

**RAUDTEEALASED RAKENDUSED. TÖÖKINDLUSE,
KASUTATAVUSE, HOOLDATAVUSE JA OHUTUSE (RAMS)
MÄÄRATLEMINE NING ESITLEMINE. OSA 1:
PÕHINÕUDED JA ÜLDPROTSEDUUR**

**Railway Applications - The Specification and
Demonstration of Reliability, Availability,
Maintainability and Safety (RAMS) - Part 1: Generic
RAMS Process**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 50126-1:2017 +A1:2024 sisaldab Euroopa standardi EN 50126-1:2017 ja selle muudatuse A1:2024 ingliskeelset teksti.	This Estonian standard EVS-EN 50126-1:2017+A1:2024 consists of the English text of the European standard EN 50126-1:2017 and its amendment A1:2024.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.10.2017, muudatus A1 15.11.2024.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation. Date of Availability of the European standard is 13.10.2017, for A1 15.11.2024.
Muudatusega A1 lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega $\boxed{A_1}$ $\langle A_1 \rangle$. Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.	The start and finish of text introduced or altered by amendment A1 is indicated in the text by tags $\boxed{A_1}$ $\langle A_1 \rangle$. The standard is available from the Estonian Centre for Standardisation and Accreditation.

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ICS 29.280; 45.020

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English Version

**Railway Applications - The Specification and Demonstration of Reliability,
Availability, Maintainability and Safety (RAMS) - Part 1: Generic RAMS Process**

Applications ferroviaires - Spécification et démonstration de la fiabilité, de la disponibilité, de la maintenabilité et de la sécurité (FDMS) - Partie 1: Processus FMDS générique

Bahnanwendungen - Spezifikation und Nachweis von Zuverlässigkeit, Verfügbarkeit, Instandhaltbarkeit und Sicherheit (RAMS) - Teil 1: Generischer RAMS Prozess

This European Standard was approved by CENELEC on 2017-07-03. Amendment A1 was approved by CENELEC on 2024-10-14. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard and its amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard and its Amendment A1 exist 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 50126-1:2017) has been prepared by CLC/TC 9X "Electrical and electronic applications for railways".

The following dates are fixed:

- latest date by which this document has to (dop) 2018-07-03
be implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2020-07-03
standards conflicting with this document
have to be withdrawn

This document supersedes EN 50126-1:1999 which has been technically revised.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

EN 50126 "*Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*" consists of the following parts:

- Part 1: Generic RAMS process;
- Part 2: System approach to safety.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

A1 Amendment A1 European foreword

This document (EN 50126-1:2017/A1:2024) has been prepared by Technical Committee CLC/TC 9X “Electrical and electronic applications for railways”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2025-11-30
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2027-11-30

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This document has been prepared under a standardization request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZZ, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website. **A1**

Introduction

EN 50126-1:1999 was aimed at introducing the application of a systematic RAMS management process in the railway sector. Through the application of this standard and the experiences gained over the last years, the need for revision and restructuring became apparent with a need to deliver a systematic and coherent approach to RAMS applicable to all the railway application fields Command, Control and Signalling (Signalling), Rolling Stock and Electric power supply for Railways (Fixed Installations).

The revision work improved the coherency and consistency of the standard, the concept of safety management and ^{A1} the practical usage of this document ^{A1}, and took into consideration the existing and related Technical Reports as well.

This European Standard provides railway duty holders and the railway suppliers, throughout the European Union, with a process which will enable the implementation of a consistent approach to the management of reliability, availability, maintainability and safety, denoted by the acronym RAMS.

Processes for the specification and demonstration of RAMS requirements are cornerstones of this standard. This European Standard promotes a common understanding and approach to the management of RAMS.

^{A1} the EN 50126 series forms part of ^{A1} the railway sector specific application of IEC 61508. Meeting the requirements in this European Standard together with the requirements of other suitable standards is sufficient to ensure that additional compliance to IEC 61508 does not need to be demonstrated.

With regard to safety, EN 50126-1 provides a Safety Management Process which is supported by guidance and methods described in EN 50126-2.

^{A1} The EN 50126 series is independent from the technology used. As far as safety is concerned, the EN 50126 series takes the perspective of safety with a functional approach. ^{A1}

The application of this standard can be adapted to the specific requirements for the system under consideration.

This European Standard can be applied systematically by the railway duty holders and railway suppliers, throughout all phases of the life cycle of a railway application, to develop railway specific RAMS requirements and to achieve compliance with these requirements. The system-level approach developed by this European Standard facilitates assessment of the RAMS interactions between elements of railway applications even if they are of complex nature.

