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Interested committees:

Title: Draft BS EN 50562-1 BS Fixed installations for railway applications - Safety of electric traction power supply systems. Part 1: Generic approach for conventional applications, functions and properties.

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

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Full document details: 25/30467840 DC

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

May 2025

ICS 29.280

Will supersede EN 50562:2018 (PART)

English Version

Fixed installations for railway applications - Safety of electric traction power supply systems - Part 1: Generic approach for conventional applications, functions and properties

To be completed

To be completed

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2025-08-22.

It has been drawn up by CLC/SC 9XC.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

1	Contents	Page
2	European foreword	4
3	Introduction	5
4	1 Scope	8
5	2 Normative references	8
6	3 Terms and definitions	9
7	4 Abbreviations	14
8	5 Risk assessment process	15
9	5.1 General	15
10	5.2 System definition	18
11	5.3 Assessment of the conventionality of applications, functions and properties and identification	
12	of additional hazards	18
13	5.4 Risk assessment	18
14	5.4.1 General	18
15	5.4.2 Risk acceptance principles	18
16	5.4.3 Protective measures	19
17	5.4.4 Risk assessment for the generic reference system	19
18	5.5 Demonstration of safety for electric traction power supply systems	19
19	5.5.1 General	19
20	5.5.2 Safety demonstration for conventional applications	20
21	5.5.3 Safety demonstration for non-conventional applications	21
22	6 Definition of the generic reference system of conventional applications in an electric traction	
23	power supply system	21
24	6.1 General	21
25	6.2 Electric traction power supply system	21
26	6.2.1 Function	21
27	6.2.2 Equipment	21
28	6.3 Substations and switching stations	22
29	6.3.1 Function	22
30	6.3.2 Control	23
31	6.3.3 Equipment	24
32	6.4 Contact line system	25
33	6.4.1 Function	25
34	6.4.2 Equipment	25
35	6.5 Extended return circuit	25
36	6.5.1 Functions	25
37	6.5.2 Equipment	25
38	6.6 Interfaces to the electric traction power supply system	26
39	6.6.1 General	26
40	6.6.2 High voltage installations	26
41	6.6.3 Remote control for electric traction power supply system	26
42	6.6.4 Rolling stock and electrical installations connected to the contact line system	27
43	6.6.5 Track	27
44	6.6.6 Signalling	27
45	6.6.7 Railway related communication systems	27
46	6.6.8 Conductive parts in the current collector zone (CCZ) and overhead contact line zone (OCLZ);	
47	27	
48	6.6.9 Civil and metallic structures	27
49	6.6.10 Electrical and non-electrical installations potentially influenced by the electric traction power	
50	supply system	27

51	6.7	Interfaces to substations and switching stations.....	27
52	6.7.1	Rolling stock	27
53	6.7.2	Electrical installations connected to the contact line system.....	28
54	6.7.3	Track.....	28
55	6.7.4	Signalling	28
56	6.7.5	Railway related communication systems	28
57	6.7.6	High voltage feeding network	28
58	6.8	Interfaces to contact line system.....	28
59	6.8.1	Rolling stock and electrical installations connected to the contact line system	28
60	6.8.2	Track.....	28
61	6.8.3	Signalling	29
62	6.8.4	Railway related communication systems	29
63	6.8.5	High voltage network	29
64	6.8.6	Conductive parts in the CCZ and OCLZ.....	29
65	6.8.7	Civil structures	29
66	6.9	Interfaces to extended return circuit.....	29
67	6.9.1	Rolling stock and electrical installations connected to the contact line system	29
68	6.9.2	Track.....	29
69	6.9.3	Signalling	30
70	6.9.4	Railway related communication systems	30
71	6.9.5	High voltage feeding network	30
72	6.9.6	Conductive parts in the CCZ and OCLZ.....	30
73	6.9.7	Conductive parts within adjacent buildings and structures	30
74	7	Protective measures of the generic electric traction power supply system.....	30
75	7.1	General.....	30
76	7.2	General protective measures	30
77	7.3	Substations and switching stations	32
78	7.3.1	General	32
79	7.3.2	Control and protection	32
80	7.4	Contact line system.....	34
81	7.5	Extended return circuit	34
82	Annex A (informative) Hazard log for the generic reference system		35
83	Annex ZZ (informative) Relationship between this European Standard and the Essential		
84	Requirements of EU Directive (EU) 2016/797 aimed to be covered.....		51
85	Bibliography		55

86 European foreword

87 This document (prEN 50562-1:2025) has been prepared by CLC/SC 9XC “Electric supply and earthing
88 systems for public transport equipment and ancillary apparatus (Fixed installations)” of CLC/TC 9X
89 “Electrical and electronic applications for railways”.

