
**Železniške naprave – Stabilne naprave električne vleke – Kontaktni vodniki
električne vleke**

Railway applications - Fixed installations - Electric traction overhead contact lines

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EUROPEAN STANDARD

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**Railway applications -
Fixed installations -
Electric traction overhead contact lines**

Applications ferroviaires -
Installations fixes -
Lignes aériennes de contact pour la
traction électrique

Bahnanwendungen -
Ortsfeste Anlagen -
Oberleitungen für den elektrischen
Zugbetrieb

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

This European Standard exists 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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 9XC, Electric supply and earthing systems for public transport equipment and ancillary apparatus (fixed installations), of the 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 50119 on 2000-11-01.

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) 2002-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-11-01

Annexes designated “normative” are part of the body of the standard. Annexes designated “informative” are given for information only. In this standard, annexes A and B are normative.

This European Standard has been prepared under a mandate (M024) given to CENELEC by the European Commission and supports the Public Procurement Directive, 93/38/EEC.

References to definitions in IEC 60050-811 in clause 3 are included for user reference and in some cases may update or modify the current definition.

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1 Scope

This European Standard applies for the design and construction of electric traction overhead contact lines in railway and tramway applications (see clause 4).

The standard is intended to be used by the system designer for the new construction of electric traction overhead contact lines or for the complete transformation of existing lines according to the client performance objectives. This document does not deal in detail with railway traction electrical supply systems or EMC requirements and is not applicable to feeders which are remote from the track.

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 within it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 50121-5		Railway applications - Electromagnetic compatibility Part 5: Emission and immunity of fixed power supply installations and apparatus
EN 50122	series	Railway applications – Fixed installations https://standards.iteh.ai/catalog/standards/sist/3e3fb1a0-ea70-405d-a541-1a1111111111
EN 50122-1		Railway applications - Fixed installations Part 1: Protective provisions relating to electrical safety and earthing
EN 50123	series	Railway applications - Fixed installations - DC switchgear
EN 50124	series	Railway applications - Insulation coordination
EN 50124-1		Railway applications - Insulation coordination Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment
EN 50125-1		Railway applications - Environmental conditions for fixed installations Part 1: Equipment on board rolling stock
EN 50149		Railway applications - Fixed installations - Electric traction - Copper and copper alloy grooved contact wires
EN 50152	series	Railway applications - Fixed installations - Particular requirements for a.c. switchgear
EN 50163		Railway applications - Supply voltages of traction systems
EN 60099	series	Surge arresters
EN 60168	1994	Tests on indoor and outdoor post insulators of ceramic material or glass for systems with a nominal voltage greater than 1 000 V (IEC 60168:1994)

EN 60383	series	Insulators for overhead lines with a nominal voltage above 1 kV (IEC 60383 series)
EN 60507		Artificial pollution tests on high-voltage insulators to be used on a.c. systems
EN 60672	series	Ceramic and glass insulating materials
EN 61325		Insulators for overhead lines with a nominal voltage above 1 kV - Ceramic or glass insulator units for d.c. systems - Definitions, test methods and acceptance criteria
IEC 60050-466		International electrotechnical vocabulary — Chapter 466: Overhead lines
IEC 60050-811		International electrotechnical vocabulary — Chapter 811: Electric traction
IEC 61109		Composite insulators for a.c. overhead lines with a nominal voltage greater than 1 000 V — Definitions, test methods and acceptance criteria.
IEC 61245		Artificial pollution tests on high-voltage insulators to be used on d.c. systems

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3 Definitions

For the purposes of this European Standard the following definitions apply:

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3.1 Systems

3.1.1

overhead contact line system (OCS)

supporting network for supplying electrical energy to electromotive power units

NOTE The system may include all overhead wiring, including the catenaries, the grooved contact wires and return wires, earth wires, lightning protection wires, line feeders and reinforcing feeders mounted on the supports, overhead conductor rails, foundations and supporting structures and components, terminating, supporting, registering or insulating the conductor equipment and switching, detecting or protecting equipment.

