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Railway applications - Fixed installations - Process,  
protective measures and demonstration of safety for  
electric traction systems

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 50562:2018 sisaldab Euroopa standardi EN 50562:2018 ingliskeelset teksti.	This Estonian standard EVS-EN 50562:2018 consists of the English text of the European standard EN 50562:2018.
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English Version

**Railway applications - Fixed installations - Process, protective  
measures and demonstration of safety for electric traction  
systems**

Applications ferroviaires - Installations fixes - Processus,  
mesures de prévention et démonstration de la sécurité pour  
les installations fixes de traction électrique

Bahnanwendungen - Ortsfeste Anlagen - Prozess,  
Schutzmaßnahmen und Nachweisführung für die Sicherheit  
für elektrische Bahnanlagen

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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 50562:2018) has been prepared by CLC/SC 9XC "Electric supply and earthing systems for public transport equipment and ancillary apparatus (Fixed installations)".

The following dates are fixed:

- latest date by which this document has to be (dop) 2018-07-31  
implemented at national level by publication of  
an identical national standard or by  
endorsement
- latest date by which the national standards (dow) 2020-07-31  
conflicting with this document have to  
be withdrawn

This document supersedes CLC/TS 50562:2011.

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.

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.

## Introduction

This European Standard provides a code of practice (CoP) for the process, protective measures and demonstration of safety for the conventional electric traction systems which supports the application of EN 50126. Within this standard “safety” is used with respect to harm to people and environment. Safety in terms of harm to assets is covered in the relevant product and application standards.

This standard includes a systems description for the generic reference system for a conventional electric traction system (refer to Figure 3) and the related subsystems. The interfaces with respect to safety at the system borders and the respective aspects to be coordinated are described. Based on the list of top-level hazards and endangered groups protective measures for risk mitigation and hazard control are derived and indications for the verification and validation procedures are given. The list of standards given in Annex B can serve as a reference.

During the preparation of this European Standard it became obvious, that the risks associated with conventional electric traction systems are broadly accepted. This conclusion is based on long term experience from several European railways. The technical systems used by these European railways in their conventional electric traction systems are equivalent to the generic reference system described in this standard. Confidential field data that were taken into account represent more than 1 200 000 year km operational experience. To exemplify, the equivalent would be a network size of about 80 000 km and the operational experience laid down in traceable field data would cover a period of 15 years of service. No fatality was reported caused by a product property or a failure of a specified function of the conventional electric traction systems.

This standard has been developed specifically to support the realization of EN 50126 within the context of safety for electric traction systems. It provides generic building blocks which assists the fulfilment of the requirements of life cycle steps given in EN 50126. Product and application standards are traditionally applied in fixed installations to ensure safety and performance in terms of e.g. reliability and cost efficiency. Within this standard the link between existing product and application standards, technical specification for interoperability and EN 50126 is given.

This standard complies with the principles of the life cycle modelling according to EN 50126 by tailoring the risk assessment process. This means that this standard encompasses the entire safety process ranging from the system description, hazards identification to the verification and validation of the implemented protective measures according to EN 50126 and it is not just a summation of product and application standards.

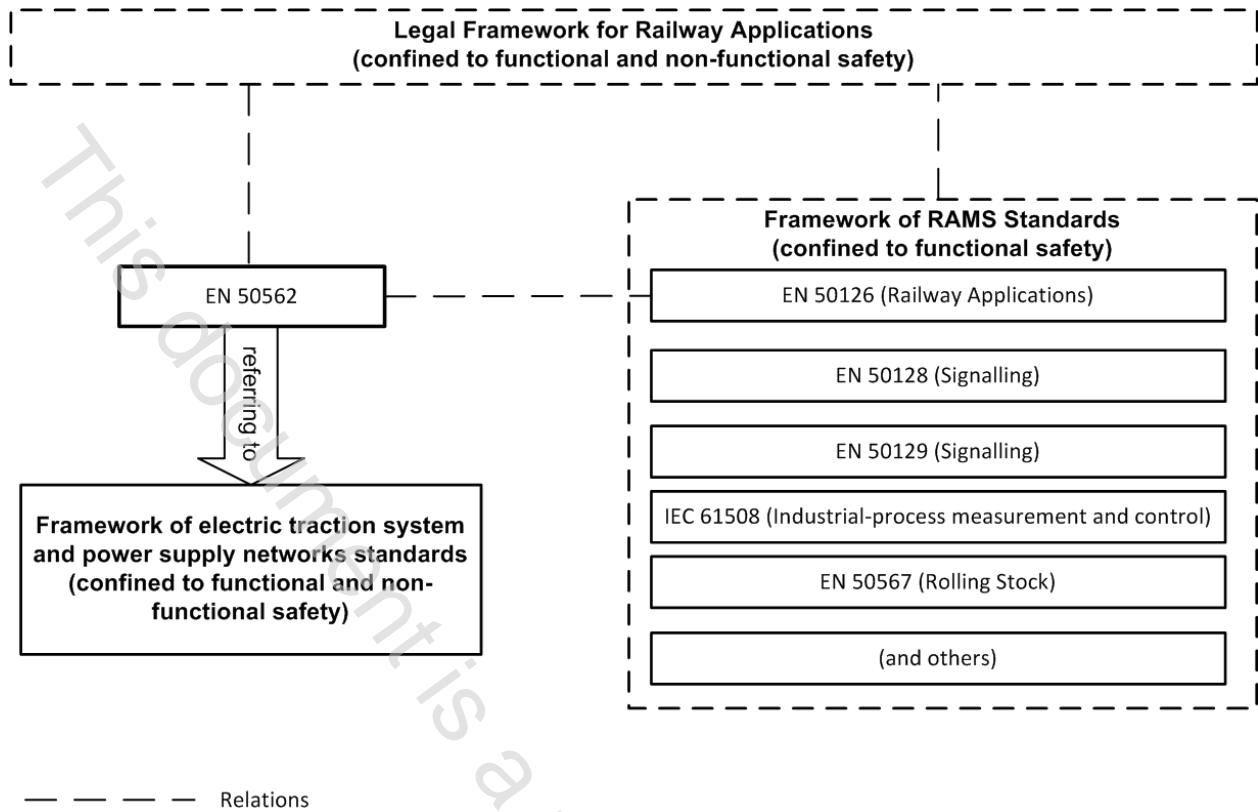
This standard has been developed so that it can also be used for assessing risks arising from technical changes within the legal framework of the European Union.