90 This document is currently submitted to the Enquiry.

91 The following dates are proposed:

- latest date by which the existence of this document has to be announced at national level (doa) dav + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dav + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dav + 36 months (to be confirmed or modified when voting)

92 This document will partially supersede EN 50562:2018.

93 prEN 50562-1:2025 includes the following significant technical changes with respect to EN 50562:2018:

94 — The standard has been supplemented by a second part. Part 1 covers conventional applications,
95 functions and properties by the application of codes of practice. Part 2 covers non-conventional
96 applications, functions and properties by application of codes of practice of other provenance,
97 comparison with reference systems and explicit risk estimation.

98 — Annex B “Documents related to EN 50562” has been removed. The content has been shifted to the
99 Bibliography.

100 — The content of Annex C “Combination of risk acceptance principles” has been integrated in Part 2.

101 — The content of Annex D “Guidance of software for safety functions on system level” has been
102 integrated in Part 2.

103 The prEN 50562 series consists of the following parts:

104 — Part 1: Generic approach for conventional applications, functions and properties

105 — Part 2: Generic approach for non-conventional applications, functions and properties

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

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

Introduction

This document supports the application of both parts of EN 50126 with the focus on safety but can also be used independently as a standard for the process, protective measures and demonstration of safety for the electric traction power supply systems. Within this document “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 document has been developed specifically to support the realization of EN 50126-1:2017 and EN 50126-2:2017 within the context of safety for electric traction power supply systems. It provides generic building blocks which assist the fulfilment of the requirements of life cycle steps given in EN 50126-1:2017 and EN 50126-2:2017. 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 document the link between existing product and application standards, technical specifications for interoperability and EN 50126-1:2017 and EN 50126-2:2017 is given.

This document complies with the principles of the life cycle modelling according to EN 50126-1:2017 and EN 50126-2:2017 by tailoring the risk assessment process, but it does not define the life cycle itself. The relation between the process steps and the life cycle proposed in EN 50126-1:2017 and EN 50126-2:2017 is indicated in prEN 50562-1:2025, Clause 5. This means that this document encompasses major parts of the EN 50126-1:2017 and EN 50126-2:2017 life cycle ranging from the concept and system description, hazard identification to the demonstration of the implemented protective measures according to EN 50126-1:2017 and EN 50126-2:2017. It is not intended to summarize any product and application standard but to supplement and ease their application also within the framework of EN 50126-1:2017 and EN 50126-2:2017.

During the preparation of this document, it became obvious that the residual risks associated with conventional electric traction power supply systems are acceptable. 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 power supply systems are equivalent to the generic reference system described in this document. In 2006, 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 power supply systems.

Publications and public surveys from the European Union support the conclusions above even up today.

The document is split into two parts. Part 1 establishes the code of practice for electric traction power supply systems. It provides a generic approach that is intended to serve for conventional applications, functions and properties. It includes a systems description for the generic reference system (see Figure 1) 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 protective measures for risk mitigation and hazard control are derived and indications for the verification and validation procedures are given.

prEN 50562-2:2025 covers the specific approach that supports the implementation of non-conventional applications, functions and properties in electric traction power supply systems in the sense of Part 1. It includes the two risk acceptance principles that are not considered in Part 1. It describes the basic procedure for the comparison with a similar system and an explicit risk estimation at the functional level including SIL determination. In this way it is possible to use codes of practice or accepted solutions not listed in this document.