This European Standard promotes co-operation between the stakeholders of Railways in the achievement of an optimal combination of RAMS and cost for railway applications. Adoption of this European Standard will support the principles of the European Single Market and facilitate European railway inter-operability.

In accordance with CENELEC editing rules ¹⁾, mandatory requirements in this standard are indicated with the modal verb "shall". Where justifiable, the standard permits process tailoring.

Specific guidance on the application of this standard for Safety aspects is provided in EN 50126-2. EN 50126-2 provides various methods for use in the safety management process. Where a particular method is selected for the system under consideration, the mandatory requirements for this method are by consequence mandatory for the safety management of the system under consideration.

This European Standard consists of the main part (Clause 1 to Clause 8) and Annexes A, B, C, D and ZZ. The requirements defined in the main part of the standard are normative, whilst Annexes are informative.

¹ CEN/CENELEC Internal Regulations Part 3: Rules for the structure and drafting of CEN/CENELEC Publications (2017-02), Annex H.

1 Scope

A1 this document **A1**

- considers RAMS, understood as reliability, availability, maintainability and safety and their interaction;
- considers the generic aspects of the RAMS life cycle. The guidance in this part can still be used in the application of specific standards;
- defines:
 - a process, based on the system life cycle and tasks within it, for managing RAMS;
 - a systematic process, tailorable to the type and size of the system under consideration, for specifying requirements for RAMS and demonstrating that these requirements are achieved;
- addresses railway specifics;
- enables conflicts between RAMS elements to be controlled and managed effectively;
- does not define:
 - RAMS targets, quantities, requirements or solutions for specific railway applications;
 - rules or processes pertaining to the certification of railway products against the requirements of this standard;
 - an approval process for the railway stakeholders.

A1 this document **A1** is applicable to railway application fields, namely Command, Control and Signalling, Rolling Stock and Fixed Installations, and specifically:

- to the specification and demonstration of RAMS for all railway applications and at all levels of such an application, as appropriate, from complete railway systems to major systems and to individual and combined subsystems and components within these major systems, including those containing software; in particular:
 - to new systems;
 - to new systems integrated into existing systems already accepted, but only to the extent and insofar as the new system with the new functionality is being integrated. It is otherwise not applicable to any unmodified aspects of the existing system;
 - as far as reasonably practicable, to modifications and extensions of existing systems already accepted, but only to the extent and insofar as existing systems are being modified. It is otherwise not applicable to any unmodified aspect of the existing system;
- at all relevant phases of the life cycle of an application;
- for use by railway duty holders and the railway suppliers.

It is not required to apply this standard to existing systems which remain unmodified, including those systems already compliant with **A1** any former version of this document **A1**.

The process defined by this European Standard assumes that railway duty holders and railway suppliers have business-level policies addressing Quality, Performance and Safety. The approach defined in this standard is consistent with the application of quality management requirements contained within EN ISO 9001.

2 Normative references

A1 The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50126-2:2017,² *Railway Applications — The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS) — Part 2: Systems approach to safety* **A1**

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

acceptance

status achieved by a product, system or process once it has been agreed that it is suitable for its intended purpose

A1 3.2

accident

unintended event or series of events that results in harm

[SOURCE: IEC 60050-821:2017, 821-12-02, modified – “that results in death, injury, loss of a system or service, or environmental damage” has been replaced with “that results in harm”] **A1**

3.3

approval

permission for a product or process to be marketed or used for stated purposes or under stated conditions

Note 1 to entry: Approval can be based on fulfilment of specified requirements or completion of specified procedures.

[SOURCE: EN ISO/IEC 17000:2004, 7.1]

[SOURCE: IEC 60050-902:2013, 902-06-01]

3.4

assurance

confidence in achieving a goal being pursued. Declaration intended to give confidence

A1 3.5

audit

systematic, independent, documented process for obtaining records, statements of fact or other relevant information and assessing them objectively to determine the extent to which specified requirements are fulfilled

[SOURCE: IEC 60050-902:2013, 902-03-04, modified – The Note 1 to entry has been omitted] **A1**

A1 3.6

availability

<for railway RAMS> ability of an item 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

[SOURCE: IEC 60050-821:2017, 821-05-82, modified – “of a product” has been changed with “for railway RAMS”] **A1**

² As impacted by EN 50126-2:2017/A1:2024.