (e.g. work in tunnels or in cuttings, extreme environmental conditions such as freezer applications, high temperatures, corrosive environment, tropical environment, contaminating environments, strong magnetic fields);
- operation subject to special rules (e.g. potentially explosive atmospheres);

¹⁾ Parameters for the measurement of track quality are dealt with in [A1](#) EN 13848-3 [A1](#).

EN 14033-2:2008+A1:2011 (E)

- hazards due to errors in software;
- hazards occurring when used to handle suspended loads which may swing freely;
- hazards due to wind pressure greater than normal e.g. pressures caused by the passing of trains at speed in excess of 190 km/h.

1.2 Validity of this European Standard

This European Standard applies to all machines, which are ordered after one year from the publication date of this European Standard.

2 Normative references

The following referenced documents are indispensable for the application 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 3-7:2004+A1, *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 791, *Drill rigs — Safety*

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

EN 12999, *Cranes — Load cranes*

EN 14033-1:2011 ^{A1}, *Railway applications — Track — Railbound construction and maintenance machines — Part 1: Technical requirements for running*

EN 14033-3:2009+A1:2011 ^{A1}, *Railway applications — Track — Railbound construction and maintenance machines — Part 3: General safety requirements*

EN 14363:2005, *Railway applications — Testing for the acceptance of running characteristics of railway vehicles — Testing of running behaviour and stationary tests*

EN 50122-1, *Railway applications — Fixed installations — Part 1: Protective provisions relating to electrical safety and earthing*

EN 50153:2002, *Railway applications — Rolling stock — Protective provisions relating to electrical hazards*

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

EN ISO 12100-2, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

ISO 4305, *Mobile cranes — Determination of stability*

ISO 4310, *Cranes — Test code and procedures*

UIC 505-1:2006, *Railway transport stock — Rolling stock construction gauge*

Bestelformulier

NEN

Stuur naar:

NEN Standards Products & Services
t.a.v. afdeling Klantenservice
Antwoordnummer 10214
2600 WB Delft

NEN Standards Products & Services

Postbus 5059
2600 GB Delft

Vlinderweg 6
2623 AX Delft

T (015) 2 690 390
F (015) 2 690 271

www.nen.nl/normshop

Ja, ik bestel

__ ex. NEN-EN 14033-2:2008+A1:2011 en Railtoepassingen - Bovenbouw - € 98.50
Railgebonden constructie- en onderhoudsmachines - Deel 2: Technische
eisen voor werkinzet

**Wilt u deze norm in PDF-formaat? Deze bestelt u eenvoudig via
www.nen.nl/normshop**

Gratis e-mailnieuwsbrieven

Wilt u op de hoogte blijven van de laatste ontwikkelingen op het gebied van normen, normalisatie en regelgeving? Neem dan een gratis abonnement op een van onze e-mailnieuwsbrieven. www.nen.nl/nieuwsbrieven

Retourneren

Fax: (015) 2 690 271
E-mail: klantenservice@nen.nl
Post: NEN Standards Products & Services,
t.a.v. afdeling Klantenservice
Antwoordnummer 10214,
2600 WB Delft
(geen postzegel nodig).

Gegevens

Bedrijf / Instelling

T.a.v. O M O V

E-mail

Klantnummer NEN

Uw ordernummer BTW nummer

Postbus / Adres

Postcode Plaats

Telefoon Fax

Factuuradres (indien dit afwijkt van bovenstaand adres)

Postbus / Adres

Postcode Plaats

Datum Handtekening

Voorwaarden

- De prijzen zijn geldig tot 31 december 2016, tenzij anders aangegeven.
- Alle prijzen zijn excl. btw, verzend- en handelingskosten en onder voorbehoud bij o.m. ISO- en IEC-normen.
- Bestelt u via de normshop een pdf, dan betaalt u geen handeling en verzendkosten.
- Meer informatie: telefoon (015) 2 690 391, dagelijks van 8.30 tot 17.00 uur.
- Wijzigingen en typfouten in teksten en prijsinformatie voorbehouden.
- U kunt onze algemene voorwaarden terugvinden op: www.nen.nl/leveringsvoorwaarden.