
Železniške naprave - Zgornji ustroj - Težka tirna mehanizacija za gradnjo in vzdrževanje - 1. del: Tehnične zahteve, ki se nanašajo na vožnjo

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

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

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

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

Applications ferroviaires - Voie - 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 29 February 2008.

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Foreword

This document (EN 14033-1:2008) 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of an identical text or by endorsement, at the latest by May 2009 and conflicting national standards shall be withdrawn at the latest by May 2009.

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, 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.

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EN 14033-1:2008 (E)**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.

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1 Scope

1.1 General

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

This European Standard applies to all rail bound 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 similar machines are dealt with in other European Standards, see Annex L.

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

This European Standard covers the requirements for the keeping of safety and access of railway traffic, railway specific problems for running on different infrastructures in relation to necessary movements of the machine as a train and movements to reach work sites. The application of these requirements is the object of a verification procedure, which does not form part of this European Standard. Access to railway infrastructures requires in all cases an access permit.

1.2 Validity of the European Standard

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

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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 12080, *Railway applications — Axleboxes — Rolling bearings*

EN 12663:2000, *Railway applications — Structural requirements of railway vehicle bodies*

EN 13103, *Railway applications — Wheelsets and bogies — Nonpowered axles — Design method*

EN 13104, *Railway applications — Wheelsets and bogies — Powered axles — Design method*

EN 13260, *Railway applications — Wheelsets and bogies — Wheelsets — Products requirements*

EN 13261, *Railway applications — Wheelsets and bogies — Axles — Product requirements*

EN 13262, *Railway applications — Wheelsets and bogies — Wheels — Product requirement*

EN 13715, *Railway applications — Wheelsets and bogies — Wheels — Wheels tread*

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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*

prEN 14033-3, *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 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, *Railway applications — Brake discs for railway rolling stock — Part 2: Brake discs mounted onto the wheel rim, wheel web or wheel hub, 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*

<https://standards.iteh.ai/catalog/standards/sist/7f84e14d-e72b-41a5-8468-1e54c451da18/sist-part-2-1-2008>

prEN 15273-2, *Railway applications — Gauges — Part 2: Rolling stock gauge*

prEN 15328, *Railway applications — Braking — Brake pads*

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

prEN 15551, *Railway applications — Freight wagons — Buffers*

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

prEN 15624, *Railway applications — Braking — Empty-loaded changeover devices*

prEN 15625, *Railway applications — Braking — Automatic variable load sensing devices*

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 3864-2:2004, *Graphical symbols — Safety colours and safety signs — Part 2: Design principles for product safety labels (ISO 3864-2:2004)*

UIC 530-2:2006, *Wagons — Running safety¹⁾*

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 540, *Brakes — Air brakes for freight and passenger trains*

UIC 541-1:2003, *Brakes — Regulations concerning the design of brake components*

UIC 541-2, *Dimensions of hose connections (brake hoses) and electric cables; types of pneumatic and electric connections and their positioning on wagons and coaches equipped with automatic couplers of the UIC and OSJD Member Railways*

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

UIC 544-2, *Conditions to be observed by the dynamic brake of locomotives and motor coaches so that the extra braking effort produced can be taken into account for the calculation of the brake-weight*

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

UIC 640, *Motive power units — Inscriptions, marks and signs*

RIV 2000, *Regulations for reciprocal use of wagons in international traffic²⁾*

3 Terms and definitions

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For the purposes of this document, the following terms and definitions apply³⁾.

3.1

railbound machine

machine that can run and work only on rail and is transported on its rail wheels

NOTE The machine is specifically designed to operate signalling and control systems and is intended for infrastructure work. The machine can be self propelled and hauled.

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

2) UIC Bureau RIV RIC, 16 rue Jean Rey, F-75015 Paris.

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

For the purposes of this document, the terms and definitions which are used in European and International Standards, which are referred to in this European Standard also apply.

EN 14033-1:2008 (E)**3.2****demountable machine**

machine that can run and work on rail and which is transported by road in between work sites

NOTE Demountable machines are permitted to work on the railway only under special operating conditions granted by the infrastructure manager and run under special conditions granted by the authorising body and/or the infrastructure manager.

3.3**trailer**

vehicle/machine that can be hauled on rail wheels

NOTE This definition does not include demountable machines and not machines, defined as category 3, 5 or 7 in this European Standard.

3.4**railway infrastructure**

all installations required for the running of railway vehicles

EXAMPLES Tracks, crossings, catenaries and signals.

3.5**infrastructure manager**

public body or undertaking responsible for establishing and maintaining railway infrastructure, as well as for operating the control and safety systems

3.6**railway undertaking**

private or public undertaking whose main business is to provide rail transport services for goods and/or passengers

3.7**machine operator**

private or public undertaking whose main business is to operate machines for the construction and maintenance of the infrastructure

NOTE For the purposes of running on the railway the undertaking needs to have the status of a railway undertaking or needs to use the services of the infrastructure manager.

