



SLOVENSKI STANDARD

SIST ENV 50121-1:1998

01-november-1998

Railway applications - Electromagnetic compatibility - Part 1: General

Railway applications - Electromagnetic compatibility -- Part 1: General

Bahnanwendungen - Elektromagnetische Verträglichkeit -- Teil 1: Allgemeines

Applications ferroviaires - Compatibilité électromagnétique -- Partie 1: Généralités

Ta slovenski standard je istoveten z: ENV 50121-1:1996

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ICS:

33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
45.020	Železniška tehnika na splošno	Railway engineering in general

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en

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EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
EUROPÄISCHE VORNORM

ENV 50121-1

February 1996

ICS 29.020; 29.280; 45.020

Descriptors: Railway equipment, electric equipment, electronic components, radio disturbances, electromagnetic compatibility, general

English version

**Railway applications - Electromagnetic compatibility
Part 1: General**

Applications ferroviaires
Compatibilité électromagnétique
Partie 1: Généralités

Bahnanwendungen
Elektromagnetische Verträglichkeit
Teil 1: Allgemeines

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REPUBLIKA SLOVENIJA
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO
Urad RS za standardizacijo in merslovje
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ENV 50121-1
SIST. 14321620003/sist-env-50121-1-1998..

PREVZET PO METODI RAZGLASITVE

-11- 1998

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 1995-05-12/13.

The text of the draft was submitted to the formal vote and was approved by CENELEC as ENV 50121-1 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 used in conjunction with one or several specific European Prestandards listed in the scope.

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

In this Prestandard, annex A is informative and annex B is normative.

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Introduction

The railway EMC set of product-specific European Prestandards is intended, in the main, to permit compliance with the EMC Directive. It consists of five parts described at the end of this introduction.

The set of Prestandards specifies the limits for EM emission of the railway as a whole to the outside world and of the EM emission and immunity for equipments operating within the railway but which must be compatible with the emission limits set for the railway as a whole. The frequency covered by the Prestandards is in the range of d.c. to 400 GHz. Testing is limited to frequencies not exceeding 1 GHz. The limits for EMC phenomena are set so that the railway as a whole satisfies the EC Directive 89/336 on electromagnetic compatibility, and so that EMC is achieved between the various parts of the railway.

The immunity and emission levels do not of themselves guarantee that integration of the apparatus will necessarily be satisfactory. The Prestandard cannot cover all the possible configurations of apparatus, but the test levels are sufficient to achieve satisfactory EMC in the majority of cases. In exceptional circumstances, for instance near a "special location" (as defined in the EMC Directive) which has unusually high levels of EM interference, the system may require additional measures to be taken to ensure proper operation. The resolution of this is a matter for discussion between the equipment supplier and the project manager of infrastructure controller or equivalent.

Throughout the set of the Prestandards the immunity levels are chosen to ensure EMC with other apparatus within the local railway environment and with emissions which enter the railway from the outside world. Limits are also placed on EM emission by railways into the outside world.

The railway apparatus is assembled into large systems and installations, such as trains and signalling control centres. Details are given in annex A. It is not, therefore, possible to establish immunity tests and limits for these large assemblies. The immunity levels for the apparatus will normally ensure reliable operation, but it is necessary to prepare an EMC management plan, to deal with specific circumstances. For example, the use of mobile telephones and the passage of the railway line may pass close to a higher power radio transmitter which produces abnormally high field strengths at a few frequencies. Special conditions may have to be applied for railway equipment which has to work near such a transmitter and these will be accepted as National Conditions for the specification.

The series of Prestandards ENV 50121, Railway applications - Electromagnetic compatibility, contains the following parts:

Part 1: General

This part gives a description of the electromagnetic behaviour of a railway, it specifies the performance criteria for the whole set. A management process to achieve EMC at the interface between the railway infrastructure and trains is provided.

Part 2: Emission of the whole railway system to the outside world

This part sets the emission limits from the railway to the outside world at radio frequencies. It defines the applied test methods and gives information on typical field strength values from d.c. to radio frequency (cartography).

