IEC 60913

Edition 2.0 2013-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Railway applications – Fixed installations – Electric traction overhead contact lines

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

IEC 60913:2013

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

RAILWAY APPLICATIONS – FIXED INSTALLATIONS – ELECTRIC TRACTION OVERHEAD CONTACT LINES

FOREWORD

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International Standard IEC 60913 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This second edition cancels and replaces the first edition published in 1988. It constitutes a technical revision of the initial standard based on European standard EN 50119.

The main technical changes with regard to the previous edition deal with:

– fundamental design data,
– system requirements,
– structures,
– components requirements,
– testing

for overhead contact line design.

The text of this standard is based on the following documents:

FDIS	Report on voting
9/1745/FDIS	9/1773/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

RAILWAY APPLICATIONS – FIXED INSTALLATIONS – ELECTRIC TRACTION OVERHEAD CONTACT LINES

1 Scope

This International Standard applies to electric traction overhead contact line systems in heavy railways, light railways, trolley busses and industrial railways of public and private operators.

It applies to new installations of overhead contact line systems and for the complete reconstruction of existing overhead contact line systems.

This standard contains the requirements and tests for the design of overhead contact lines, requirements for structures and their structural calculations and verifications as well as the requirements and tests for the design of assemblies and individual parts.

This standard does not provide requirements for conductor rail systems where the conductor rails are located adjacent to the running rails.

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.

NOTE Normative references are made to ISO and IEC standards. For some necessary references, ISO and IEC standards do not exist. In these cases, references are made to European Standards which are normative for Europe according to EN 50119. For non-European countries these references are only informative and listed in the bibliography.

IEC 60050-811, *International Electrotechnical Vocabulary (IEV) – Chapter 811: Electric traction*

IEC 60071 (all parts), *Insulation co-ordination*

IEC 60099 (all parts), *Surge arresters*

IEC 60099-1, *Surge arresters – Part 1: Non-linear resistor type gapped surge arresters for a.c. systems*

IEC 60099-4, *Surge arresters – Part 4: Metal-oxide surge arresters without gaps for a.c. systems*

IEC 60168, *Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 1 000 V*

IEC 60273, *Characteristics of indoor and outdoor post insulators for systems with nominal voltages greather than 1 000 V*

IEC 60305, *Insulators for overhead lines with a nominal voltage above 1 000 V – Ceramic or glass insulator units for a.c. systems – Characteristics of insulator units of the cap and pin type*

IEC 60383 (all parts), *Insulators for overhead lines with nominal voltage above 1 000 V*

IEC 60433, *Insulators for overhead lines with a nominal voltage above 1 000 V – Ceramic insulators for a.c. systems – Characteristics of insulator units of the long rod type*

IEC 60494 (all parts), *Railway applications – Rolling stock – Pantographs – Characteristics and tests*

IEC 60494-1, *Railway applications – Rolling stock – Pantographs – Characteristics and tests – Part 1: Pantographs for mainline vehicles*

IEC 60494-2, *Railway applications – Rolling stock – Pantographs – Characteristics and tests – Part 2: Pantographs for metros and light rail vehicles*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60660, *Insulators – Tests on indoor post insulators of organic material for systems with nominal voltages greater than 1 000 V up to but not including 300 kV*

IEC 60672-1, *Ceramic and glass insulating materials – Part 1: Definitions and classification*

IEC 60672-2, *Ceramic and glass insulating materials – Part 2: Methods of test*

IEC 60672-3, *Ceramic and glass-insulating materials – Part 3: Specifications for individual materials*

IEC 60850, *Railway applications – Supply voltages of traction systems*

IEC 60889, *Hard-drawn aluminium wire for overhead line conductors*

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 61089, *Round wire concentric lay overhead electrical stranded conductors*

IEC 61109, *Insulators for overhead lines – Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1 000 V – Definitions, test methods and acceptance criteria*

IEC 61232, *Aluminium-clad steel wires for electrical purposes*

IEC/TR 61245, *Artificial pollution tests on high-voltage insulators to be used on d.c. systems*

IEC 61284:1997, *Overhead lines – Requirements and tests for fitting*

IEC 61325, *Insulators for overhead lines with a nominal voltage above 1 000 V – Ceramic or glass insulator units for d.c. systems – Definitons, test methods and acceptance criteria*

