



SLOVENSKI STANDARD SIST ENV 50121-3-2:1998

01-november-1998

Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus

Railway applications - Electromagnetic compatibility -- Part 3-2: Rolling stock - Apparatus

Bahnanwendungen - Elektromagnetische Verträglichkeit -- Teil 3-2: Schienenfahrzeuge - Einrichtungen

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Applications ferroviaires - Compatibilité électromagnétique -- Partie 3-2: Matériel roulant - Equipements

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Ta slovenski standard je istoveten z: **ENV 50121-3-2:1996**

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45.060.01	Železniška vozila na splošno	Railway rolling stock in general

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EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
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ENV 50121-3-2

February 1996

ICS 29.020; 29.280; 45.020

Descriptors: Railway rolling stock, rolling stock apparatus, electric equipment, radio disturbances, electromagnetic compatibility, tests, limits

English version

**Railway applications - Electromagnetic compatibility
Part 3-2: Rolling stock - Apparatus**

Applications ferroviaires - Compatibilité
électromagnétique
Partie 3-2: Matériel roulant
Equipements

Bahnanwendungen - Elektromagnetische
Verträglichkeit
Teil 3-2: (To be completed)

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REPUBLIKA SLOVENIJA
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO
Urad RS za standardizacijo in meroslovje

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SIST ENV 50121-3-2:1998
PREVZET PO METODI RAZGLASITVE -11- 1996

This European Prestandard (ENV) was approved by CENELEC on 1995-12-11 as a prospective standard for provisional application. The period of validity of this ENV is limited initially to three years. After two years the members of CENELEC will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard (EN).

CENELEC members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

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FOREWORD

This European Prestandard was prepared by Technical Committee CENELEC TC 9X Electrical and electronic applications for railways, in accordance with the decision taken by CLC/TC 9X at its 11th meeting on 12/13 May 1995.

The text of the draft was submitted to the formal vote and was approved by CENELEC as ENV 50121-3-2 on 1995-12-11.

The following date was fixed:

- latest date by which the existence of the ENV has to be announced at national level (doa) 1996-01-15

This European Prestandard is to be read in conjunction with ENV 50121-1:1996 - Railway applications - Electromagnetic compatibility - Part 1 : General .

Annexes designated 'normative' are part of the body of the Prestandard. Annexes designated 'informative' are given only for information.

In this Prestandard, annexes A and B are informative.
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1 Scope

This European Prestandard applies to emission and immunity aspects of EMC for electrical and electronic apparatus intended for use on railway rolling stock.

The frequency range considered is from d.c. to 400 GHz. At present, testing is not defined for frequencies above 1000 MHz.

The application of tests shall depend on the particular apparatus, its configuration, its ports, its technology and its operating conditions.

This Prestandard takes into account the internal environment of the railway rolling stock and the external environment of the railway, and interferences to the apparatus from equipments such as hand-held radio transmitters.

If a port is intended to transmit or receive for the purpose of radio communication then the emission and immunity limits in this Prestandard at the communication frequency do not apply.

This Prestandard does not apply to transient emissions when starting or stopping the apparatus.

The objective of this Prestandard is to define limits and test methods for electromagnetic emissions and immunity test requirements in relation to conducted and radiated disturbances.

These limits and tests represent essential electromagnetic compatibility requirements.

Emission requirements have been selected so as to ensure that disturbances generated by the apparatus operated normally on railway rolling stock do not exceed a level which could prevent other apparatus from operating as intended.

Likewise, the immunity requirements have been selected so as to ensure an adequate level of immunity for rolling stock apparatus.

The levels do not however cover extreme cases which may occur with an extremely low probability of occurrence in any location. Specific requirements which deviate from this Prestandard shall be specified.

Additionally, severity levels based on apparatus location have been established.

Test requirements are specified for each port considered.

These specific provisions are additional to the general provisions in ENV 50121-1.

2 Normative references

This European Prestandard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereaf-

ter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- EN 50155 Railway applications - Electronic equipment used on rolling stock
- EN 55011 Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment (CISPR 11, modified)
- EN 55022 Limits and methods of measurement of radio disturbance characteristics of information technology equipment (CISPR 22)
- EN 61000-4-2 Electromagnetic compatibility (EMC)
Part 4 : Testing and measurement techniques - Section 2 : Electrostatic discharge immunity test (IEC 1000-4-2)
- EN 61000-4-4 Electromagnetic compatibility (EMC)
Part 4 : Testing and measurement techniques - Section 4 : Electrical fast transient/burst immunity test (IEC 1000-4-4)
- EN 61000-4-5 Electromagnetic compatibility (EMC)
Part 4 : Testing and measurement techniques - Section 5 : Surge immunity test (IEC 1000-4-5)
- ENV 50121-1 Railway applications - Electromagnetic compatibility
Part 1 : General
- ENV 50121-3-1 Railway applications - Electromagnetic compatibility -
Part 3-1: Rolling stock - Train and complete vehicle
- ENV 50140 Radiated radio-frequency electromagnetic field -
Immunity test
- ENV 50141 Conducted disturbances induced by radio-frequency
fields - Immunity test
- CISPR 16-1:1993 Specification for radio interference measuring
apparatus and measurement methods
- IEC 50 (161) International Electrotechnical Vocabulary -
Chapter 161 : Electromagnetic compatibility

3 Definitions

Definitions related to EMC and to relevant phenomena may be found in the EEC Directive, in chapter 161 of the IEV (IEC 50) and in IEC and CISPR Publications. The definitions stated in the EEC Directive (89/336/EEC) take precedence.