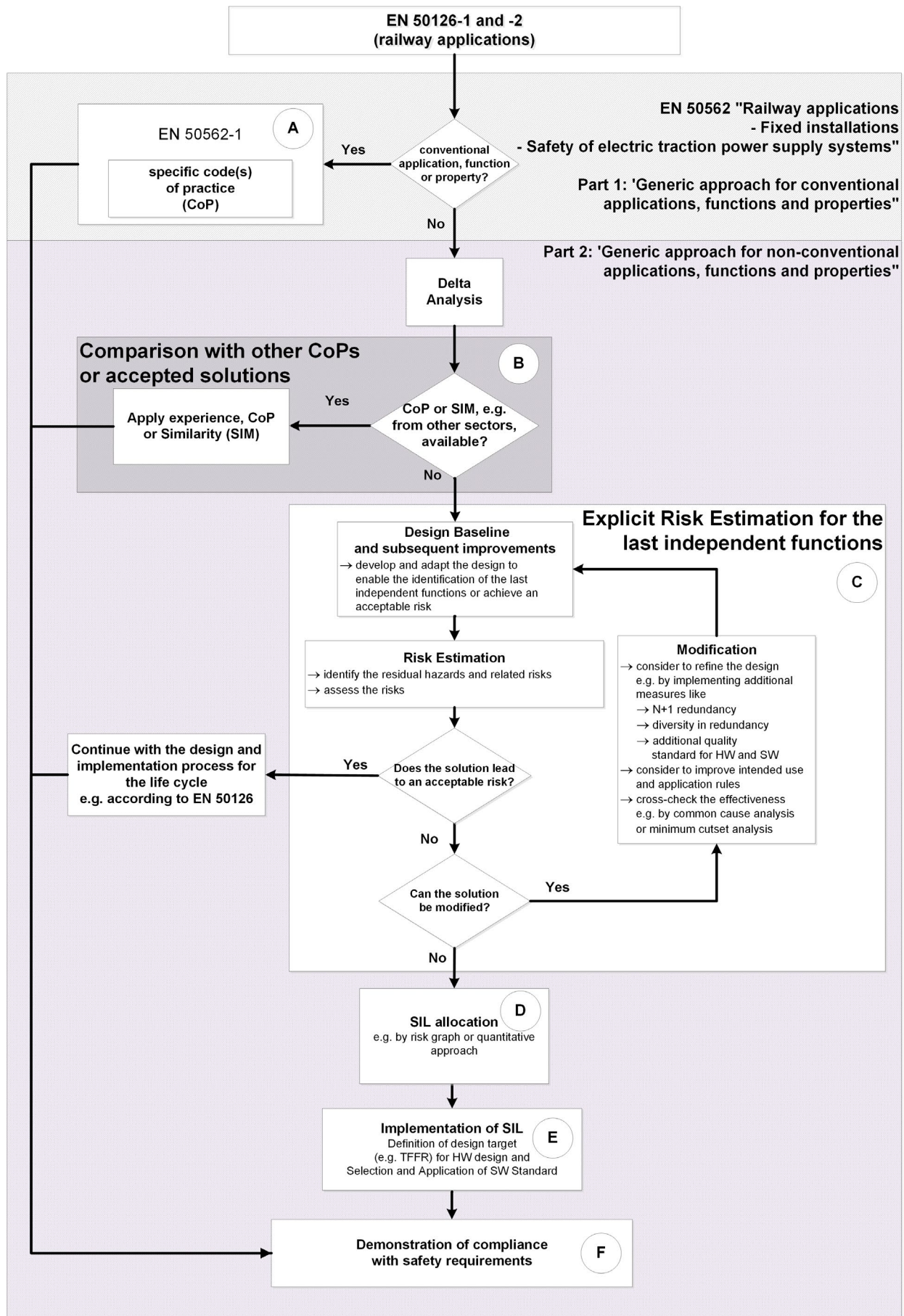


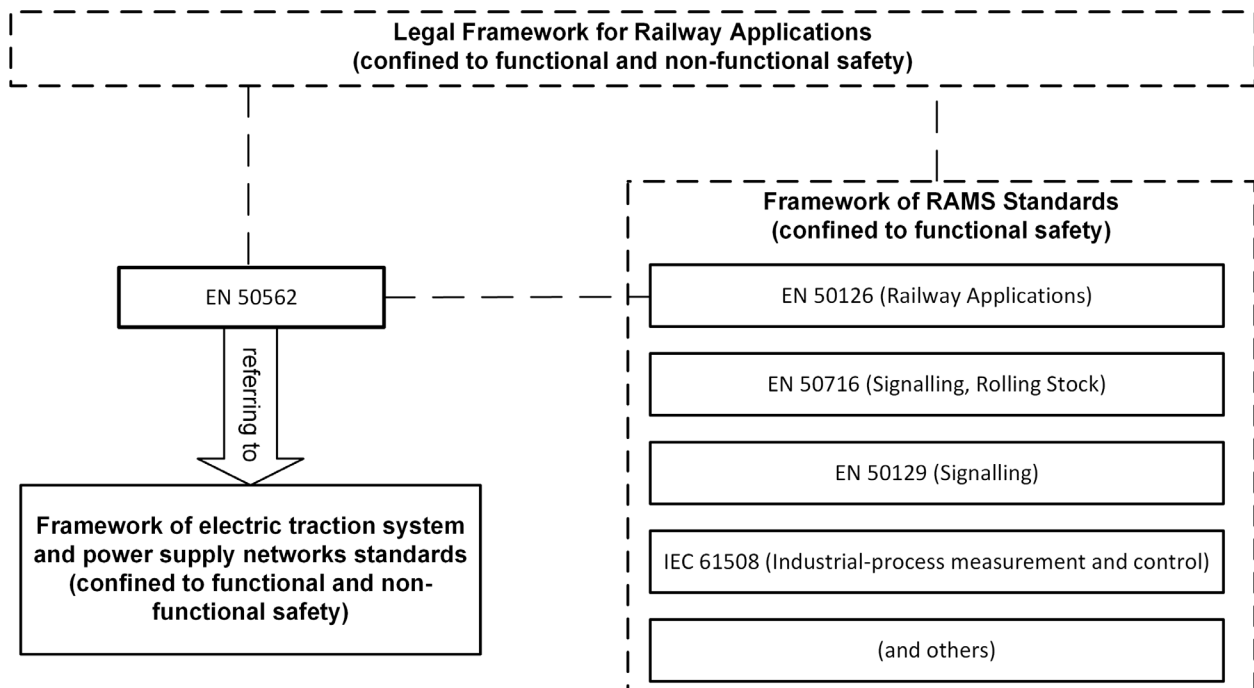
Figure 1 — EN 50562 concept

prEN 50562-1:2025 and prEN 50562-2:2025 have been developed so that they can also be used for assessing risks arising from technical changes within the legal framework of the European Union. prEN 50562-1:2025 can be used as stand-alone standard, but prEN 50562-2:2025 requires the application of prEN 50562-1:2025 to integrate non-conventional applications in an environment dominated by conventional applications, functions and properties.

This document 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 power supply systems in the framework of EN 50126-1:2017 and EN 50126-2:2017.

When applying TSIs, e.g. TSI Energy, this document supports the demonstration of safety of electric traction power supply systems and supports the safe integration at overall system level.

The interrelation between the legal framework, the standards traditionally applied, and the set of standards dedicated to safety is shown in Figure 2.



— — — — Relations

Figure 2 — Interrelationship between standards and the legal framework

1 Scope

This document defines the process, protective measures and demonstration of safety in accordance with EN 50126-1:2017 and EN 50126-2:2017 for AC and DC electric traction power supply systems for railways. This document can also be applied to urban rail and trolleybus systems. All these systems can be elevated, at-grade and underground.

This document has two parts:

- prEN 50562-1:2025 establishes the code of practice for conventional applications, functions and properties in electric traction power supply systems.
- prEN 50562-2:2025 supports the implementation of non-conventional applications, functions and properties in electric traction power supply systems.

This document applies to electric traction power supply systems, which are new or are undergoing major changes as defined in the legal framework. For similar technology and similar hazardous scenarios, the safety considerations can be used as a guideline.

This document does not apply to:

- 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,

This document does not consider aspects like IT-security or protection against any other malevolent acts. It is assumed that those aspects are handled on the overall system level.

