

**Raudteealased rakendused. Side-, signalisatsiooni- ja andmetöötlussüsteemid. Ohutust tagavad elektroonikasüsteemid signalisatsiooniks**

Railway applications. Communication, signalling and processing systems. Safety related electronic systems for signalling

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 50129:2005 sisaldab Euroopa standardi EN 50129:2003+AC:2010 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 08.05.2003 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 13.02.2003.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 50129:2005 consists of the English text of the European standard EN 50129:2003+AC:2010.

This standard is ratified with the order of Estonian Centre for Standardisation dated 08.05.2003 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 13.02.2003.

The standard is available from Estonian standardisation organisation.

ICS 93.100

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English version

**Railway applications –  
Communication, signalling and processing systems –  
Safety related electronic systems for signalling**

Applications ferroviaires –  
Systèmes de signalisation,  
de télécommunications et de traitement –  
Systèmes électroniques de sécurité  
pour la signalisation

Bahnanwendungen –  
Telekommunikationstechnik,  
Signaltechnik und  
Datenverarbeitungssysteme –  
Sicherheitsrelevante elektronische  
Systeme für Signaltechnik

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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 9XA, Communication, signalling and processing systems, 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 50129 on 2002-12-01.

This European Standard supersedes ENV 50129:1998.

This European Standard was prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and supports the essential requirements of Directive 96/48/EC.

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) 2003-12-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2005-12-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, Annexes A, B and C are normative and Annexes D and E are informative.

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## Contents

	Page
<b>Introduction</b> .....	<b>6</b>
<b>1 Scope</b> .....	<b>7</b>
<b>2 Normative references</b> .....	<b>8</b>
<b>3 Definitions and abbreviations</b> .....	<b>9</b>
3.1 Definitions.....	9
3.2 Abbreviations.....	13
<b>4 Overall framework of this standard</b> .....	<b>14</b>
<b>5 Conditions for safety acceptance and approval</b> .....	<b>15</b>
5.1 The Safety Case.....	15
5.2 Evidence of quality management.....	17
5.3 Evidence of safety management.....	20
5.4 Evidence of functional and technical safety.....	24
5.5 Safety acceptance and approval.....	26
<b>Annex A (normative) Safety Integrity Levels</b> .....	<b>30</b>
A.1 Introduction.....	30
A.2 Safety requirements.....	30
A.3 Safety integrity.....	31
A.4 Allocation of safety integrity requirements.....	31
A.5 Safety Integrity Levels.....	39
<b>Annex B (normative) Detailed technical requirements</b> .....	<b>42</b>
B.1 Introduction.....	42
B.2 Assurance of correct functional operation.....	42
B.3 Effects of faults.....	44
B.4 Operation with external influences.....	50
B.5 Safety-related application conditions.....	51
B.6 Safety Qualification Tests.....	53
<b>Annex C (normative) Identification of hardware component failure modes</b> .....	<b>55</b>
C.1 Introduction.....	55
C.2 General procedure.....	55
C.3 Procedure for integrated circuits (including microprocessors).....	55
C.4 Procedure for components with inherent physical properties.....	55
C.5 General notes concerning component failure modes.....	56
C.6 Additional general notes, concerning components with inherent physical properties.....	56
C.7 Specific notes concerning components with inherent physical properties.....	57

