

**Raudteealased rakendused. Rööbastee. Raudtee ehitus-
ja hooldusmasinad. Osa 1: Tehnilised nõuded
sõidumadustele**

Railway applications - Track - Railbound construction and
maintenance machines - Part 1: Technical requirements for
running

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 14033-1:2011 sisaldab Euroopa standardi EN 14033-1:2011 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.03.2011 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 23.02.2011.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 14033-1:2011 consists of the English text of the European standard EN 14033-1:2011.

This standard is ratified with the order of Estonian Centre for Standardisation dated 31.03.2011 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 23.02.2011.

The standard is available from Estonian standardisation organisation.

ICS 45.120, 93.100

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: 605 5050; E-mail: info@evs.ee

English Version

**Railway applications - Track - Railbound construction and
maintenance machines - Part 1: Technical requirements for
running**

Applications ferroviaires - Voies - Machines de construction
et de maintenance empruntant exclusivement les voies
ferrées - Partie 1: Prescriptions techniques pour la
circulation

Bahnanwendungen - Oberbau - Schienengebundene Bau-
und Instandhaltungsmaschinen - Teil 1: Technische
Anforderungen an das Fahren

This European Standard was approved by CEN on 8 January 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	6
1.1 General.....	6
1.2 Validity of the European Standard	6
2 Normative references	6
3 Terms and definitions	9
4 Machine categorisation	10
4.1 Categories	10
4.2 Type examination and categories	10
5 Gauge.....	11
5.1 General rules	11
5.2 Stowing of moveable machine parts in transport positions	11
6 Frame	11
6.1 Principal dimensions.....	11
6.2 Design of the machine frame.....	11
6.3 Lifting and jacking points	12
6.4 Stowage points for transport on boats.....	12
7 Running gear.....	13
7.1 General.....	13
7.2 Wheel diameter	13
7.3 Static axle loading	13
7.4 Wheel profile	13
7.5 Shape and dimensions of the axles and wheelsets	13
7.6 Axle arrangement and axle loads.....	14
7.7 Design for longitudinal compressive forces.....	15
7.8 Lifeguards.....	15
8 Running safety.....	16
8.1 Running tests	16
8.2 Running safety on track twists.....	17
8.3 Running simulation	17
9 Brakes	17
9.1 Compulsory braking equipment.....	17
9.2 Characteristics	18
9.2.1 Performance	18
9.2.2 Mechanical characteristics of the brake	19
9.2.3 Automatic compressed air brake	19
9.2.4 Direct brake	20
9.2.5 Brake functions to keep a machine stationary	20
9.2.6 Dynamic brake	21
9.2.7 Emergency brake	21
9.2.8 Brake distributor controls.....	22
9.2.9 Other brake systems	22
9.3 Air reservoirs.....	22
9.4 Compressed air production of self-propelled machines	22
9.5 Brake hose connections	23
9.6 Special braking equipment	23

10	Buffing and draw gear	23
10.1	Couplings	23
10.2	Buffers	23
10.3	Interaction forces between the machine and coupled vehicles	24
10.4	Space to be kept free at the end of the machine	24
10.5	Buffer handrail	24
10.6	Shunters step	24
11	Operation of track circuits, axle-counters, treadles for level crossings, hot box detectors and unreleased brake detectors	24
11.1	Operation of track circuits	24
11.2	Operation of axle-counters and treadles for level crossings	25
11.3	Operation of hot axle box and unreleased brake detectors	25
12	Running safety equipment	25
12.1	Indication equipment	25
12.2	Data recorder	25
13	Warning equipment and lights	25
13.1	Warning horns	25
13.2	Lamp brackets and marker lights	25
13.2.1	Lamp brackets	25
13.2.2	Arrangement of marker lights	27
13.2.3	Light characteristics	27
13.2.4	Additional devices	28
13.2.5	Light switching arrangements	28
14	Drivers cabs and driving positions	28
14.1	General	28
14.2	Access to cab	28
14.2.1	General	28
14.2.2	Steps, handrails, platforms and railings	28
14.2.3	Doors	28
14.3	Interior of cab	29
14.3.1	Drivers position	29
14.3.2	Additional seats	29
14.3.3	Layout of drivers cab(s)	29
14.3.4	Windscreens	29
14.3.5	Side windows	30
14.4	Heating, cooling and ventilation	30
14.5	Internal lighting	30
14.6	Area of visibility	31
14.7	Drivers desks	31
14.8	Controls and indicators	31
14.9	Drivers and assistants seats	32
14.10	Equipment and controls	32
14.10.1	Minimum equipment necessary for the driving of the machine	32
14.10.2	Equipment necessary for the monitoring of the machine	33
14.10.3	Arrangement of instruments for the drivers assistant	33
14.10.4	Miscellaneous accessories	33
15	Safety design features	33
15.1	Electrical protection measures	33
15.2	Mechanical protection measures	34
15.3	Fire protection	34
15.4	Electromagnetic compatibility	34
16	Environmental protection	34
16.1	General	34
16.2	Carriage and storage of fuel and oil	34
16.3	Tanks and equipment	35
16.3.1	Fuel tanks and pipework	35
16.3.2	Hydraulic oil circuit	35

