



**NSAI**  
Standards

Irish Standard  
I.S. EN 61881-1:2011

Railway applications - Rolling stock  
equipment - Capacitors for power  
electronics -- Part 1: Paper/plastic film  
capacitors (IEC 61881-1:2010 (EQV))

## I.S. EN 61881-1:2011

*Incorporating amendments/corrigenda issued since publication:*

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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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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.

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## 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).

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## 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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	-	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

**Part 1: Paper/plastic film capacitors**

FOREWORD

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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).

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