NOTE For railways IT-security is covered in CLC/TS 50701. Because of the short life cycles of IT security applications it is advisable to separate IT-security functions from safety functions at least on virtual levels. E.g. the frequent patch processes for updating the IT-security applications is expected to be independent from safety applications.

2 Normative references

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 50119:2020, *Railway applications - Fixed installations - Electric traction overhead contact lines*

EN 50122-1:2022, *Railway applications - Fixed installations - Electrical safety, earthing and the return circuit - Part 1: Protective provisions against electric shock*

EN 50122-2:2022, *Railway applications - Fixed installations - Electrical safety, earthing and the return circuit - Part 2: Provisions against the effects of stray currents caused by DC traction systems*

EN 50122-3:2022, *Railway applications - Fixed installations - Electrical safety, earthing and the return circuit - Part 3: Mutual Interaction of AC and DC traction systems*

EN 50124-1:2017, *Railway applications - Insulation coordination - Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment*

- 214 EN 50124-2:2017, *Railway applications - Insulation coordination - Part 2: Overvoltages and related*
215 *protection*
- 216 EN 50163:2004¹, *Railway applications - Supply voltages of traction systems*
- 217 EN 50488:2021, *Railway applications - Fixed installations - Electrical protective measures for working on*
218 *or near an overhead contact line system and/or its associated return circuit*
- 219 EN 50633:2016, *Railway applications - Fixed installations - Protection principles for AC and DC electric*
220 *traction systems*
- 221 EN IEC 62305-1:2024, *Protection against lightning - Part 1: General principles*
- 222 EN IEC 62305-2:2024, *Protection against lightning - Part 2: Risk management*
- 223 EN IEC 62305-3:2024, *Protection against lightning - Part 3: Physical damage to structures and life hazard*
- 224 EN IEC 62305-4:2024, *Protection against lightning - Part 4: Electrical and electronic systems within*
225 *structures*

226 **3 Terms and definitions**

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

228 ISO and IEC maintain terminology databases for use in standardization at the following addresses:

229 — ISO Online browsing platform: available at <https://www.iso.org/obp>

230 — IEC Electropedia: available at <http://www.electropedia.org>

231 **3.1**

232 **contact line system**

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

234 Note 1 to entry: The mechanical system can be comprised of:

235 — the contact line;

