SLOVENSKI STANDARD
SIST EN 61881-1:2011

01-april-2011

Nadomešča:
SIST EN 61881:2001

Železniške naprave - Oprema voznih sredstev - Kondenzatorji za močnostno elektroniko - 1. del: Zahteve, preskusi in splošne informacije (IEC 61881-1:2010)

Railway applications - Rolling stock equipment - Capacitors for power electronics - Part 1: Requirements, tests and general information (IEC 61881-1:2010)

Bahnanwendungen - Betriebsmittel auf Bahnfahrzeugen - Kondensatoren für Leistungselektronik - Teil 1: Papier-/Foliekondensatoren (IEC 61881-1:2010)

Applications ferroviaires - Matériel roulant - Condensateurs pour électronique de puissance - Partie 1: Exigences, essais et informations générales (CEI 61881-1:2010)

Ta slovenski standard je istoveten z: **EN 61881-1:2011**

ICS:

31.060.70	Močnostni kondenzatorji	Power capacitors
45.040	Materiali in deli za železniško tehniko	Materials and components for railway engineering

SIST EN 61881-1:2011 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61881-1

February 2011

ICS 45.060

Supersedes EN 61881:1999

English version

Railway applications - Rolling stock equipment - Capacitors for power electronics - Part 1: Paper/plastic film capacitors

(IEC 61881-1:2010)

Applications ferroviaires - Matériel roulant - Condensateurs pour électronique de puissance - Partie 1: Condensateurs papier et film plastique (CEI 61881-1:2010)

Bahnanwendungen - Betriebsmittel auf Bahnfahrzeugen - Kondensatoren für Leistungselektronik - Teil 1: Papier-/Foliekondensatoren (IEC 61881-1:2010)

This European Standard was approved by CENELEC on 2011-01-02. 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.

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.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 9/1405/FDIS, future edition 1 of IEC 61881-1, prepared by IEC TC 9, Electrical equipment and systems for railways, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61881-1 on 2011-01-02.

This European Standard supersedes EN 61881:1999.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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)	2011-10-02
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-01-02

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61881-1:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60077-1:1999	NOTE	Harmonized as EN 60077-1:2002 (modified).
IEC 60077-2:1999	NOTE	Harmonized as EN 60077-2:2002 (modified).
IEC 60110-1:1998	NOTE	Harmonized as EN 60110-1:1998 (not modified).
IEC 60146-1-1:2009	NOTE	Harmonized as EN 60146-1-1:2009 (not modified).
IEC 60384-14:2005	NOTE	Harmonized as EN 60384-14:2005 (not modified).
IEC 60664-1:2007	NOTE	Harmonized as EN 60664-1:2007 (not modified).
IEC 60831-1:1996	NOTE	Harmonized as EN 60831-1:1996 (not modified).
IEC 60831-2:1995	NOTE	Harmonized as EN 60831-2:1996 (not modified).
IEC 60871-1:2005	NOTE	Harmonized as EN 60871-1:2005 (not modified).
IEC 60931-1:1996	NOTE	Harmonized as EN 60931-1:1996 (not modified).
IEC 60931-2:1995	NOTE	Harmonized as EN 60931-2:1996 (not modified).
IEC 61071	NOTE	Harmonized as EN 61071.
IEC 61287-1:2005	NOTE	Harmonized as EN 61287-1:2006 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-20	-	Environmental testing - Part 2-20: Tests - Test T: Test methods for solderability and resistance to soldering heat of devices with leads	EN 60068-2-20	-
IEC 60068-2-21	-	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN 60068-2-21	-
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60269-1	-	Low-voltage fuses - Part 1: General requirements	EN 60269-1	-
IEC 60695-2-11	-	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	-
IEC 60695-11-5	-	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	-
IEC 60721-3-5	-	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 5: Ground vehicle installations	EN 60721-3-5	-
IEC 61373	-	Railway applications - Rolling stock equipment - Shock and vibration tests	EN 61373	-
IEC 62491	-	Industrial systems, installations and equipment and industrial products - Labelling of cables and cores	EN 62491	-
IEC 62497-1	-	Railway applications - Insulation coordination - Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment	-	-

IEC 61881-1

Edition 1.0 2010-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Railway applications – Rolling stock equipment – Capacitors for power electronics – Part 1: Paper/plastic film capacitors

Applications ferroviaires – Matériel roulant – Condensateurs pour électronique de puissance – Partie 1: Condensateurs papier et film plastique

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

RAILWAY APPLICATIONS – ROLLING STOCK EQUIPMENT – CAPACITORS FOR POWER ELECTRONICS –

Part 1: Paper/plastic film capacitors

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61881-1 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

IEC 61881-1 cancels and replaces IEC 61881 (1999).