<b>Annex D (informative) Supplementary technical information</b>	<b>77</b>
D.1 Introduction	77
D.2 Achievement of physical internal independence	77
D.3 Achievement of physical external independence	78
D.4 Example of a method for single-fault analysis	79
D.5 Example of a method for multiple-fault analysis	80
<b>Annex E (informative) Techniques and measures for safety-related electronic systems for signalling for the avoidance of systematic faults and the control of random and systematic faults</b>	<b>85</b>
<b>Bibliography</b>	<b>94</b>
Figure 1 – Scope of the main CENELEC railway application standards	8
Figure 2 – Structure of EN 50129	15
Figure 3 – Structure of Safety Case	17
Figure 4 – Example of system life cycle	19
Figure 5 – Example of design and validation portion of system life-cycle	21
Figure 6 – Arrangements for independence	22
Figure 7 – Structure of Technical Safety Report	26
Figure 8 – Safety acceptance and approval process	28
Figure 9 – Examples of dependencies between Safety Cases/Safety Approval	29
Figure A.1 – Safety requirements and safety integrity	30
Figure A.2 – Global process overview	32
Figure A.3 – Example risk analysis process	33
Figure A.4 – Definition of hazards with respect to the system boundary	34
Figure A.5 – Example hazard control process	36
Figure A.6 – Interpretation of failure and repair times	37
Figure A.7 – Treatment of functional independence by FTA	38
Figure A.8 – Relationship between SILs and techniques	40
Figure B.1 – Influences affecting the independence of items	46
Figure B.2 – Detection and negation of single faults	49
Figure D.1 – Example of a fault analysis method	81
Table A.1 – SIL-table	41
Table C.1 – Resistors	61
Table C.2 – Capacitors	62
Table C.3 – Electromagnetic components	63
Table C.4 – Diodes	66
Table C.5 – Transistors	67
Table C.6 – Controlled rectifiers	69
Table C.7 – Surge Suppressors	71
Table C.8 – Opto-electronic components	72
Table C.9 – Filters	73
Table C.10 – Interconnection assemblies	74

Table C.11 – Fuses .....	75
Table C.12 – Switches and push/pull buttons.....	75
Table C.13 – Lamps .....	75
Table C.14 – Batteries .....	75
Table C.15–Transducers/sensors (not including those with internal electronic circuitry).....	76
Table C.16 – Integrated circuits.....	76
Table D.1 - Examples of measures to detect faults in large-scale integrated circuits by means of periodic on-line testing, with comparison (SW or HW), in a 2-out-of-n system.....	82
Table E.1 – Safety planning and quality assurance activities .....	86
Table E.2 – System requirements specification .....	87
Table E.3 – Safety organisation.....	87
Table E.4 – Architecture of system/sub-system/equipment .....	88
Table E.5 – Design features.....	89
Table E.6 – Failure and hazard analysis methods.....	90
Table E.7 – Design and development of system/sub-system/equipment.....	91
Table E.8 – Design phase documentation.....	91
Table E.9 – Verification and validation of the system and product design .....	92
Table E.10 – Application, operation and maintenance .....	93

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## Introduction

This document is the first European Standard defining requirements for the acceptance and approval of safety-related electronic systems in the railway signalling field. Until now only some differing national recommendations and general advice of the UIC (International Union of Railways) on this topic were in existence.

Safety-related electronic systems for signalling include hardware and software aspects. To install complete safety-related systems, both parts within the whole life-cycle of the system have to be taken into account. The requirements for safety-related hardware and for the overall system are defined in this standard. Other requirements are defined in associated CENELEC standards.

The aim of European railway authorities and European railway industry is to develop compatible railway systems based on common standards. Therefore cross-acceptance of Safety Approvals for sub-systems and equipment by the different national railway authorities is necessary. This document is the common European base for safety acceptance and approval of electronic systems for railway signalling applications.

Cross-acceptance is aimed at generic approval, not specific applications. Public procurement within the European Community concerning safety-related electronic systems for railway signalling applications will in future refer to this standard when it becomes an EN.

The standard consists of the main part (Clause 1 to Clause 5) and Annexes A, B, C, D and E. The requirements defined in the main part of the standard and in Annexes A, B and C are normative, whilst Annexes D and E are informative.

This standard is in line with, and uses relevant sections of EN 50126: "Railway applications: The Specification and Demonstration of Dependability - Reliability, Availability, Maintainability and Safety (RAMS)". This standard and EN 50126 are based on the system life-cycle and are in line with EN 61508-1, which is replaced by the set of EN 50126/EN 50128/EN 50129, as far as Railway Communication, Signalling and Processing Systems are involved. Meeting the requirements in these standards is sufficient to ensure that further compliance to EN 61508-1 need not be evaluated.