236 — structures and foundations;

237 — supports and any components supporting or registering the conductors;

238 — head and cross spans;

239 — along-track feeders, negative feeders, and other lines like earth wires and return conductors, including boosters,
240 as far as they are supported from contact line system structures;

241 — cross-track feeders;

242 — disconnectors;

243 — over-voltage protection devices;

244 — conductors connected permanently to the contact line for supply of other electrical equipment such as lights, signal
245 operation, point control and point heating;

¹ As impacted by EN 50163:2004/A1:2007, EN 50163:2004/corrigendum May 2010, EN 50163:2004/AC:2013, EN 50163:2004/A2:2020 and EN 50163:2004/A3:2022.

246 — any other equipment necessary for operating the contact line.

247 [SOURCE: IEC 60050-811:2017, 811-33-59, modified — Note 1 to entry has been modified.]

248 3.2

249 **conventional application in an electric traction power supply system**

250 conventional application that is constructed, operated and maintained in accordance with the applicable
251 standards and common practice

252 Note 1 to entry: Common practice is understood as

253 — The application under consideration is covered by the generic reference system description given in
254 prEN 50562-1:2025, Clause 6,

255 — The technology applied is reliable, proven and defined in the standards for electric traction power systems and
256 general electric power supply,

257 — The safety rules according to EN 50110-1:2023 and EN 50488:2021 supplemented by operation and maintenance
258 manuals are applied as a minimum,

259 — Operation and maintenance is carried out only by qualified and authorized personnel,

260 — Operation is carried out according to experience gained in similar applications,

261 Common practice normally also includes aspects such as IT security, access control and work permits; but these are
262 covered at the level of the overall system.

263 **EXAMPLE** A non-conventional application can be found in workshops, where maintainer have access to the roof
264 of the train and are working in the direct vicinity of the contact line. If the maintenance process requires an automated
265 function for applying EN 50488, e.g. earthing of the contact line etc., there is currently no code of practice available for
266 this technical solution. Consequently, this function is non-conventional and is handled according to prEN 50562-2:2025.

267 3.3

268 **current collector zone**

269 **CCZ**

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

272 [SOURCE: EN 50122-1:2022, 3.5.11]

273 3.4

274 **effective touch voltage**

275 **U_{te}**

276 voltage between conductive parts when touched simultaneously by a human being

277 Note 1 to entry: The value of the effective touch voltage can be appreciably influenced by the impedance of the
278 human being in electric contact with these conductive parts.

279 Note 2 to entry: The conductive path through the body of a human being is conventionally from hand to both feet
280 (horizontal distance of 1 m) or from hand to hand.

281 [SOURCE: IEC 60050-195:2021, 195-05-11, modified — in the headline “touch voltage, <effective>” was
282 replaced by “(effective) touch voltage”; “or livestock” in the end of the paragraph and in Note 1 have been
283 deleted, the symbol and the Note 2 to entry have been added]

284 3.5

285 **electrical safety**

286 freedom from unacceptable risk of harm caused by electrical systems

287 [SOURCE: EN 50122-1:2022, 3.1.1]

3.6**electric shock**

physiological effect resulting from an electric current passing through a human body or livestock

[SOURCE: IEC 60050-195:2021, 195-01-04]

3.7**electric traction power supply system**

railway electrical distribution network used to provide energy for rolling stock

Note 1 to entry: The system can comprise:

— contact line systems;

— extended return circuit;

— running rails of non-electrified tracks, which are in the vicinity of, and conductively connected to the running rails of an electric traction power supply system;

— electrical installations, which are supplied from contact lines either directly or via a transformer;

— electrical installations in power plants in substations, which are utilized solely for distribution of power directly to the contact line;

— electrical installations of switching stations.

[SOURCE: EN 50122-1:2022, 3.4.1]

3.8**emergency switching-off**

opening operation of a switching device intended to remove electric power from an electrical installation to avert or alleviate a hazardous situation

Note 1 to entry: Emergency switching-off is an immediate reaction with minimized delay. Within the context of electric traction power supply systems, the emergency switching-off refers to electrical safety. It reduces but does not eliminate the electric shock risk; referring to "the five safety rules" according to EN 50110-1:2023, 6.2.1.

[SOURCE: IEC 60050-826:2004, 826-17-03, modified – Note 1 to entry has been added]

3.9**functional switching**

operation intended to switch on or off or vary the supply of electric energy to an electrical installation or parts of it for normal operating purposes

Note 1 to entry: Functional switching also includes predefined switching sequences like general switching-off, which is the opening operation of a group of switching devices intended to remove electric power from an electric installation or from parts of it to achieve an intended switching state. The switchgears involved and the switching sequences depend amongst others on the local conditions, the configuration of the system and the purpose of the intended switching state.

