



**SLOVENSKI STANDARD**  
**SIST EN 50215:1999**

**01-december-1999**

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**Železniške naprave – Preskušanje voznih sredstev po končani gradnji in pred rednim obratovanjem**

Railway applications - Testing of rolling stock after completion of construction and before entry into service

Bahnanwendungen - Prüfung von Bahnfahrzeugen nach Fertigstellung und vor Indienststellung

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Applications ferroviaires - Essais sur matériel roulant après achèvement et avant mise en service

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**Ta slovenski standard je istoveten z: EN 50215:1999**

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**ICS:**

29.280	Električna vlečna oprema	Electric traction equipment
45.060.01	Železniška vozila na splošno	Railway rolling stock in general

**SIST EN 50215:1999**

**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 50215**

April 1999

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ICS 29.280; 45.060.10

English version

**Railway applications**  
**Testing of rolling stock after completion of construction**  
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Applications ferroviaires  
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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

This European Standard was prepared by SC 9XB, Electromechanical material on board rolling stock, of Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50215 on 1999-04-01

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical national  
standard or by endorsement (dop) 2000-04-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2002-04-01

Annexes designated „informative“ are given for information only.

In this standard, annexes A and B are informative.

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## Introduction

This European Standard has been produced with the objective of providing the criteria for validating the conformance of complete railway vehicles against specified requirements to generate confidence on the part of the purchaser.

This European Standard deals with the tests intended solely to validate the conformance of the railway vehicles with the functional specifications of the purchaser.

NOTE : The authorisation process for use is given by the relevant authority and is subject to conformance with additional requirements not covered by this standard.

In the new context of the infrastructure owner being independent from the railway operator, the purchaser may have to prove by technical demonstration and tests that his rolling stock conforms with the requirements of the infrastructure owner. As the conformance tests depend on the fixed installations of the infrastructure owner (e.g. safety related systems, etc.), they cannot be standardised.

The document has used IEC 61133 as its base but the form and structure has been amended to facilitate the production of validation documentation to demonstrate conformance to assist the process of finalising a contract for complete railway vehicles.

Greater confidence will be generated if the manufacturer has a quality assurance system in conformance with recognised standards such as EN ISO 9001, EN ISO 9002 and EN ISO 9003.

The criteria expressed in this document are generic and may have to be supplemented for particular or special applications by other European Standards for railway vehicles.

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## 1 Scope

This European Standard specifies general criteria to demonstrate by testing that complete railway vehicles conform with standards or other normative documents.

This European Standard, as a whole or in part, applies to all railway vehicles except special purpose vehicles such as track-laying machines, ballast cleaners and personnel carriers. The extent of application of the standard for particular vehicles will be specifically mentioned in the contract.

NOTE: The parts of the standard which are applicable will depend on the type of vehicle (e.g. passenger, freight, powered trailer, etc.).

In so far as this European Standard is applicable it may be used for the following:

- generator sets mounted on a vehicle provided for auxiliary purposes;
- the electrical transmission used on trolley buses or similar vehicles;
- control and auxiliary equipment of vehicles with non-electrical propulsion systems;
- vehicles guided, supported or electrically propelled by systems which do not use the adhesion between wheel and rail.

## 2 Normative references

This European Standard incorporates by dated or undated references, provisions from other publications. These normative references are cited at the appropriate place in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN ISO 9001	Quality systems - Model for quality assurance in design/development, production, installation and servicing
EN ISO 9002	Quality systems - Model for quality assurance in production, installation and servicing
EN ISO 9003	Quality systems - Model for quality assurance in final inspection and test
EN 50153	Railway applications - Rolling stock - Protective provisions relative to electrical hazards
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 50126	Railway applications - The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)
EN 50128*)	Railway applications - Software for railway control and protective systems
EN 50155	Railway applications - Electronic equipment used on rolling stock
EN 50163	Railway applications - Supply voltages of traction systems
EN 50207*)	Railway applications - Electronic power convertors for rolling stock

\*) in preparation



EN 50238*)	Railway applications - Communication, signalling and processing systems - Compatibility between rolling stock and train detection systems
IEC 61133	Electric traction - Rolling stock – Test methods for electric and thermal/electric rolling stock on completion of construction and before entry into service
ISO 3095	Acoustics - Measurement of noise emitted by railbound vehicles

### 3 Definitions

For the purposes of this standard, the following definitions apply:

**3.1 manufacturer:** Organization which has the technical responsibility for the supply of the vehicle system.

NOTE: There may be more than one manufacturer where the contract for the vehicle is split in two or more parts.