This standard also supports the decision making regarding the assessment of changes, e.g. with respect to the significance of changes in technologies. It includes in particular the risk acceptance principle regarding the application of codes of practice. It also supports the application of the risk acceptance principles similar reference systems and explicit risk estimation for electric traction systems in the framework of EN 50126.

When applying TSIs, e.g. TSI Energy, this standard supports the demonstration of the inherent safety of the conventional electric traction system and supports the safe integration at overall system level.

Amongst others this standard can be used as a code of practice for conventional electric traction systems. This does not exclude consideration of other codes of practice even from other fields of application.

The interrelation between the legal framework, the standards traditionally applied and the set of standards confined to safety is shown in Figure 1.



**Figure 1 — Interrelationship between standards and the legal framework**

## 1 Scope

This European Standard defines the process, protective measures and demonstration of safety in accordance with EN 50126 for conventional electric traction systems for railways. This standard can also be applied to guided mass transport systems and trolleybus systems. All these systems can be elevated, at-grade and underground.

Other systems including those listed below were not assessed and therefore are outside the scope of this European Standard:

- underground mine traction systems,
- cranes, transportable platforms and similar transportation equipment on rails, temporary structures (e.g. exhibition structures) in so far as these are not supplied directly or via transformers from the contact line system and are not endangered by the traction power supply system,
- suspended cable cars,
- funicular railways,
- magnetic levitated systems,
- railways with inductive power with inductive contactless transmission of the energy from the electric traction power supply system to the electrically powered traction unit,
- railways with buried contact line system that is required to be energised only below the train to ensure safety,

For similar technology and similar hazardous scenarios, the safety considerations of this standard can be used as a guideline. This European Standard applies to conventional electric traction systems, which are new or are undergoing major changes.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document including any amendments applies.

EN 50110 (series), *Operation of electrical installations*

EN 50119, *Railway applications - Fixed installations - Electric traction overhead contact lines*

EN 50122 (series), *Railway applications – Fixed installations – Electrical safety, earthing and the return circuit*

EN 50123 (series), *Railway applications – Fixed installations – DC switchgear*

EN 50124 (series), *Railway applications – Insulation coordination*

EN 50126 (series), *Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*

EN 50152 (series), *Railway applications – Fixed installations – Particular requirements for AC switchgear*

EN 50153, *Railway applications - Rolling stock - Protective provisions relating to electrical hazards*

EN 50163, *Railway applications - Supply voltages of traction systems*



EN 50388, *Railway Applications - Power supply and rolling stock - Technical criteria for the coordination between power supply (substation) and rolling stock to achieve interoperability*

EN 50633, *Railway applications - Fixed installations - Protection principles for AC and DC electric traction systems*

CLC/TR 50488, *Railway applications - Safety measures for the personnel working on or near overhead contact lines*

EN 60255 (series), *Measuring relays and protection equipment (IEC 60255)*

EN 61508 (series), *Functional safety of electrical/electronic/programmable electronic safety-related systems (IEC 61508)*

EN 62305 (series), *Protection against lightning (IEC 62305)*

### 3 Terms and definitions

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

#### 3.1

##### **contact line system**

support system and contact line supplying electric energy to vehicles through current collecting equipment

Note 1 to entry: The contact line system can comprise.

- the contact line,
- masts and foundations,
- supports and any components registering the conductors,
- cross-spans or cables,
- tensioners,
- other along track conductors such as feeders, earth wires and return conductors when supported from the same masts as the contact line,
- conductors connected permanently to the contact line for supplying other electrical equipment such as lighting, signal operation, point control and point heating.

[SOURCE: IEC 60050-811:2017, 811-33-59]

#### 3.2

##### **conventional electric traction system**

electric traction system constructed, operated and maintained according to relevant standards and common practice

#### 3.3

##### **current collector zone**

##### **CCZ**

zone whose limits are in general not exceeded by an energized collector no longer in contact with the contact line or broken collector and its fragments

[SOURCE: EN 50122-1:2011, 3.5.10]