[SOURCE: IEC 60050-826:2004, 826-17-05, modified – Note 1 to entry has been added]

3.10**function**

mode of action or activity by which a product fulfils its purpose

[SOURCE: IEC 60050-821-12-25:2017, 821-12-25]

327 **3.11**

328 **hazard**

329 potential source of harm

330 Note 1 to entry: In English, the term “hazard” can be qualified in order to define the origin of the hazard or the nature
331 of the expected harm (e.g. “electric shock hazard”, “crushing hazard”, “cutting hazard”, “toxic hazard”, “fire hazard”,
332 “drowning hazard”).

333 Note 2 to entry: In French, the synonym “risque” is used together with a qualifier or a complement to define the origin
334 of the hazard or the nature of the expected harm (e.g. “risque de choc électrique”, “risque d’écrasement”, “risque de
335 coupure”, “risque toxique”, “risque d’incendie”, “risque de noyade”).

336 Note 3 to entry: In French, the term “risque” also denotes the combination of the probability of occurrence of harm and
337 the severity of that harm, in English “risk” (see IEC 60050-903-01-07).

338 [SOURCE: IEC 60050-903:2013, 903-01-02]

339 **3.13**

340 **mechanical switching device**

341 switching device designed to close and open one or more electric circuits by means of separable contacts

342 [SOURCE: IEC 60050-441:1984, 441-14-02, modified — “a” removed at the beginning of the definition.]

343 **3.14**

344 **overhead contact line zone**

345 **OCLZ**

346 zone the limits of which are in general not exceeded by a broken overhead contact wire or catenary wire

347 [SOURCE: EN 50122-1:2022, 3.5.10]

348 **3.15**

349 **protection**

350 provisions for detecting faults or other abnormal operating conditions in a power system, for enabling fault
351 clearance, for terminating abnormal operating conditions, and for initiating signals or indications

352 Note 1 to entry: The term “protection” is a generic term for protection equipment or protection systems.

353 Note 2 to entry: The term “protection” can be used to describe the protection of a complete power system or the
354 protection of individual plant items in a power system e.g. transformer protection, line protection, generator protection.

355 Note 3 to entry: Protection does not include items of power system plant provided, for example, to limit overvoltages
356 on the power system. However, it includes items provided to control the power system voltage or frequency deviations
357 such as automatic reactor switching, load-shedding, etc.

358 [SOURCE: IEC 60050-448:1995, 448-11-01, modified — “abnormal condition” has been replaced with
359 “abnormal operating conditions”.]

360 **3.16**

361 **protective measure**

362 measure intended to achieve adequate risk reduction, implemented:

363 — by the designer (inherent design, safeguarding and complementary protective measures, information
364 for use) and

365 — by the user (organization: safe working procedures, supervision, training; permit-to-work systems;
366 provision and use of additional safeguards; use of personal protective equipment)

367 [SOURCE: IEC 60050-903:2013, 903-01-17]

368 **3.17**369 **extended return circuit**

370 part of the electric traction power supply system which is not live and which leads the current back from the
 371 loads such as vehicles or other equipment to the source

372 EXAMPLE The conductors can be:

373 — running rails,

374 — return conductor rails,

375 — return conductors,

376 — substation return conductors;

377 — booster transformer return conductors

378 but not auto transformer system negative feeder conductors.

379 [SOURCE: EN 50122-1:2022, 3.3.1]

380 **3.18**381 **return conductor**

382 conductor paralleling the track return system and connected to the running rails at periodic intervals

383 [SOURCE: IEC 60050-811:2017, 811-35-13]

384 **3.19**385 **return conductor rail**386 **return current rail**

387 conductor rail used instead of the running rails for the return traction currents

388 [SOURCE: IEC 60050-811:2017, 811-34-10]

389 **3.20**390 **safety**

391 freedom from unacceptable risk

392 [SOURCE: IEC 60050-903:2013, 903-01-19]

393 **3.21**394 **semiconductor switching device**

395 switching device designed to make or break the current in an electric circuit by means of the controlled
 396 conductivity of a semiconductor

397 [SOURCE: IEC 60050-441:1984, 441-14-03, modified — “or break” has been added.]

398 **3.22**399 **signal for electric traction issues**

400 signal providing information about electrical issues providing a human machine interface

401 EXAMPLE the status of the electrical supply which could require a driver reaction e.g. neutral sections and related
 402 handling of the contact collector

403 Note 2 to entry: Examples can be found e.g. in EN 16494.

404 Note 3 to entry: Those signals for electric traction issues do not define or set routes for the operation of trains or provide
 405 speed restrictions.

