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Fixed installations for railway applications - Electrical safety, earthing and the return circuit - Part 2: Provisions against the effects of stray currents caused by DC traction systems

EESTI STANDARDIMIS- JA AKREDITEERIMISKESKUS
ESTONIAN CENTRE FOR STANDARDISATION AND ACCREDITATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 50122-2:2022 +A1:2025 sisaldab Euroopa standardi EN 50122-2:2022 ja selle muudatuse A1:2025 ingliskeelset teksti.	This Estonian standard EVS-EN 50122-2:2022+A1:2025 consists of the English text of the European standard EN 50122-2:2022 and its amendment A1:2025.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 02.09.2022, muudatus A1 01.08.2025.	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 02.09.2022, for A1 01.08.2025.
Muudatusega A1 lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega ⟦A1⟩ ⟨A1⟧. 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 ⟦A1⟩ ⟨A1⟧. The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.120.50; 29.280

EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 50122-2 + A1

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Supersedes EN 50122-2:2010

English Version

Fixed installations for railway applications - Electrical safety, earthing and the return circuit - Part 2: Provisions against the effects of stray currents caused by DC traction systems

Installations fixes pour applications ferroviaires - Sécurité électrique, mise à la terre et circuit de retour - Partie 2: Mesures de protection contre les effets des courants vagabonds issus de la traction électrique à courant continu

Ortsfeste Anlagen für Bahnanwendungen - Elektrische Sicherheit, Erdung und Rückleitung - Teil 2: Schutzmaßnahmen gegen Streustromwirkungen durch Gleichstrombahnen

This European Standard was approved by CENELEC on 2022-07-25. Amendment A1 was approved by CENELEC on 2025-06-23. 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.

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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

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European foreword

This document (EN 50122-2:2022) 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 implemented at national level by publication of an identical national standard or by endorsement	(dop)	2023-07-25
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2025-07-25

This document supersedes EN 50122-2:2010 and all of its amendments and corrigenda (if any).

EN 50122-2:2022 includes the following significant technical changes with respect to EN 50122-2:2010:

— harmonization with EN 50122-1:2022;

— improvement of measurement specification in Annex A;

— new Annex D “Laboratory testing of materials for the insulation of rails”.

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.

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] Amendment A1 European foreword

This document (EN 50122-2:2022/A1:2025) was prepared by SC 9XC, “Electric supply and earthing systems for public transport equipment and ancillary apparatus (fixed installations)”, of CLC/TC 9X, “Electrical and electronic applications for railways”.

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• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2026-08-31
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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.

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]

1 Scope

This document specifies requirements for protective provisions against the effects of stray currents, which result from the operation of DC electric traction power supply systems.

As several decades' experience has not shown evident corrosion effects from AC electric traction power supply systems, this document only deals with stray currents flowing from a DC electric traction power supply system.

This document applies to all metallic fixed installations which form part of the traction system, and also to any other metallic components located in any position in the earth, which can carry stray currents resulting from the operation of the railway system.

This document applies to all new DC lines and to all major revisions to existing DC lines. The principles can also be applied to existing electrified transportation systems where it is necessary to consider the effects of stray currents.

This document does not specify working rules for maintenance but provides design requirements to allow maintenance.

The range of application includes:

a) railways,

b) guided mass transport systems such as:

   1) tramways,

   2) elevated and underground railways,

   3) mountain railways,

   4) magnetically levitated systems, which use a contact line system, and

   5) trolleybus systems,

c) material transportation systems.

This document does not apply to

a) electric traction power supply systems in underground mines,

b) cranes, transportable platforms and similar transportation equipment on rails, temporary structures (e.g. exhibition structures) in so far as these are not supplied directly from the contact line system and are not endangered by the electric traction power supply system,

c) suspended cable cars,

d) funicular railways.

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

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

EN ISO 21857:2021, *Petroleum, petrochemical and natural gas industries - Prevention of corrosion on pipeline systems influenced by stray currents (ISO 21857:2021)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50122-1:2022 apply.

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

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

— IEC Electropedia: available at https://www.electropedia.org/

4 Identification of hazards and risks

DC electric traction power supply systems can cause stray currents, which can adversely affect railway infrastructure as well as third party structures, if the feed and return circuits are not sufficiently insulated from earth.

Where current leaves the structure through an electrolytic path such as concrete or soil the major effects of such stray currents can be corrosion. There is also the risk of overheating, arcing and fire and subsequent danger to persons and equipment both inside and outside the DC electric traction power supply system.

The following systems, which can produce stray currents, shall be considered:

— DC railways using running rails carrying the traction return current including track sections of other traction systems bonded to the tracks of DC railways;

— DC trolleybus systems which share the same power supply with a system using the running rails carrying the traction return current;

— DC railways not using running rails carrying the traction return current, where DC currents can flow to earth or earthing installations.

All components and systems which can be affected by stray currents shall be considered such as

— running rails,

— metallic pipe work,

— cables with metal armour and/or metal shield,

— metallic tanks,

— earthing installations,

— steel reinforced concrete structures and elements (e.g. bearers and slab track components),

— buried metallic structures,

— signalling and telecommunication installations,

— non-traction AC and DC power supply systems,

— cathodic protection installations.

Any provisions employed to control the effects of stray currents shall be checked, verified and validated according to this document.