Part 3-1: Rolling stock - Train and complete vehicle

This part specifies the emission and immunity requirements for all types of rolling stock. It covers traction stock and trainsets, as well as independent hauled stock.

The scope of this part of the Prestandard ends at the interface of the stock with its respective energy inputs and outputs.

Part 3-2: Rolling stock - Apparatus

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

Part 4: Emission and immunity of the signalling and telecommunications apparatus

This part specifies limits for electromagnetic emission and immunity for signalling and telecommunications apparatus.

Part 5: Fixed power supply installations

This part applies to emission and immunity aspects of EMC for electrical and electronic apparatus and components intended for use in railway fixed installations associated with power supply.

ENV 50121-1 and ENV 50121-2 are Product Family Standards which take precedence over Generic Standards. ENV 50121-3-1, ENV 50121-3-2, ENV 50121-4, and ENV 50121-5 are Product Standards.

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1 Scope

1.1 This part 1 of the European Prestandards series ENV 50121 outlines the structure and the content of the whole set. It also mandates in Annex B a management process for achieving electromagnetic compatibility (EMC) at the interface between the railway infrastructure, as defined in the EU Directive 91/440/EEC, and trains.

The objective of the whole set of Prestandards is to specify the Electromagnetic (EM) emission and immunity requirements for railway products, and for the railway as an installation.

Phenomena excluded from the set are lightning, EM pulse and abnormal operating conditions.

The biological effects of non-ionising radiation are not considered here.

1.2 This European Prestandard is supplemented by the following specific Prestandards:

ENV 50121-2	Railway applications - Electromagnetic compatibility Part 2: Emission of the whole railway system to the outside world
ENV 50121-3-1	Railway applications - Electromagnetic compatibility Part 3-1: Rolling stock - Train and complete vehicle
ENV 50121-3-2	Railway applications - Electromagnetic compatibility Part 3-2: Rolling stock - Apparatus
ENV 50121-4	Railway applications - Electromagnetic compatibility Part 4: Emission and immunity of the signalling and telecommunications apparatus
ENV 50121-5	Railway applications - Electromagnetic compatibility Part 5: Fixed power supply installations

2 Normative references

This European Prestandard incorporates by dated or undated reference, 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EU Directive, 89/336/EEC, on the approximation of the laws of the member States relating to electromagnetic compatibility

EU Directive, 91/440/EEC, on the Development of the Community's Railways

EN 50082-2 1995 Electromagnetic compatibility - Generic immunity standard
Part 2: Industrial environment.

IEC 50(161) International Electrotechnical Vocabulary (IEV)
Chapter 161: Electromagnetic compatibility.

3 Definitions

- For the purpose of this European Prestandard definitions related to EMC and to relevant phenomena may be found in the EU Directive, in Chapter 1.61 of the IEC (IEC 50) and in IEC and CISPR Publications. The definitions stated in the Directive (89/336/EEC) take precedence.

No particular definition is used in part 1.

4 Performance criteria

NOTE: This clause is drafted according to EN 50082-2.

The variety and the diversity of the apparatus within the scope of this set of Prestandards makes it impossible 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 following criteria:

Performance criterion A: The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonable expect from the apparatus if used as intended.

Performance criterion C: Temporary loss of function is allowed, provided the loss of function is self recoverable or can be restored by the operation of the controls.

5 Management of EMC

The railway is a complex installation with moving sources of electromagnetic energy and the existence alone of the EMC Prestandards in the ENV 50121 series is not a guarantee of satisfactory performance. There may be cases where apparatus has to be positioned in restricted spaces or added to an existing assembly, with the possible creation of environments of unusual severity. All cases shall be considered with respect to a formal plan for the management of EMC. This plan should be established at as early a stage of the project as is possible, and Annex B gives detail of a management plan.

NOTE: Annex B is normative with a limited scope; however, operation outside the scope should consider whether the use of the management plan could be beneficial.