406 **3.23**

407 **substation return conductor**

408 conductor connecting the running rails or other parts of the return circuit to the substation

409 [SOURCE: EN 50122-1:2022, 3.3.7]

410 **3.24**

411 **switchgear and controlgear**

412 **switchgear**

413 switching devices and their combination with associated control, measuring, protective and regulating
414 equipment, also assemblies of such devices and equipment with associated interconnections, accessories,
415 enclosures and supporting structures, intended in principle for use in connection with generation,
416 transmission, distribution and conversion of electric energy

417 [SOURCE: IEC 60050-441:1984, 441-11-01, modified – “switchgear” was added as a synonym term]

418 **3.25**

419 **system hazard**

420 unintended condition within a technical system which contributes to a top-level hazard

421 Note 1 to entry: A system hazard can include defects and deficiencies of functions and properties.

422 **3.26**

423 **top-level hazard**

424 physical situation that provides a potential source of harm where no further barriers are specified

425 **3.27**

426 **track circuit**

427 electrical circuit of which the rails of a track section form a part, with usually a source of current connected
428 at one end and a detection device at the other end for detecting whether this track section is clear or
429 occupied by a vehicle

430 Note 1 to entry: In a continuous signalling system, the track circuit can be used to transmit information between the
431 ground and the train.

432 [SOURCE: IEC 60050-821:2017, 821-03-01]

433 **4 Abbreviations**

434 For the purposes of this document, the following abbreviations apply:

AC	Alternating Current
ACRC	Automated Connection to the Return Circuit
CCZ	Current Collector Zone
CMMI	Capability Maturity Model Integration
CoP	Code of Practice
DC	Direct Current
EHS	Environmental Health and Safety
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
ERE	Explicit Risk Estimation
HMI	Human Machine Interface
IO	Input/Output

ISA	Independent Safety Assessor
IT	Information Technology
NSA	National Safety Authority
O&M	Operation and Maintenance
OCLZ	Overhead Contact Line Zone
OTHERS	Other groups of persons besides PAX, PUB and STAFF, such as trespasser, vandals.
	NOTE characteristic: knowing that there are residual risks when entering the vicinity of tracks, power lines and contact line systems
PAX	Passengers of the railway
	NOTE characteristic: not expecting a risk
PFD	average Probability of failure on demand
PFH	average Frequency of dangerous failure
PUB	General public, e.g. neighbourhood, passer-by, but not passengers.
	NOTE characteristic: not expecting a risk
QM	Quality Management
SIL	Safety Integrity Level
SIM	Comparison with a similar reference system
SRAC	Safety Related Application Condition
STAFF	Competent persons having the permission for access to and work on railway assets, e.g. railway personnel, civil workers for railway construction, search and rescue.
	NOTE characteristic: knowing that there are residual risks when entering electrical rooms or the vicinity of tracks, power lines and contact line systems
T&C	Testing and Commissioning
TFFR	Tolerable Functional Failure Rate
THR	Tolerable Hazard Rate
TLH	Top Level Hazard
TSI	Technical Specification for Interoperability

435 5 Risk assessment process

436 5.1 General

437 Precondition for the application of this document as a code of practice is that the design, construction,
 438 operation, and maintenance of conventional applications, functions and properties within an electric traction
 439 power supply system follow the relevant standards to ensure safety. For non-conventional applications,
 440 functions and properties as a part of electric traction power supply systems, where no sector-specific
 441 standards exist, safety shall be established by considering combinations of the risk acceptance principles
 442 'application of codes of practice', 'comparison with a similar reference system' and/or 'explicit risk estimation'
 443 according to prEN 50562-2:2025.

444 This clause describes how to:

- 445 — define the system under consideration and the relevant interfaces,
- 446 — apply this document as a code of practice or showing the link to prEN 50562-2:2025 for performing a
- 447 delta analysis and risk assessment for non-conventional applications, functions and properties,

