SLOVENSKI STANDARD
SIST EN 15955-1:2013

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Železniške naprave - Zgornji ustroj - Motorna vozila za posebne namene in spremljajoča oprema - 1. del: Tehnične zahteve, ki se nanašajo na vožnjo in na delovanje

Railway applications - Track - Demountable machines and associated equipment - Part 1: Technical requirements for running and working

Bahnanwendungen - Oberbau - Ausgleisbare Maschinen und zugehörige Ausstattung - Teil 1: Technische Anforderungen an das Fahren und den Arbeitseinsatz

Applications ferroviaires - Voie - Machines déraillables et éléments associés - Partie 1 : Prescriptions techniques pour la circulation et le travail

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Foreword

This document (EN 15955-1:2013) 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of an identical text or by endorsement, at the latest by October 2013, and conflicting national standards shall be withdrawn at the latest by October 2013.

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.

EN 15955 *Railway applications — Track — Demountable machines and associated equipment* consists of the following parts:

— *Part 1: Technical requirements for running and working* (the present document);

— *Part 2: General safety requirements*.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this European Standard.

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

Demountable machines as specified in 3.1 form the object of this standard.

This standard deals with railway specific risks of the demountable machines defined in Clause 4 when running and working on railway infrastructures.

The safety requirements in relation to the Machinery Directive 2006/42/EC are dealt with in EN 15955-2 of this series of standards.

Deviations or special national conditions are dealt with in 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.

1 Scope

1.1 General

This European Standard specifies the technical requirements to minimise the specific railway hazards of self propelled demountable machines – henceforward referred to as machines – and associated equipment, which can arise during the commissioning, the operation and the maintenance of these machines when carried out in accordance with the specification given by the manufacturer or his authorised representative. These machines are not designed or intended to operate signalling and control systems and are only designed and intended to work and run under special operating conditions specifically designated by the infrastructure manager. Other machines are dealt with in other European Standards; see Annex D.

This part of EN 15955 deals with the technical railway requirements; Part 2 deals with the requirements for the machine to be declared conformant by the manufacturer, except in the case of machines classified in Annex 4 of the Machinery Directive (2006/42/EC) which requires conformity check in conjunction with a notified body.

These demountable machines are not intended to be vehicles as defined in the Interoperability Directive and are not permitted to run on the railway lines open to normal traffic. If this is required, they will need to be authorised or placed into service as set out in the Interoperability Directive 2008/57/EC.

Additional 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 rail wheels and underground infrastructures.

This European Standard is also applicable to machines and associated equipment that in working configuration are partly supported on the ballast or the formation.

This European Standard does not apply to the following:

- requirements for quality of the work or performance of the machine;
- specific requirements established by the railway infrastructure operator for the use of machines, which will be the subject of negotiation between the manufacturer and the purchaser;
- separate machines temporarily mounted on demountable machines and associated equipment.

This European Standard 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 (below – 20 °C or above + 40 °C), corrosive environments, contaminating environments, strong magnetic fields;
- hazards due to errors in software;
- hazards occurring when used to handle suspended loads which may swing freely.

The intended use of these machines may have operational parameters specified by each infrastructure manager, e.g. the maximum speed allowed for these machines is likely to be limited by the infrastructure manager; compliance with the clauses of this standard does not confer permission for machines to travel at this speed. These machines will not be allowed on a track open to normal railway traffic.

1.2 Validity of this European Standard

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 791, *Drill rigs — Safety*

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

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

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

EN 14033-2:2008+A1:2011, *Railway applications — Track — Railbound construction and maintenance machines — Part 2: Technical requirements for working*

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

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

EN 15273-2, *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 15954-1:2013, *Railway applications — Track — Trailers and associated equipment — Part 1: Technical requirements for running and working*

EN 15955-2:2013, *Railway applications — Track — Demountable machines and associated equipment — Part 2: General safety requirements*

EN 50121-3-1:2006, *Railway applications — Electromagnetic compatibility — Part 3-1: Rolling stock — Train and complete vehicle*

EN 50121-3-2:2006, *Railway applications — Electromagnetic compatibility — Part 3-2: Rolling stock — Apparatus*

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

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

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

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

UIC 541-1, *Brakes — Regulations concerning the design of brake components* [1)]

UIC 577, *Wagon stresses* [1)]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

3.1
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 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 running 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 run under special conditions granted by the authorised body and/or the infrastructure manager.