3.8**authorised body**

body of a state that, in accordance with the laws and prescriptions in force in that state, is competent to approve rail vehicles for the use in public rail traffic

3.9**type approval certificate**

document issued after the checking of documents and/or testing of vehicles in which the agreement of the running of the machine in the railway infrastructure is confirmed

3.10**access permit**

document issued by the railway infrastructure manager for an approved machine to run on the railway infrastructure, if necessary with special access conditions

3.11**supplement to the access permit**

permits the use of the machine in another country, if necessary taking into account special access requirements

3.12**train**

assembly of vehicles/machines attached by couplings conforming to the relevant regulations of the authorised body and/or infrastructure manager

4 Machine categorisation**4.1 Categories**

The application of all requirements of this European Standard is not possible in every case because of the differences in the design of machines.

The machines are therefore divided into seven categories as shown in Table 1.

Table 1 — Machine categories by maximum travelling speed

		Self-propelled machine travelling speed (v)		Non-self-propelled machine
		≥ 100 km/h	< 100 km/h	
Can be incorporated into a train with a speed of:	v ≥ 100 km/h	Category 1	Category 2	Category 3
	v < 100 km/h	---	Category 4	Category 5
Cannot be incorporated into a train ^a		---	Category 6	Category 7

^a The authorised body and/or the infrastructure manager regulates the conditions for incorporation of categories 6 and 7 into special trains

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4.2 Type approval and categories

In order to use this European Standard, it is necessary to establish in which category the machine belongs. The corresponding requirements for the categories are defined in Annex A.

Machines meeting the requirements for their category, receive running approval for this category only.

5 Gauge**5.1 General rules**

Machines shall meet the dimensional requirements of prEN 15273-2 in all respects. The critical points near the limits of the permissible kinematic gauge shall be represented in the documentation according to Annex C.

Machines intended to run on infrastructures with more restrictive gauges shall conform to the specific rules of those infrastructures and the corresponding restrictions shall be indicated on their access permit.

EN 14033-1:2008 (E)**5.2 Stowing of moveable machine parts in transport positions**

Except for roof equipment all moveable parts of the machine that can encroach on the gauge defined in 5.1, including those parts that are prevented from abnormal movement by their operating mechanism safety features, shall be stowed and held by efficient red painted locks or another colour if parts painted in red. The control of locking shall be possible from inside the machine.

Only where a moveable part is able to fall on to the track or to exceed the gauge, locks shall be doubled by slings, chains or similar devices in order to prevent them from falling onto the track in case of a failure of the locking mechanism.

It shall be obvious to anyone checking the machine that these parts of the machine are locked in their stowed position. Furthermore, for self-propelled machines a warning light shall illuminate on the driver's desk to indicate if a moveable part of the machine is not locked.

When travelling, all control circuits not related to travelling, including locking devices, shall be deactivated.

6 Frame**6.1 Principal dimensions**

The total length over the buffers and the distance between axles on adjacent bogies shall be in accordance with UIC 530-2.

6.2 Design of the machine frame

The machine frame shall be able to withstand the following forces without any permanent deformation when running in train formation:

- machines not permitted to be loose shunted or hump shunted shall be constructed to meet the requirements of category F-II of EN 12663:2000;
- all other machines shall be constructed to meet the requirements of category F-I of EN 12663:2000.

6.3 Lifting and jacking points

The machine body shall incorporate lifting points by which the whole machine is capable of being safely lifted or jacked. It shall also be possible to lift one end of the machine (including its running gear) with the other end resting on the remaining running gear.

The load cases specified in EN 12663:2000, 4.3.2 shall apply for lifting and jacking under workshop and servicing operations.

For lifting cases associated only with rescue following derailment or other abnormal incident, where some permanent deformation of the structure is acceptable, it is permissible to reduce the load factor in EN 12663:2000, Table 9 and Table 10 from 1,1 to 1,0.

If a factor of 1,0 is used for a validation test, the measured strains shall be extrapolated to demonstrate the conformance to the higher factor.

The lifting shall occur via designated lifting points. The location of the lifting points shall be defined by the customer's operational requirements.

6.4 Stowage points on boats

Machines suitable for transport on boats shall be fitted with stowage hooks in accordance with UIC 535-2.

7 Running gear

7.1 General

The requirements of this clause do not concern wheels or rollers used for specific working conditions and which are retracted during running.

The running gear should be able to negotiate the horizontal and vertical radii given in Table B.1.

7.2 Wheel diameter

The new wheel diameter should be between 920 mm and 1 000 mm. However, wheels with a diameter less than 920 mm may be used to meet particular design requirements. The minimum worn diameter shall not, however, be smaller than 330 mm.

7.3 Static axle loading

The maximum permissible static axle load depends on the wheel diameter. In the running condition, the limits shall comply with the values given in Table 2.

Table 2 — Static axle loading
(Standard Preview)

Wheel diameter \varnothing d^a mm	Maximum permissible static axle load
$\varnothing \geq 840$	22,5
$840 > \varnothing \geq 760$	20
$760 > \varnothing \geq 680$	18,5
$680 > \varnothing \geq 630$	17
$630 > \varnothing \geq 550$	14,5
$550 > \varnothing \geq 470$	12,5
$470 > \varnothing \geq 390$	10,5
$390 > \varnothing \geq 330$	9
^a d = worn diameter limit \varnothing = diameter	

7.4 Wheel profile

The wheel profile shall comply with the requirements of EN 13715.

7.5 Shape and dimensions of the axles and wheelsets

The axles shall comply with the requirements of EN 13261. The design of the axles shall additionally take into account the forces generated when working.

The wheels shall comply with the requirements of EN 13262 and EN 13979-1.