**3.2 manufacturers' works:** Location where the assembly of the vehicles is completed and where tests at standstill are generally performed.

**3.3 purchaser:** Organization which orders the vehicle and has the responsibility for direct negotiations with the manufacturer.

**3.4 supplier:** Organization which has the responsibility for the supply of individual items of equipment or groups of equipment to the manufacturer.

**3.5 supplier's works:** Location where individual items of equipment or groups of equipment are manufactured.

**3.6 contract:** All the component parts of the technical specifications agreed between manufacturers and user, consisting of user technical specifications, manufacturers' technical responses, minutes of meetings, and any other formal contract documents.

**3.7 type test:** A test of one or more devices, system or complete vehicle to show that the design meets the required specifications and the relevant standards.

**3.8 routine test:** A test to which each vehicle is subjected to during or after manufacture to ascertain whether it complies with the specified criteria.

**3.9 supplementary test:** Any additional test (either type or routine) added to the TEST PLAN by agreement between the manufacturer and the purchaser.

**3.10 validation documentation:** Documented evidence that a product, process or service is in conformance with specified requirements or other normative documents.

### 4 Requirements

#### 4.1 General

The manufacturer shall exercise control over all activities affecting the quality of the products to ensure that the requirements of the standards or other normative documents to which the declaration refers are met.

For this purpose the manufacturer shall have at his disposal all necessary means for carrying out this control at all levels (for example raw materials, supplies, production, finished products or packing). There shall be available information on the manufacturer's quality system and the results of tests as appropriate.

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\*) in preparation

The manufacturer shall establish and maintain a quality system. This shall include auditable procedures covering the final inspection and test operations, including workmanship standards, test specifications, test records, calibration of test instruments and equipment, document control, control of non-conforming products and personnel training.

NOTE: It is recommended that manufacturers operate a quality system in accordance with EN ISO 9001.

The Quality Plan for the design, production, inspection and testing of the product shall include a TEST PLAN defining how the manufacturer will demonstrate conformance to the specified requirements.

The contract shall define the various tests to be undertaken on completed vehicles and before entry into service to assure the purchaser that:

- the vehicles comply with the technical requirements of the contract by type testing (type tests, see also 3.7).
- that every vehicle conforms to the design standard proved in the type testing (routine tests, see also 3.8).

All component type and routine tests shall be successfully completed.

This standard does not cover the following types of testing:

- endurance and reliability,
- development,
- investigative,
- system test.

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#### 4.2 Third party test facilities

If it is intended to use third party test facilities this shall be declared and agreed at the time of contract with details of the third party, its test facilities and accreditation.

#### 4.3 Test plan

The various tests to be undertaken by the manufacturer shall be presented by the manufacturer within its Quality Plan as a TEST PLAN which shall detail the following:

- a) the test programme;
- b) the component and equipment type tests to be completed before undertaking each vehicle test;
- c) the test facilities to be used;
- d) the test methods;
- e) the vehicle loading conditions for each test;
- f) the environmental conditions for each test;
- g) the limits and tolerances of any test measuring methods;
- h) the success criteria for each test;
- i) the Corrective Action process;
- j) the validation documentation.

Where the contract requires validation of certain tests or documents by the purchaser, these shall be identified in the TEST PLAN.

Where the contract requires safety to be demonstrated by a series of tests highlighted by a Safety or Risk Assessment performed in accordance with EN 50126 (in preparation) then these test shall be included in the test programme.

The auditable process used to produce the TEST PLAN shall include a method to ensure a comprehensive list of tests is produced to support the validation documentation.

On successful completion of each test the validation documentation shall be prepared by the manufacturer.

The manufacturer shall ensure that the validation documentation is prepared for each item in the TEST PLAN for the vehicles concerned.

## 5 Categories of tests

The TEST PLAN shall present the tests to be carried out in the following two categories:

### 5.1 Type tests

These tests shall be performed to demonstrate that the vehicle design complies with the performance requirements specified. The tests shall be undertaken on the first vehicles built to the design unless otherwise agreed at the time of contract.

If the type tests are performed on a prototype or pre-production vehicle, then the manufacturer shall conclude an agreement with the user, which specifies the additional tests that are necessary on the first production built vehicle.

A series of measurements shall be made covering all the essential parameters to check the performance requirements as declared in the TEST PLAN.

The tests shall be performed as appropriate as follows:

- at standstill (see clause 8)
- on-line (see clause 9)

### 5.2 Routine tests

These tests shall be carried out on each vehicle to be delivered.