16.4	Power equipment	35
17	Machine marking.....	35
17.1	Lettering on the machine	35
17.2	Machine identification number.....	36
17.3	Details of the railway infrastructure where the machine is allowed to run	36
18	Machine data and maintenance book.....	36
18.1	Maintenance schedule	36
18.2	Maintenance manual	36
Annex A	(normative) Application of technical requirements to machines categories	38
Annex B	(informative) Special national conditions	43
Annex C	(normative) Machine diagram with gauge and critical points.....	54
Annex D	(normative) Free space at the end of the machine.....	55
Annex E	(normative) Steps, handrails and door handles	56
Annex F	(normative) Identification plate.....	57
Annex G	(normative) Technical documentation for operators.....	58
Annex H	(normative) Marking	60
Annex I	(informative) Technical documentation	62
Annex J	(informative) On board safety equipment.....	65
Annex K	(informative) Structure of European Standards for track construction and maintenance machines	69
Annex L	(informative) Migration rule for this European Standard	71
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC	72
Bibliography	74

Foreword

This document (EN 14033-1:2011) 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 August 2011, and conflicting national standards shall be withdrawn at the latest by August 2011.

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.

This document supersedes EN 14033-1:2008.

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 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

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 United Kingdom.

Introduction

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

The railway specific particulars of the machines for construction and maintenance form the objective of this European Standard.

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 and the interoperability of the rail system within the Community.

1 Scope

1.1 General

This European Standard defines the specific technical railway requirements for running of machines and other vehicles used for construction, maintenance and inspection of track, structures, track formation and fixed electric traction equipment.

This European Standard applies to all railbound machines and other vehicles – referred to as machines – running exclusively on the railway (utilising adhesion between the rail and 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 machines are dealt with in other European Standards, see Annex K.

Special requirements can apply for running on infrastructures with narrow gauge or broad gauge lines, lines of tramways, railways utilising other than adhesion between the rail and wheels, road-rail machines and underground infrastructures.

This European Standard covers the requirements for safety and access of railway traffic, railway specific requirements for running on different infrastructures in relation to necessary movements of the machine as a train and movements to reach work sites.

1.2 Validity of the European Standard

This European Standard applies to new designs taking into consideration the recommendations given in Annex L on the application of the standard (migration rule).

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 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 10220, *Seamless and welded steel tubes – Dimensions and masses per unit length*
- EN 10305-4, *Steel tubes for precision applications – Technical delivery conditions – Part 4: Seamless cold drawn tubes for hydraulic and pneumatic power systems*
- EN 10305-6, *Steel tubes for precision applications – Technical delivery conditions – Part 6: Welded cold drawn tubes for hydraulic and pneumatic power systems*
- EN 12080, *Railway applications – Axleboxes – Rolling bearings*
- EN 12663-1:2010, *Railway applications – Structural requirements of railway vehicle bodies – Part 1: Locomotives and passenger rolling stock (and alternative method for freight wagons)*
- EN 12663-2:2010, *Railway applications – Structural requirements of railway vehicle bodies – Part 2: Freight wagons*
- EN 13103, *Railway applications – Wheelsets and bogies – Non-powered axles – Design method*
- EN 13104, *Railway applications – Wheelsets and bogies – Powered axles – Design method*
- EN 13260, *Railway applications – Wheelsets and bogies – Wheelsets – Product requirements*
- EN 13261, *Railway applications – Wheelsets and bogies – Axles – Product requirements*
- EN 13262, *Railway applications – Wheelsets and bogies – Wheels – Product requirements*
- EN 13715, *Railway applications – Wheelsets and bogies – Wheels – Wheels tread*
- EN 13979-1, *Railway applications – Wheelsets and bogies – Monobloc wheels – Technical approval procedure – Part 1: Forged and rolled wheels*
- EN 14033-2, *Railway applications – Track – Railbound construction and maintenance machines – Part 2: Technical requirements for working*
- EN 14033-3:2009, *Railway applications – Track – Railbound construction and maintenance machines – Part 3: General safety requirements*
- EN 14198:2004, *Railway applications – Braking – Requirements for the brake system of trains hauled by a locomotive*
- EN 14363:2005, *Railway applications – Testing for the acceptance of running characteristics of railway vehicles – Testing of running behaviour and stationary tests*
- EN 14531-6, *Railway applications – Methods for calculation of stopping and slowing distances and immobilisation braking – Part 6: Step by step calculations for train sets or single vehicles*
- EN 14535-1, *Railway applications – Brake discs for railway rolling stock – Part 1: Brake discs pressed or shrunk onto the axle or drive shaft, dimensions and quality requirements*
- prEN 14535-2:2007, *Railway applications – Brake discs for railway rolling stock – Part 2: Brake discs mounted onto the wheel –, Dimensions and quality requirements*
- EN 14601, *Railway applications – Straight and angled end cocks for brake pipe and main reservoir pipe*
- EN 15152, *Railway applications – Front windscreens for train cabs*
- EN 15153-1, *Railway applications – External visible and audible warning devices for high speed trains – Part 1: Head, marker and tail lamps*