Because this standard is concerned with the evidence to be presented for the acceptance of safety-related systems, it specifies those life-cycle activities which shall be completed before the acceptance stage, followed by additional planned activities to be carried out after the acceptance stage. Safety justification for the whole of the life-cycle is therefore required.

This standard is concerned with what evidence is to be presented. Except where considered appropriate, it does not specify who should carry out the necessary work, since this may vary in different circumstances.

For safety-related systems which include programmable electronics, additional conditions for the software are defined in EN 50128.

Additional requirements for safety-related data communication are defined in EN 50159-1 and EN 50159-2.



## 1 Scope

This standard is applicable to safety-related electronic systems (including sub-systems and equipment) for railway signalling applications.

The scope of this standard, and its relationship with other CENELEC standards, are shown in Figure 1.

This standard is intended to apply to all safety-related railway signalling systems/sub-system/equipment. However, the hazard analysis and risk assessment processes defined in EN 50126 and this standard are necessary for all railway signalling systems/sub-systems/equipment, in order to identify any safety requirements. If analysis reveals that no safety requirements exist (i.e.: that the situation is non-safety-related), and provided the conclusion is not revised as a consequence of later changes, this safety standard ceases to be applicable.

This standard applies to the specification, design, construction, installation, acceptance, operation, maintenance and modification/extension phases of complete signalling systems, and also to individual sub-systems and equipment within the complete system. Annex C includes procedures relating to electronic hardware components.

This standard applies to generic sub-systems and equipment (both application-independent and those intended for a particular class of application), and also to systems/sub-systems/equipment for specific applications.

This standard is not applicable to existing systems/sub-systems/equipment (i.e. those which had already been accepted prior to the creation of this standard). However, as far as reasonably practicable, this standard should be applied to modifications and extensions to existing systems, sub-systems and equipment.

This standard is primarily applicable to systems/sub-systems/equipment which have been specifically designed and manufactured for railway signalling applications. It should also be applied, as far as reasonably practicable, to general-purpose or industrial equipment (e.g.: power supplies, modems, etc.), which is procured for use as part of a safety-related signalling system. As a minimum, evidence shall be provided in such cases to demonstrate

- either that the equipment is not relied on for safety,
- or that the equipment can be relied on for those functions which relate to safety.

This standard is applicable to the functional safety of railway signalling systems. It is not intended to deal with the occupational health and safety of personnel; this subject is covered by other standards.