3.2
road-rail machine
self propelled machine that can run on rails and ground

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

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

3.3
trailer
non-self propelled machine that can be hauled on rail wheels

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

Note 2 to entry: This includes attachments with rail wheels.

1) May be purchased from: *Union Internationale de Chemins de fer* (UIC), 14 rue Jean Rey, F-75015 Paris.

3.4
railbound machine
on-track machines
OTM
vehicle specially designed for construction and maintenance of the track and infrastructure, which is 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

3.5
trolley
equipment for transport along the track of materials, tools and/or various equipment, moving on wheels or runners and operated by human force only, which is designed so that it can be manually placed on or off the track

[SOURCE: EN 14033-1:2011, 3.8, modified]

3.6
portable machine
machine designed or adapted to be worked on the track, transportable by hand with or without trolleys or separate supports for movement on rail(s), and be operated by internal combustion, electrical, mechanical, hydraulic, pneumatic energy sources or from an external supply, but not powered for movement along the track

Note 1 to entry: It is designed so that the machine and/or its separate component parts may be manually placed on or off the track.

3.7
mobile elevating work platform
MEWP
mobile machine that is intended to move persons to working positions where they are carrying out work from the work platform with the intention that persons are getting 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

3.8
host vehicle
basic road vehicle or machine which is converted to run on rails

3.9
manufacturer
body that designs and constructs a demountable machine, or converts the original machine/vehicle to a demountable machine

3.10
running configuration
state of machine when it is on the rail and all movable parts are stowed and secured within the applicable kinematic gauge

Note 1 to entry: For kinematic gauge and acceptable exceedance, see EN 15273-2.

3.11
working configuration
configuration of the machine as soon as any part of the machine or its equipment is away from the running configuration

3.12
on and off tracking configuration
configuration 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 configuration along the track

3.14
stationary
standing on the track with the rail wheels not rotating

3.15
operating track
track which is in an acceptable condition to operate normal trains

3.16
working track
track that is being maintained for which the geometrical parameters may reach the limiting values and for which special operational restrictions may apply

Note 1 to entry: For limiting values, see EN 14033-2:2008+A1:2011, Annex F.

3.17
railway infrastructure
all installations required for the running of railway vehicles

EXAMPLE Tracks, crossings, catenaries, signals.

3.18
operator

person who handles the controls of a machine in order to perform the functions of the machine including towing or controlling a trailer(s)

3.19
driver
person who handles the controls of a machine in order to control the machine in running configuration moving along the track including towing or controlling a trailer(s)

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

3.20
train
self-propelled vehicle/machine or assembly of vehicles/machines attached by couplings conforming to the relevant regulations of the authorised body and/or infrastructure manager

3.21
working limit contour
limit in which a machine can work without interfering with the kinematic gauge of trains on adjacent tracks

Note 1 to entry: For the kinematic gauge, see EN 14033-2:2008+A1:2011, Annex D.

3.22
rated load
maximum load that the lifting equipment has been designed for normal operation and the manufacturer states can be lifted in any specified position

3.23
authorised body
body in a state that, in accordance with the laws and prescriptions in force in that state, is competent to approve rail vehicles for the use on the rail network

3.24
type testing
examination of the first machine, of a new type, for build conformity to the requirements of this standard

3.25
type conformity
examination of the conformity of each machine to the all the safety requirements of this standard before delivery of the machine

3.26
type examination certificate
document issued after the checking of documents and/or testing of machines in which the agreement of the use of the machine in the railway infrastructure is confirmed

3.27
type conformance certificate
document which states that the machine conforms to the design of the first machine of the type that has been approved

3.28
railway undertaking
private or public undertaking whose main business is to provide rail transport services for goods and/or passengers

3.29
infrastructure manager
public body or undertaking responsible for establishing and maintaining railway infrastructure as well as for operating the railway control and safety systems

3.30
working authorisation
authorisation given by an infrastructure manager which permits a machine to work on that railway infrastructure

3.31
methods of examination
visual checks, measurements, functional tests, load test(s), specific verification/measurements and other controls

Note 1 to entry: For methods of examination, see Table B.1.