The routine tests shall include sufficient measurements and checks to confirm compliance. Specific parameters used in the type test should be selected to demonstrate compliance of each vehicle.

The tests shall be performed at standstill (see clause 8) or on line (see clause 9) as appropriate.

## 6 Test conditions

### 6.1 General

Tests shall be performed under the prevailing ambient conditions unless otherwise specified.

### 6.2 Tests at standstill

These tests shall check that the vehicle is sufficiently safe to undertake the on-line tests.

The test facilities shall be appropriate and sufficient to ensure the tests are performed consistently.

Where tests are performed at a third-party facility which involves movement of the vehicle sufficient tests shall be undertaken by the manufacturer to ensure that the movement can be completed safely.

### 6.3 On-line tests

The tests are normally undertaken on the lines over which the vehicle is intended to operate or, if not available, over lines with similar characteristics as specified in the contract.

The purchaser shall arrange access to the lines as appropriate and the necessary crew under the conditions specified in the contract.

Operation of the test trains shall comply with all regulations of the infrastructure owner.

The purchaser shall provide all the necessary facilities for any preparation for on-line tests (including preliminary test running) under the conditions specified in the contract.

Where it is necessary to undertake the on-line tests on the track of another administration, the selected route, its characteristics and conditions of operation shall be agreed at the time of contract.

It is permitted to perform some or all of the on-line tests at a dedicated facility by agreement.

NOTE 1: Attention is drawn to the need to ensure that the responsibilities of all parties involved in performing the on-line tests are clearly defined.

NOTE 2: Attention is also drawn to the need to complete all the necessary preliminaries such as the relevant parts of the RAM case and the Safety Case before undertaking the on-line tests.

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## 7 Validation documentation SIST EN 50215:1999

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The validation documentation shall contain sufficient information to identify the vehicle and all its major components and enable these to be traced through the test records. As a minimum the following shall be provided:

- a) the name and address of the organisation which produced the documentation;
- b) the name and address of the manufacturer;
- c) the identification of the vehicle and its major components by name, type, model number and any relevant supplementary information such as lot number, batch or serial number;
- d) the standards or normative documents referenced in the contract or TEST PLAN in a clear and concise way;
- e) all supplementary information such as grade or category of the vehicle components;
- f) the date of the documentation;
- g) the signature and title or an equivalent marking of the authorised signatory.

## 8 Schedule of standstill tests

The manufacturer shall undertake the schedule of standstill tests as defined in the TEST PLAN. Table A.1 gives a representative list of standstill tests which may be included in the schedule. The list shall not be taken as exhaustive but may be used as a guideline in the process used by the manufacturer to produce his TEST PLAN.

In the absence of specific requirements in the user's specification, the following tests shall be included in the TEST PLAN as appropriate for the type of vehicle covered in the contract.

Unless otherwise stated in the sub-clause heading, the following requirements are for both the Type and Routine Tests. Where different requirements are specified for these tests, they are detailed in separate sub-clauses for Type and Routine Tests.

## 8.1 Dimensional tests

Objective: To determine whether the outside dimensions of the vehicle, any clearances and flexible connections when completely assembled and in working order, comply with the limits set out in the contract.

### 8.1.1 Type tests

#### 8.1.1.1 Outside dimensions

For each type of vehicle the outside dimensions of the vehicle shall be measured and checked against the limits set out in the contract, which may include the following conditions:

- a) the range of adjustment of all appropriate components (for example air bags);
- b) the range of tolerances for wear and tear (for example wheel wear);
- c) the range of loading conditions;
- d) the range of movement in case of failure or damage (for example suspension components);
- e) the worst case combinations of the above a) to d).

Clearances of items that may intrude into limiting dimensions, for example doors which open outwards, shall be taken into account and checked under working conditions if required by the contract.

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#### 8.1.1.2 Clearance tests

Tests shall be carried out to determine whether the specified clearances are achieved during relative movements for the load conditions specified in the contract as follows:

- a) between vehicle bodies and bogies;
- b) between adjacent coupled vehicles.

See the note after 8.1.1.3 below.

#### 8.1.1.3 Hose and cable length tests

Tests shall be carried out to determine the appropriate length for bogie and inter-car hoses and cables.

NOTE: Tests 8.1.1.2 and 8.1.1.3 can be carried out at standstill, using a bogie rotation table and traverser. Alternatively these can be carried out during the on-line tests.

### 8.1.2 Routine tests (supplementary)

Outside dimension tests (8.1.1.1) and clearance tests (8.1.1.2) shall be carried out in one load condition only, and confined to key dimensions.