- EN 15153-2, *Railway applications – External visible and audible warning devices for high speed trains – Part 2: Warning horns*
- EN 15179, *Railway applications – Braking – Requirements for the brake system of coaches*
- EN 15220-1, *Railway applications – Brake indicators – Part 1: Pneumatically operated brake indicators*
- EN 15273-2, *Railway applications – Gauges – Part 2: Rolling stock gauge*
- EN 15355, *Railway applications – Braking – Distributor valves and distributor-isolating devices*
- EN 15528, *Railway applications – Line categories for managing the interface between load limits of vehicles and infrastructure*
- EN 15551, *Railway applications – Railway rolling stock – Buffers*
- EN 15566, *Railway applications – Railway rolling stock – Draw gear and screw coupling*
- EN 15611, *Railway applications – Braking – Relay valves*
- EN 15624, *Railway applications – Braking – Empty-loaded changeover devices*
- EN 15625, *Railway applications – Braking – Automatic variable load sensing devices*
- prEN 15807:2008, *Railway applications – Pneumatic half couplings*
- prEN 15839, *Railway applications – Testing for the acceptance of running characteristics of railway vehicles – Freight wagons – Testing of running safety under longitudinal compressive forces*
- prEN 15877-1:2009, *Railway applications – Marking on railway vehicles – Part 1: Freight wagons*
- EN 50121-3-1, *Railway applications – Electromagnetic compatibility – Part 3-1: Rolling stock – Train and complete vehicle*
- EN 50121-3-2, *Railway applications – Electromagnetic compatibility – Part 3-2: Rolling stock – Apparatus*
- EN 50153:2002, *Railway applications – Rolling stock – Protective provisions relating to electrical hazards*
- EN 50238:2003, *Railway applications – Compatibility between rolling stock and train detection systems*
- ISO 8573-1, *Compressed air – Part 1: Contaminants and purity classes*
- ISO 11112, *Earth-moving machinery – Operator's seat – Dimensions and requirements*
- NF F11-100:2005, *Railway rolling stock – Quality of compressed air for pneumatic apparatuses and circuits use*
- UIC 438-1:2004, *Identification marking for passenger rolling stock*¹⁾
- UIC 520:2003, *Wagons, coaches and vans – Draw gear – Standardisation*
- UIC 527-1:2005, *Coaches, vans and wagons – Dimensions of buffer heads – Track layout on S-curves*
- UIC 530-2:2008, *Wagons – Running safety*

¹⁾ Railway Technical Publications (ETF), 16 rue Jean Rey, F-75015 Paris

UIC 535-2:2006, *Standardisation and positioning on wagons of steps, end platforms, gangways, handrails, tow hooks, automatic coupler (AC), automatic draw-on coupling and brake valve controls on the UIC member RUs and OSJD member Rus*

UIC 541-03:1984, *Brakes – Regulations concerning manufacture of the different brake parts – Driver's brake valve*

UIC 541-4:2007, *Brakes – Brakes with composition brake blocks – General conditions for certification of composite brake blocks*

UIC 543:2007, *Brakes – Regulations governing the equipment of trailing stock*

UIC 544-1:2004, *Brakes – Braking power*

UIC 545:2007, *Brakes – Inscriptions, marks and signs*

UIC 640:2003, *Motive power units – Inscriptions, marks and signs*

3 Terms and definitions

For the purposes of this document, the following terms and definitions and the terms listed in the relevant railway specific documents and in the UIC leaflets apply.

3.1

railbound machine (on-track machines, OTM)

vehicle specially designed for construction and maintenance of the track and infrastructure and used in different modes: working configuration, running configuration as a self-propelling vehicle, running configuration as a hauled vehicle, when:

- it is running on its own rail wheels,
- it is designed to have characteristics necessary for the operation of track based train detection systems

3.2

demountable machine

self propelled machine that can run and work on rail and which is not intended to operate signalling and control systems

NOTE 1 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 running on the ground.

NOTE 2 Such a machine is permitted to work on the railway only under special operating conditions granted by the infrastructure manager and run under special conditions granted by the authorised body and/or the infrastructure manager.

3.3

trailer

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

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

NOTE 2 This includes attachments with rail wheels.

3.4

railway infrastructure

all installations required for the running of railway vehicles

EXAMPLE Tracks, crossings, catenaries and signals.