For the purpose of this Prestandard the following definitions apply:

rolling stock apparatus: A finished product with an intrinsic function intended for implementation into the rolling stock installation and may be placed on the market as a single commercial unit.

apparatus location: Physical zones within the rolling stock where the electromagnetic environment is defined. Due to the high variation of the electromagnetic environment within rolling stock, it is necessary to define a number of locations (see clause 4).

The main categories of ports for rolling stock apparatus are presented in figure 1.

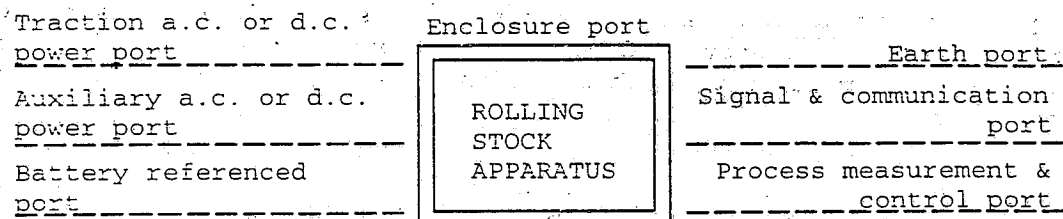


Figure 1: Main categories of ports

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The different types of rolling stock apparatus with their ports are listed in annex A.

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4 Locations

The different installation locations of apparatus on railway rolling stock are the following:

- 1) External rolling stock environment (under frame, roof)
- 2) Locomotive machine room
- 3) Driver's cab, passenger compartments
- 4) Interior of control electronic cubicles
- 5) Interior of power equipments

5 Performance criteria

The variety and the diversity of the apparatus within the scope of this Prestandard makes it difficult to define precise criteria for the evaluation of the immunity test results.

Apparatus shall not become dangerous or unsafe as a result of the application of the tests defined in this Prestandard.

A functional description and a definition of performance criteria, during

or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report, based on the criteria A, B, C defined in the clause 4 of ENV 50121-1.

NOTE: The registered performance criteria within the test specification of this Prestandard can be altered for some particular apparatus. This is subject to agreement between manufacturer and user.

6 Conditions during testing

It is not always possible to test every function of the apparatus. The tests shall be made at typical operating mode considered by the manufacturer to produce the largest emission or maximum susceptibility to noise as appropriate in the frequency band being investigated consistent with normal applications. The manufacturer shall define the conditions during testing in a test plan.

If the apparatus is part of a system, or can be connected to auxiliary apparatus, then the apparatus shall be tested while connected to the minimum configuration of auxiliary apparatus necessary to exercise the ports in accordance with EN 55022.

The configuration and mode of operation during the tests shall be precisely noted in the test plan and in the test report.

If the apparatus has a large number of similar ports or ports with many similar connections, then a sufficient number shall be selected to simulate actual operating conditions and to ensure that all the different types of termination are covered (i.e. at least 4, or 20% of the parts, unless otherwise specified).

The tests shall be carried out within the specified operating range for the apparatus and at its rated supply voltage, unless otherwise indicated in the basic standard.

7 Applicability

The measurements in this Prestandard shall be made on the relevant ports of the apparatus. Measurements shall only be carried out where the relevant ports exist.

It may be determined from consideration of the electrical characteristics and usage of a particular apparatus that some of the limited tests are inappropriate and therefore unnecessary (e.g. induction motors, transformers, ...). In such a case it shall be required that the decision not to test be recorded in the test report.

If not otherwise specified the EMC tests shall be type tests.

8 Emission tests and limits

The emission tests and limits for apparatus covered by this prestandard are given on a port by port basis.

The emission limits for individual equipment within a vehicle are only mandatory for items which are supplied to the end user as separate items.

At the discretion of the system integrator these emission limits may be applied to items of equipment which are not supplied as separate items.

Measurements shall be performed in well-defined and reproducible conditions for each type of disturbance.

The description of the test, the test methods and the test set-up are given in basic standards which are referred to in tables 1 to 6.

The contents of these basic standards are not repeated here, however modifications or additional information needed for the practical application of the tests are given in this Prestandard.

NOTE : The reference to "basic standard" is intended to be limited to those parts of the standard that give the description of the test, the test methods and the test set-up.

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Table 1 : Traction a.c. power ports

Ports	Basic standard	Frequency range	Limits	Remarks
High voltage connection, input side before filter (port 3 on figures A.1, A.2, A.3)		Power frequency harmonic distortion, Signalling and Telecommunication frequencies	See ENV 50121-3-1	
		9 kHz-30 MHz	No conducted radio frequency limits are applied. The apparatus when installed with the other surrounding equipments must satisfy the radiated emission limits of ENV 50121-3-1 for trains	It is desirable but not possible to apply conducted radio frequency limits. No practical test method exists and the relationship between conducted emissions and radiated emissions is not possible to define.

Table 2 : Traction d.c. power ports

Ports	Basic standard	Frequency range	Limits	Remarks
High voltage connection, input side before filter (port 3 on figure A.4)		Signalling and Telecommunication frequencies	See ENV 50121-3-1	
		9 kHz-30 MHz	See notes. Subject to agreement or As table 1	See notes
<p>NOTE 1 : At present there is no agreed method or limit for conducted emissions on the traction supply from 9 kHz to 30 MHz. Limiting conducted emissions from an apparatus connected to the traction supply will prevent excessive radiated emissions from the supply system. A method for measuring conducted emissions is proposed in annex B. Manufacturers and users should gain experience in this technique and the relationship between conducted and radiated emissions in order to progress this standard in the future.</p> <p>NOTE 2 : Subject to agreement between customer and supplier.</p>				

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