3.32
visual check
check that establishes whether all elements on the machine, system or component, e.g. protective devices, visual warning device, marking, are present and that documents and drawings correspond to the requirements

3.33
measurement test
test that establishes whether the stated measurable parameters have met the requirements of this standard

Note 1 to entry: Measureable parameters include geometric dimensions, safety distances, insulation resistance of electric circuits, noise and vibration.

3.34
functional test
test that establishes whether, in unloaded working condition the machine, including all safety devices, works as intended and all functions comply with the requirements and with the technical documentation

3.35
load test
test that establishes whether the strength and stability of the equipment under load together with all safety devices and adjustments meets the requirements of this standard

3.36
specific verification/measurements
verification/measurements that establish whether the stated requirements of this standard have been met

Note 1 to entry: Requirements include calculations, technical documentation and specific documents of this standard.

4 Machine categorisation

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 three types as shown in Table 1 and the requirements are worded for the different types of machines, where necessary.

Table 1 — Types of machine

Cannot be incorporated into a train	**Type A**	**Type B**	**Type C**
Self-propelled machine running speed *v* km/h	> 60	30 to 60	< 30

5 Railway specific safety requirements and/or measures

5.1 General

Machines shall comply with the safety requirements and/or protective measures in accordance with Clauses 5 and 6, and supplied with information in accordance with Clause 7. Machines shall be designed to work on working track within the geometric limits, see EN 14033-2:2008+A1:2011, Annex F, and shall be designed to work on operating track.

Machines that can only work on operating tracks shall display in each driving cab and on the identification plate an indication of that restriction.

5.2 Gauge

5.2.1 Running gauge

5.2.1.1 General

Except as shown in 5.2.1.2, machines in running configuration shall meet the dimensional requirements of EN 15273-2. The critical points near the limits of the permissible kinematic gauge, see EN 14033-1:2011, Annex C, shall be recorded in the technical documentation detailed in Clause 7.

5.2.1.2 Special case for restrictive gauges

Machines intended to travel on infrastructures with more restrictive gauges shall conform to the specific rules of those infrastructures and the corresponding restrictions shall be indicated on their operating permits.

5.2.2 Demountable machine in running configuration

5.2.2.1 Stowing of moveable machine parts in running configuration

— When the machine is in the running configuration, any movable equipment which has the capacity to go outside the gauge shall be capable of being stowed in a manner which prevents inadvertent or unintended movement out of the gauge. All such moveable parts and assemblies forming part of the machine that are unpacked in order to allow the machine to work in rail and non-rail configuration shall, in their stowed state, be secured by devices capable of resisting the foreseeable forces encountered during running, which shall not rely upon a power source to retain the locking function. Moveable parts shall be held by efficient locks. The visible positive locking components in running configuration shall be painted in red. If the locking mechanism is powered, the control of locking should preferably be possible from inside the machine gauge.

Or:

— Check valves on hydraulic systems which shall prevent movement and fail safe.

It shall be obvious to anyone checking the machine that these parts of the machine are locked in their stowed position. Furthermore, for locking devices operable from the cab, either a red warning light shall illuminate on the driver's desk to indicate if any moveable part of the machine is not locked or a green light shall indicate on the driver's desk that all moveable parts of the machine are locked.

5.2.2.2 Operating controls in running configuration

When in running configuration, all operating controls not related to running, including locking devices, shall be deactivated automatically.