IEC 61773, *Overhead lines – Testing of foundations for structures*

IEC 61952, *Insulators for overhead lines – Composite line post insulators for a.c. systems with a nominal voltage greater than 1 000 V – Definitions, test methods and acceptance criteria*

IEC 61992 (all parts), *Railway applications – Fixed installations – DC switchgear*

IEC 61992-1, *Railway applications – Fixed installations – DC switchgear – Part 1: General*

IEC 61992-4, *Railway applications – Fixed installations – DC switchgear – Part 4: Outdoor d.c. disconnectors, switch-disconnectors and earthing switches*

IEC 61992-5, *Railway applications – Fixed installations – DC switchgear – Part 5: Surge arresters and low-voltage limiters for specific use in d.c. systems*

IEC 62128 (all parts), *Railway applications – Fixed installations*

IEC 62128-1:2003, *Railway applications – Fixed installations – Part 1: Protective provisions relating to electrical safety and earthing*

IEC 62128-2:2003, *Railway applications – Fixed installations – Part 2: Protective provisions against the effects of stray currents caused by d.c. traction systems*

IEC 62236-2:2008, *Railway applications – Electromagnetic compatibility (EMC) – Part 2: Emission of the whole railway system to the outside world*

IEC 62271-102, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*

IEC 62271-103:2011, *High-voltage switchgear and controlgear – Part 103: Switches for rated voltages above 1 kV up to and including 52 kV*

IEC 62486, *Railway applications – Current collection systems – Technical criteria for the interaction between pantograph and overhead line (to achieve free access)*

IEC 62497 (all parts), *Railway applications – Insulation coordination*

IEC 62497-1, *Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment*

IEC 62497-2, *Railway applications – Insulation coordination – Part 2: Overvoltages and related protection*

IEC 62498-2, *Railway applications – Environmental conditions for equipment – Part 2: Fixed electrical installations*

IEC 62505 (all parts), *Railway applications – Fixed installations – Particular requirements for a.c. switchgear*

IEC 62505-2, *Railway applications – Fixed installations – Particular requirements for a.c. switchgear – Part 2: Single-phase disconnectors, earthing switches and switches with U_n above 1 kV*

IEC 62621, *Railway applications – Fixed installations – Electric traction – Special requirements for composite insulators used for overhead contact line systems*

ISO 630 (all parts), *Structural steels*

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel – Part 1: Bolts, screws and studs with specified property classes – Coarse thread and fine pitch thread*

ISO 898-2:2012, *Mechanical properties of fasteners made of carbon steel and alloy steel – Part 2: Nuts with specified property classes – Coarse thread and fine pitch thread*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods*

ISO 2394, *General principles on reliability for structures*

ISO 3010:2001, *Basis for design of structures – Seismic actions on structures*

ISO 4354, *Wind actions on structures*

ISO 10721 (all parts), *Steel structures*

ISO/TR 11069:1995, *Aluminium structures – Material and design – Ultimate limit state under static loading*

ISO 14688-1, *Geotechnical investigation and testing – Identification and classification of soil – Part 1: Identification and description*

ISO 14688-2, *Geotechnical investigation and testing – Identification and classification of soil – Part 2: Principles for a classification*

ISO 14689-1, *Geotechnical investigation and testing – Identification and classification of rock – Part 1: Identification and description*

ISO/TS 17892 (all parts), *Geotechnical investigation and testing – Laboratory testing of soil*

ISO 22475-1, *Geotechnical investigation and testing – Sampling methods and groundwater measurements – Part 1: Technical principles for execution*

ISO 22476-2, *Geotechnical investigation and testing – Field testing – Part 2: Dynamic probing*

ISO 22476-3, *Geotechnical investigation and testing – Field testing – Part 3: Standard penetration test*

ISO 23469:2005, *Bases for design of structures – Seismic actions for designing geotechnical works*

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the terms and definitions given in IEC 60050-811 and the following apply.

3.1 Systems

3.1.1
contact line system
support network for supplying electrical energy from substations to electrically powered traction units, which covers overhead contact line systems and conductor rail systems; the electrical limits of the system are the feeding point and the contact point to the current collector

Note 1 to entry: The mechanical system may comprise

– the contact line,
– structures and foundations,
– supports and any components supporting or registering the conductors,
– head and cross-spans,
– tensioning devices,