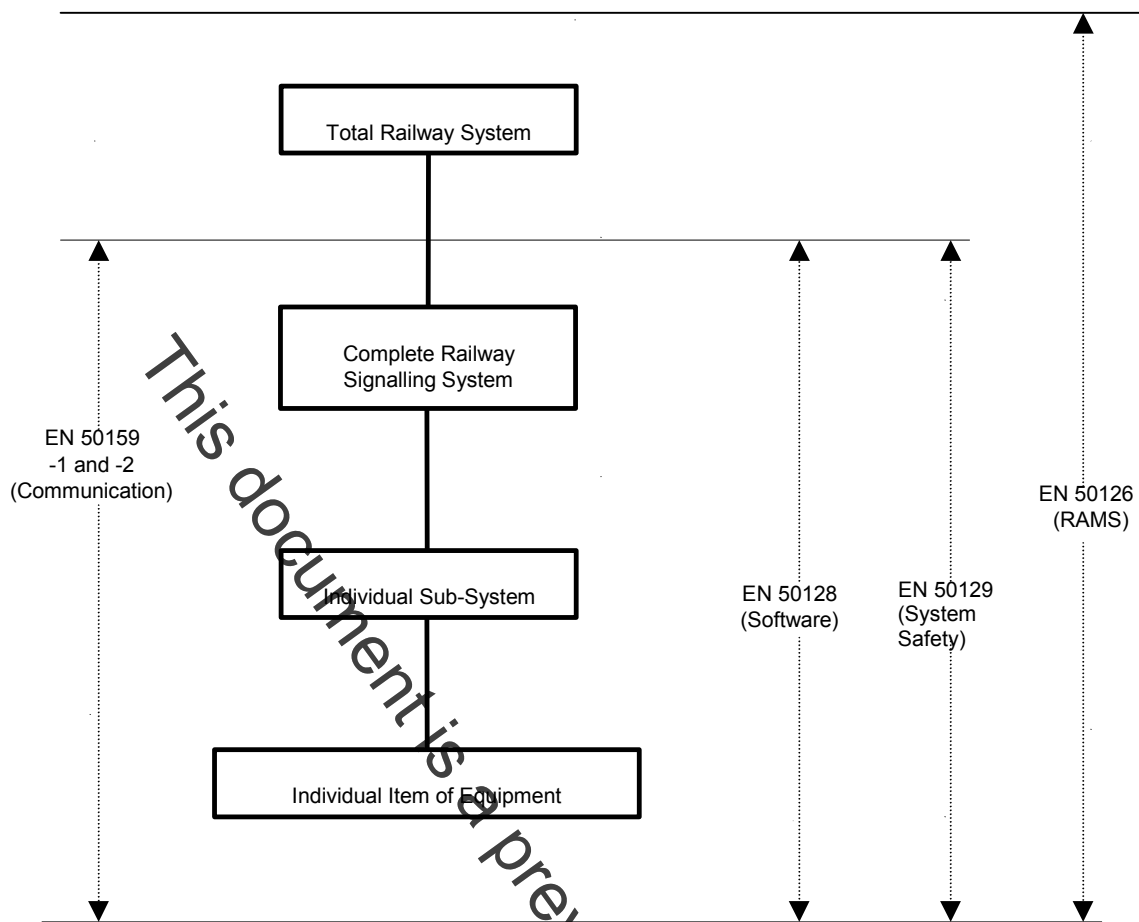


Figure 1 – Scope of the main CENELEC railway application standards

## 2 Normative references

This European Standard 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 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 (including amendments).

NOTE Additional informative references are included in Bibliography.

EN 50121 Series	Railway applications – Electromagnetic compatibility
EN 50124-1	Railway applications – Insulation coordination – Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment
EN 50124-2	Railway applications – Insulation coordination – Part 2: Overvoltages and related protection
EN 50125-1	Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock
EN 50125-3	Railway applications – Environmental conditions for equipment – Part 3: Equipment for signalling and communications
EN 50126	Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)

EN 50128	Railway applications – Communication, signalling and processing systems – Software for railway control and protection systems
EN 50155	Railway applications – Electronic equipment used on rolling stock
EN 50159-1	Railway applications – Communication, signalling and processing systems Part 1: Safety-related communication in closed transmission systems
EN 50159-2	Railway applications – Communication, signalling and processing systems Part 2: Safety related communication in open transmission systems
EN 61508-1	Functional safety of electrical/electronic/ programmable electronic safety-related systems - Part 1: General requirements (IEC 61508-1)
IEC 60664 Series	Insulation coordination for equipment within low-voltage systems

### 3 Definitions and abbreviations

#### 3.1 Definitions

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

##### 3.1.1

##### **accident**

an unintended event or series of events that results in death, injury, loss of a system or service, or environmental damage

##### 3.1.2

##### **assessment**

the process of analysis to determine whether the design authority and the validator have achieved a product that meets the specified requirements and to form a judgement as to whether the product is fit for its intended purpose

##### 3.1.3

##### **authorisation**

the formal permission to use a product within specified application constraints

##### 3.1.4

##### **availability**

the ability of a product to be in a state to perform a required function under given conditions at a given instant of time or over a given time interval assuming that the required external resources are provided

##### 3.1.5

##### **can**

is possible

##### 3.1.6

##### **causal analysis**

analysis of the reasons how and why a particular hazard may come into existence

##### 3.1.7

##### **common-cause failure**

failure common to items which are intended to be independent

##### 3.1.8

##### **consequence analysis**

analysis of events which are likely to happen after a hazard has occurred

##### 3.1.9

##### **configuration**

the structuring and interconnection of the hardware and software of a system for its intended application

##### 3.1.10

##### **cross-acceptance**

the status achieved by a product that has been accepted by one authority to the relevant European Standards and is acceptable to other authorities without the necessity for further assessment