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

FDIS	Report on voting
9/1405/FDIS	9/1454/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 – ROLLING STOCK EQUIPMENT – CAPACITORS FOR POWER ELECTRONICS –

Part 1: Paper/plastic film capacitors

1 Scope

This part of IEC 61881 applies to capacitors for power electronics intended to be used on rolling stock.

The rated voltage of capacitors covered by this part is limited to 10 000 V.

The operating frequency of the systems in which these capacitors are used is usually up to 15 kHz, while the pulse frequencies may be up to 5 to 10 times the operating frequency.

It distinguishes between AC and DC capacitors.

They are considered as components mounted in enclosures.

NOTE This standard covers an extremely wide range of capacitor technologies for numerous applications: overvoltage protection, DC and AC filtering, switching circuits, DC energy storage, auxiliary inverters, etc.

Examples are given in Clause 9.

The following are excluded from this standard:

– capacitors for induction heat-generating plants operating at frequencies between 40 Hz and 24 000 Hz (see IEC 60110-1 and 60110-2);
– capacitors for motor applications and the like (see IEC 60252-1 and IEC 60252-2);
– capacitors to be used in circuits for blocking one or more harmonics in power supply networks;
– small AC capacitors as used for fluorescent and discharge lamps (see IEC 61048 and IEC 61049);
– capacitors for suppression of radio interference (see IEC 60384-14);
– shunt capacitors for AC power systems having a rated voltage above 1 000 V (see IEC 60871-1 and IEC 60871-2);
– shunt power capacitors of the self-healing type for AC systems having a rated voltage up to and including 1 000 V (see IEC 60831-1 and IEC 60831-2);
– shunt power capacitor of the non self-healing type for AC systems having a rated voltage up to and including 1 000 V (see IEC 60931-1 and IEC 60931-2);
– series capacitors for power systems (see IEC 60143-1, IEC 60143-2 and IEC 60143-3);
– coupling capacitors and capacitors dividers (see IEC 60358);
– capacitors for applications requiring energy storage/high current discharge such as photocopiers and lasers;
– capacitors for microwave ovens;
– capacitors for power electronics (see IEC 61071).

2 Normative references

The following referenced documents are indispensable for the application 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.

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests. Test N: Change of temperature*

IEC 60068-2-20, *Environmental testing – Part 2-20: Tests. Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-21, *Environmental testing – Part 2-21: Tests. Test U: Robustness of terminations and integral mounting devices*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests. Test Cab: Damp heat, steady state*

IEC 60269-1, *Low-voltage fuses – Part 1: General requirements*

IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

IEC 60695-11-5, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60721-3-5, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 5: Ground vehicles installations*

IEC 61373, *Railway applications – Rolling stock equipment – Shock and vibration tests*

IEC 62491, *Industrial systems, installations and equipment and industrial products – Labelling of cables and cores*

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

3 Terms and definitions

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

3.1
capacitor element (or element)
indivisible part of a capacitor consisting of two electrodes separated by a dielectric

3.2
capacitor unit (or unit)
assembly of one or more capacitor elements in the same case with terminals brought out

3.3
capacitor bank
assembly of two or more capacitor units, electrically connected to each other

3.4
capacitor
general term used when it is not necessary to state whether reference is made to an element, a unit or a capacitor bank

3.5
capacitor equipment
assembly of capacitor units and their accessories intended for connection to a network

3.6
capacitor for power electronics
power capacitor intended to be used in power electronic equipment and capable of operating continuously under sinusoidal and non sinusoidal current and voltage

3.7
metal-foil capacitor (non self-healing)
capacitor in which the electrodes usually consist of metal foils separated by a dielectric, in the event of a breakdown of the dielectric; the capacitor does not restore itself

3.8
self-healing metallized dielectric capacitor
capacitor, the electrodes of which are metallized (usually by evaporation); in the event of dielectric breakdown, the capacitor restores itself

3.9
AC capacitor
capacitor essentially designed for operation with alternating voltage

NOTE AC capacitors may be used with DC voltage up to the rated voltage only when authorized by the capacitor manufacturer.

3.10
DC capacitor
capacitor essentially designed for operation with direct voltage

NOTE DC capacitors may be used with a specified AC voltage only where authorized by the capacitor manufacturer.

3.11
model capacitor
smaller unit which simulates a complete unit or element in an electrical test, without reducing the severity of the electrical, thermal or mechanical conditions

NOTE The combined sum of stresses should always be considered, for instance the sum of temperature, mechanical conditions and electrical stresses.

3.12
internal (element) fuse
device incorporated in the capacitor which disconnects an element or a group of elements in the event of breakdown

3.13
safety devices

3.13.1
overpressure disconnector
disconnecting device inside a capacitor, designed to interrupt the current path in case of capacitor failure

3.13.2
overpressure detector
device designed to detect abnormal increase of the internal pressure by an electrical switch/signal and indirectly interrupt the current path