5.2.3 Working limit

5.2.3.1 Interference of gauge

Machines and their moveable component parts shall be designed and built to work without unintentional interference with the kinematic gauge necessary for the running of machines permitted by the infrastructure manager without running restrictions on the operating track. For the different zones of work and the zone limit between the working track and the adjacent operating track in service, see EN 14033-2:2008+A1:2011, 5.3.

Where the clearance, under worst operating conditions, between the underside of a revolving superstructure and rail level, is less than 1 300 mm this shall be recorded in the instruction handbook together with the actual height above rail level of the underside of the rotating superstructure; see Clause 7, list entry a) 3) ii).

NOTE The clearance of 1 300 mm is required to enable the superstructure to slew over adjacent track side structures, e.g. platforms. Other distances may be required by some infrastructure managers.

Where a machine has powered moveable components capable of exceeding the kinematic gauge, e.g. a MEWP basket (Mobile Elevating Work Platform basket), there shall be a means of direct communication between the operating position on the mobile component and the driving position of the machine.

5.2.3.2 Movement limiting devices

5.2.3.2.1 General

Where operation of the machine exceeds the working limit according to 5.2.3.1, the accidental intrusion into the kinematic gauge of the line open to traffic shall be made impossible by means of lateral and height limiting devices. The limiting devices are to provide protection against exceedance of the gauge shown in 5.2.1.

Operation of movement limiting devices shall be by key switch or equivalent lock. The key switch shall be positioned outside the danger zone.

The movement limiting devices shall be described with indication of their type and their configuration of operation in the instruction handbook; see Clause 7.

5.2.3.2.2 Design of movement limiting devices

5.2.3.2.2.1 General

Movement limiting devices shall permit the height and rotation limit to be variable to suit each location. The movement limiting device shall stop the movement when height and lateral limits are reached, or prevent movement commencing in an unsafe direction if the machine is stopped at its limit. All movement limiting devices shall comply with 5.2.3.2.2.2 or 5.2.3.2.2.3 or 5.2.3.2.2.4, as appropriate.

5.2.3.2.2.2 Mechanical limiting devices

These devices shall be capable of resisting the foreseeable forces encountered.

NOTE This includes resisting static forces (start-up force of the motion) where they are in the form of a lock, and dynamic forces where they are in the form of a stop, e.g. attachment point or latching.

5.2.3.2.2.3 Electric limiting devices

The design shall be such that there shall be no predictable credible single point failure that would cause the system to fail unsafe, i.e. allow the corresponding movement to continue. Any fault, including unacceptable differences in signals, shall cause the system to fail to a safe condition.

Safety switches acting as information-giving components shall fulfil the requirements as specified in the EN 60947 series, or, as an alternative, to these safety switches, sensors or switches may be used under the following conditions, shown in order of preference:

a) using sensors or other types of switch duplicated: they shall either be self-verifying at start-up or shall have continuous monitoring of the signals from the sensors or switches for out-of-range; or

b) using an arrangement of a single sensor or switch, provided there is a permanent monitoring of the plausibility of its signals by means of other sensors or switches not of the same safety device.

5.2.3.2.2.4 Hydraulic limiting devices

Hydraulic limiting devices shall be designed and installed to provide safety levels equivalent to those for electrical safety devices.

Any credible hydraulic fault shall cause the system to fail to a safe condition, i.e. stop the corresponding movement.

Pilot-operated control valves in these devices or systems shall be so designed and installed that they fail to safety, i.e. stop the corresponding movement, in the event of power failure.

5.2.3.2.2.5 Operation of movement limiting devices

When the working demands necessitate an exceedance of the working limit, it shall only be made possible by means of a deliberate manual action, e.g. actuating an additional switch or releasing a lock. When the machine is brought back within its permitted working limit, the design shall be such that the device will need to be operated again to exceed the permitted working limit.

In the case of exceeding the working limit, an acoustic warning and a flashing red light at the driver's position and working positions shall indicate this dangerous situation.