3.1.2

overhead contact line

[IEC 60050-811, definition 811-33-02]

contact line placed above (or beside) the upper limit of the vehicle gauge and supplying vehicles with electric energy through roof-mounted current collection equipment

3.1.3

contact line

[IEC 60050-811, definition 811-33-01]

conductor system for supplying electric energy to vehicles through current-collecting equipment

3.1.4

overhead line

[IEC 60050-466, definition 466-01-01]

an electric line whose conductors are supported above ground, generally by means of insulators and appropriate supports.

NOTE Certain overhead lines may also be constructed with insulated conductors

3.1.5

overhead contact line with catenary suspension

[IEC 60050-811, definition 811-33-05]

overhead contact line where the grooved contact wire or wires are suspended from one or more longitudinal catenaries

NOTE Longitudinal suspension is an equivalent term to catenary suspension.

3.1.6

load gauge, static

maximum cross-sectional profile of the vehicles using the railway line

3.1.7

kinematic load gauge

static load gauge enlarged to allow for dynamic movements of the vehicle, e.g. suspension travel and bounce

3.1.8

kinematic envelope

kinematic load gauge further enlarged to allow for possible tolerances in the position of the track

3.1.9

swept envelope

kinematic envelope enlarged to allow for centre and end throw of the vehicles on horizontal and vertical curves

3.1.10

neutral section

[IEC 60050-811, definition 811-36-16]

section of a contact line provided with a sectioning point at each end, to prevent successive electrical sections, differing in voltage or phase, being connected together by the passage of current collectors

3.1.11

insulated overlap

[IEC 60050-811, definition 811-36-14]

sectioning point formed by overlapping the ends of adjacent sections of contact lines, allowing parallel running, insulation being provided by a suitable air gap between the two sets of equipment

3.2 Conductors

3.2.1

contact wire

[IEC 60050-811, definition 811-33 15]

electric conductor of an overhead contact line with which the current collectors make contact

3.2.2

catenary

[IEC 60050-811, definition 811-33-06]

longitudinal wire supporting the grooved contact wire or wires either directly or indirectly

3.2.3

main catenary

[IEC 60050-811, definition 811-33-07]

catenary supporting an auxiliary catenary by means of droppers

3.2.4**auxiliary catenary**

[IEC 60050-811, definition 811-33-08]

catenary suspended from the main catenary and supporting the grooved contact wire or wires directly by means of droppers

3.2.5**stitch catenary suspension**

catenary suspension in which the contact wire is suspended by one or more droppers from a short continuous auxiliary wire, attached to the main catenary at one point on each side of the main catenary support

3.2.6**feeder**

electrical connection between the contact line and the substation or switching station

3.2.7**line feeder**

overhead conductor mounted on the same structure as the overhead contact line to supply successive feeding points

3.2.8**reinforcing feeder**

overhead conductor mounted adjacent to the overhead contact line, and directly connected to it at frequent intervals, in order to increase the effective cross-sectional area

3.2.9**return circuit**

all conductors which form the intended path for the traction return current

NOTE The conductors may be e.g. running rails, return conductor rails, return conductor earth wires, return cables.

3.2.10**return conductor**

[IEC 60050-811, definition 811-34-10]

any part of the return circuit

3.2.11**return conductor rail**

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

3.2.12**return cable**

insulated return conductor forming part of the return circuit and connecting the rest of the return circuit of the substation

3.2.13**conductor**

[IEC 60050-466, definition 466-01-15]

a metal wire or cable, either solid or stranded, designed to carry electrical energy and forming part of the overhead contact line system

3.2.14**earth wire**

[IEC 60050-811, definition 811-35-12]

wire connecting supports collectively to earth or the running rails to protect people and installations in case of insulation fault and which may also be used as a return conductor

3.3 Electrical

3.3.1

nominal voltage

voltage by which an installation or part of an installation is designated

NOTE The voltage of the contact line may differ from the nominal voltage by a quantity within permitted tolerances given in EN 50163.