448 — apply protective measures,

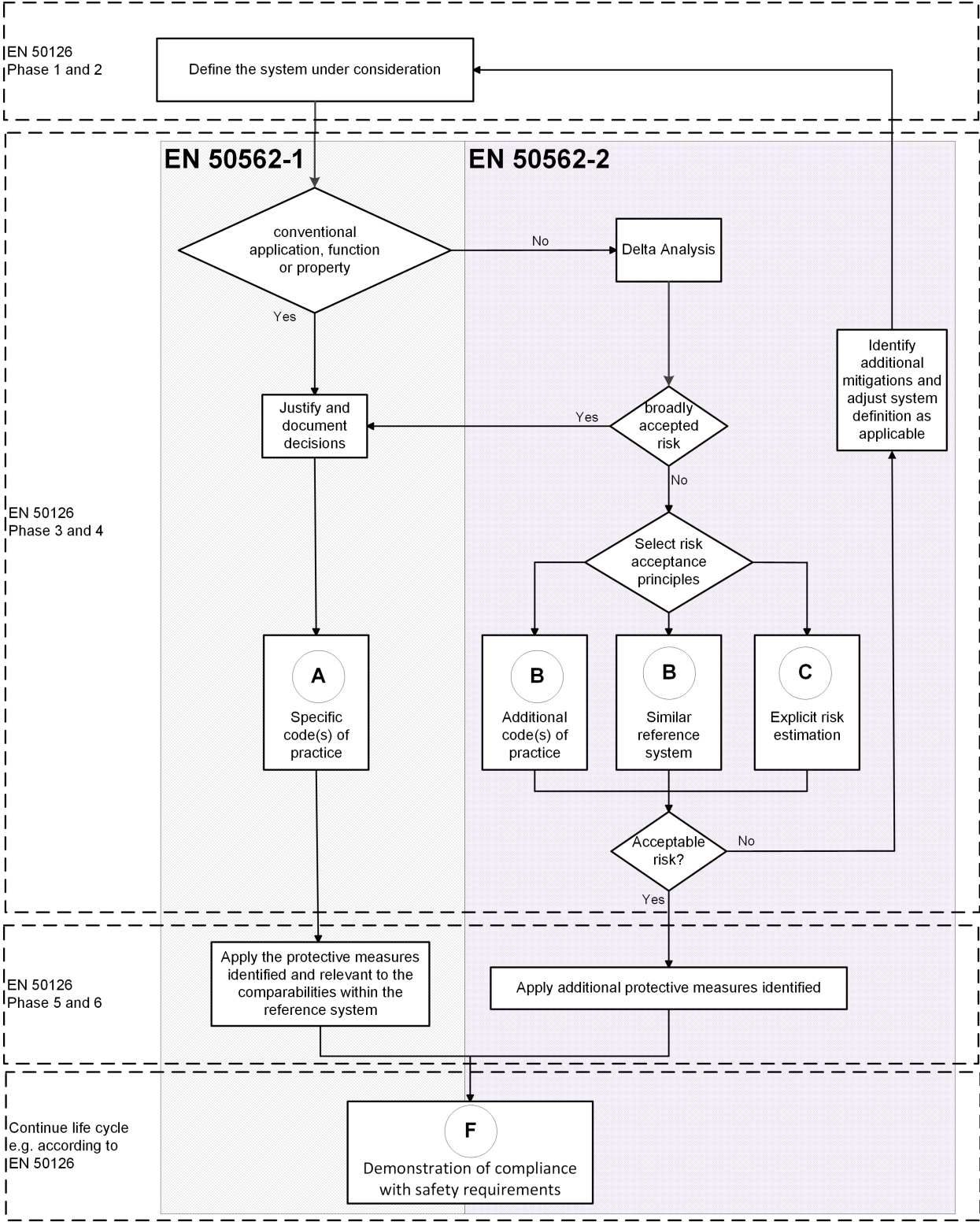
449 — demonstrate safety.

450 Clause 6 provides a system description of a conventional electric traction power supply system that serves
451 as a generic reference system. When using this document for the risk acceptance principles application of
452 a code of practice and for the comparison with a similar reference system the risk assessment shall be
453 focused on the differences of the reference system and the system under consideration. The reference
454 system can be derived from the generic reference system defined in Clause 6 or from an existing system
455 that is proven in use and has an acceptable safety level within similar conditions and operational context.

456 In case the generic reference system is chosen, the protective measures identified as listed in Clause 7
457 shall be evaluated regarding their applicability for the system under consideration. Protective measures for
458 new hazards shall be added as applicable. For other reference systems this applies in analogy based on
459 the protective measures identified for the reference system referred to.

460 The risk assessment process provided is a process tailored from EN 50126-1:2017 and EN 50126-2:2017
461 and consists of the following steps shown in Figure 3.

462



463

464 **Figure 3 — Risk assessment process for an electric traction power supply system and relation to**
465 **corresponding life cycle phases according to EN 50126-1:2017**

466 NOTE Figure 3 is tailored from Figure 8 of EN 50126-1:2017. The difference in terms of visualization between
467 Figure 1 and Figure 3 is that Figure 1 emphasizes the process point of view while Figure 3 concentrates on the risk-
468 based approach of EN 50126-1:2017 and EN 50126-2:2017. The capital letter identifiers refer to those in Figure 1.