3.3.2

feeding section

electrical section of the route fed by individual track feeder circuit breakers within the area supplied by the substation

3.3.3

earth

[IEC 60050-826, definition 826-04-01]

conductive mass of the earth, whose electric potential at any point is conventionally taken as equal to zero

3.3.4

fault current

maximum current passed through the overhead contact line under fault conditions, within a short defined time period, between live equipment and earth

3.3.5

short circuit

accidental or intentional conductive path between two or more points in a circuit forcing the voltages between these points to be relatively low. Any such conductive path whether between conductors or between conductor and earth is regarded as a short circuit

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3.3.6

short circuit current

electric current flowing through the short-circuit

3.3.7

continuous current rating

nominal rating capacity of the overhead contact line within the system operating parameters

3.3.8

stray current

current which follows paths other than the return circuit

3.3.9

feeding point

point at which the feeding system supply is connected to the contact line

3.3.10

isolation

disconnection of a section of overhead contact line from the source of electrical energy, either in an emergency or to facilitate maintenance

3.4 Mechanical

3.4.1

span

[IEC 60050-811, definition 811-33-40]

the overhead contact line from one support or suspension point to the next

3.4.2

tension length

length of overhead contact line between two anchoring points

3.4.3

gradient

ratio of the difference in height of the overhead contact line above rail level at two successive supports to the length of the span

3.4.4

stagger

[IEC 60050-811, definition 811-33-21]

displacement of the contact wire to opposite sides of the track centre at successive supports to avoid localised wear of the pantograph wearing strips

3.4.5

encumbrance

vertical distance from the lower face of the grooved contact wire to the middle of the catenary, measured at the support

NOTE System height is an equivalent term for encumbrance.

3.4.6

contact wire height

distance from the top of the rail to the lower face of the contact wire, measured perpendicular to the track

3.4.7

minimum contact wire height

a minimum value of the contact wire height in the span in order to avoid the arcing between one or more contact wires and the vehicles in all conditions

3.4.8

minimum design contact wire height

theoretical contact wire height including tolerances, designed to ensure that the minimum contact wire height is always achieved

3.4.9

nominal contact wire height

[UIC 606-1 leaflet]

a nominal value of the contact wire height at a support in the normal conditions

3.4.10

maximum design contact wire height

theoretical contact wire height including tolerances and uplift, which the pantograph is required to reach

3.4.11

contact wire uplift

vertical upward movement of the grooved contact wire due to the force produced from the pantograph

3.5 Support

3.5.1

support structure

[IEC 60050-811, definition 811-33-19]

parts which support the conductors and the associated insulators of an overhead contact line

3.5.2

mast

mainly vertical structure to provide for support, tensioning and registration of the overhead contact line

3.5.3

cantilever

support consisting of one or more transverse members projecting from a mast

3.5.4

cross-span, span wire

wire or cable, normally electrically insulated, placed across the track and used either to support one or more overhead contact lines (headspan), or to carry lateral registration force (cross-span registration)

3.5.5

foundation

construction, usually of concrete or steel completely or partly buried in the ground on which the support is mounted. The foundation shall provide stability to all loads carried by the support

3.6 Component

3.6.1

section insulator

[IEC 60050-811, definition 811-36-15]

sectioning point formed by insulators inserted in a continuous run of a contact line with skids or similar devices to maintain continuous current collection

3.6.2

dropper

[IEC 60050-811, definition 811-33-22 modified]

component used to suspend a cross-span registration, an auxiliary catenary or a contact wire from a headspan or a longitudinal catenary

3.6.3

tensioning device

[IEC 60050-811, definition 811-36-45]

arrangement enabling the mechanical tension of the conductors to be adjusted

NOTE Tensioning equipment and tensioner are equivalent terms for tensioning device.

3.6.4

automatic tensioning device

device used in tensioning equipment to automatically maintain constant the mechanical tension in the conductors within certain temperature limits

3.6.5

pull-off

form of supporting structure or registration assembly which only fixes the horizontal position (stagger) of the contact and catenary wires, and does not support their vertical load

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