



**NSAI**  
Standards

Irish Standard  
I.S. EN 61881-3:2012

Railway applications - Rolling stock  
equipment - Capacitors for power  
electronics -- Part 3: Electric double-  
layer capacitors (IEC 61881-3:2012  
(EQV))

## I.S. EN 61881-3:2012

*Incorporating amendments/corrigenda issued since publication:*

EN 61881-3:2012/A1:2013

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SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

|  |  |   |
|--|--|---|
| <i>This document replaces:</i>   | <i>This document is based on:</i><br>EN 61881-3:2012                           | <i>Published:</i><br>28 September, 2012                                   |
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**Railway applications -  
Rolling stock equipment -  
Capacitors for power electronics -  
Part 3: Electric double-layer capacitors  
(IEC 61881-3:2012/A1:2013)**

Applications ferroviaires -  
Matériel roulant -  
Condensateurs pour électronique  
de puissance -  
Partie 3: Condensateurs électriques  
à double couche  
(CEI 61881-3:2012/A1:2013)

Bahnanwendungen -  
Betriebsmittel auf Bahnfahrzeugen -  
Kondensatoren für Leistungselektronik -  
Teil 3: Doppelschichtkondensatoren  
(IEC 61881-3:2012/A1:2013)

This amendment A1 modifies the European Standard EN 61881-3:2012; it was approved by CENELEC on 2013-10-21. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

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This amendment 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 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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document 9/1819/FDIS, future IEC 61881-3:2012/A1, prepared by IEC/TC 9 "Electrical equipment and systems for railways" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61881-3:2012/A1:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-07-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-10-21

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## Endorsement notice

The text of the International Standard IEC 61881-3:2012/A1:2013 was approved by CENELEC as a European Standard without any modification.

In the Bibliography of EN 61881-3:2012, the following note has to be **added** for the standard indicated:

IEC 60529          NOTE          Harmonized as EN 60529.

EUROPEAN STANDARD

**EN 61881-3**

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2012

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ICS 45.060

English version

**Railway applications -  
Rolling stock equipment -  
Capacitors for power electronics -  
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Teil 3: Doppelschichtkondensatoren  
(IEC 61881-3:2012)

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CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

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## Foreword

The text of document 9/1680/FDIS, future edition 1 of IEC 61881-3, prepared by IEC/TC 9, "Electrical equipment and systems for railways" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61881-3:2012.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-06-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-09-12

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## Endorsement notice

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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 60384-1:2008 | NOTE | Harmonized as EN 60384-1:2009 (not modified). |
| IEC 60664-1:2007 | NOTE | Harmonized as EN 60664-1:2007 (not modified). |
| IEC 61287-1:2005 | NOTE | Harmonized as EN 61287-1:2006 (not modified). |
| IEC 61881-1:2010 | NOTE | Harmonized as EN 61881-1:2011 (not modified). |
| IEC 61881-2      | NOTE | Harmonized as EN 61881-2.                     |

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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 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 60068-1<br>+ corr. October<br>+ A1 | 1988<br>1988<br>1992 | Environmental testing -<br>Part 1: General and guidance   | EN 60068-1<br>- <sup>1)</sup> | 1994<br>-   |
| IEC 60068-2-14                         | 2009                 | Environmental testing -<br>Part 2-14: Tests - Test N: Change of<br>temperature  | EN 60068-2-14                 | 2009        |
| IEC 60068-2-17                         | 1994                 | Environmental testing -<br>Part 2: Tests - Test Q: Sealing  | EN 60068-2-17                 | 1994        |
| IEC 60068-2-20                         | -                    | Environmental testing -<br>Part 2-20: Tests - Test T: Test methods for<br>solderability and resistance to soldering heat<br>of devices with leads                                 | EN 60068-2-20                 | -           |
| IEC 60068-2-21                         | -                    | Environmental testing -<br>Part 2-21: Tests - Test U: Robustness of<br>terminations and integral mounting devices   | EN 60068-2-21                 | -           |
| IEC 60068-2-78                         | -                    | Environmental testing -<br>Part 2-78: Tests - Test Cab: Damp heat,<br>steady state  | EN 60068-2-78                 | -           |
| IEC 60571<br>+A1                       | 1998<br>2006         | Electronic equipment used on rail vehicles  | -                             | -           |
| IEC 60721-3-5                          | -                    | Classification of environmental conditions -<br>Part 3: Classification of groups of<br>environmental parameters and their severities<br>- Section 5: Ground vehicle installations | EN 60721-3-5                  | -           |
| IEC 61373<br>+ corr. October           | 2010<br>2011         | Railway applications - Rolling stock<br>equipment - Shock and vibration tests   | EN 61373                      | 2010        |
| IEC 62236-3-2                          | -                    | Railway applications - Electromagnetic<br>compatibility -<br>Part 3-2: Rolling stock - Apparatus  | -                             | -           |
| IEC 62391-1                            | 2006                 | Fixed electric double-layer capacitors for use<br>in electronic equipment -<br>Part 1: Generic specification  | EN 62391-1                    | 2006        |
| IEC 62391-2                            | 2006                 | Fixed electric double-layer capacitors for use<br>in electronic equipment -<br>Part 2: Sectional specification - Electric<br>double-layer capacitors for power application        | EN 62391-2                    | 2006        |
| IEC 62497-1                            | -                    | Railway applications - Insulation coordination --<br>Part 1: Basic requirements - Clearances and<br>creepage distances for all electrical and<br>electronic equipment             | -                             | -           |

<sup>1)</sup> EN 60068-1 includes A1 to IEC 60068-1+ corr. October .

**I.S. EN 61881-3:2012**

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| <u>Publication</u> | <u>Year</u> | <u>Title</u>   | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|--------------|-------------|
| IEC 62498-1        | 2010        | Railway applications - Environmental   | -            | -           |
| + corr. November   | 2010        | conditions for equipment -<br>Part 1: Equipment on board rolling stock   |              |             |
| IEC 62576          | 2009        | Electric double-layer capacitors for use in<br>hybrid electric vehicles - Test methods for<br>electrical characteristics | EN 62576     | 2010        |



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

**Part 3: Electric double-layer 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 61881-3 has been prepared by subcommittee 9: Electrical equipment and systems for railways.

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

|             |                  |
|-------------|------------------|
| FDIS        | Report on voting |
| 9/1680/FDIS | 9/1708/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.

A list of all parts of IEC 61881 series, under the general title *Railway applications – Rolling stock equipment – Capacitors for power electronics*, can be found on the IEC website.

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 3: Electric double-layer capacitors

### 1 Scope

This part of IEC 61881 applies to d.c. electric double-layer capacitors (cell, module and bank) for power electronics intended to be used on rolling stock.

This standard specifies quality requirements and tests, safety requirements, and describes installation and operation information.

NOTE Example of the application for capacitors specified in this Standard; d.c. energy storage, etc.

Capacitors not covered by this Standard:

- IEC 61881-1: Paper/plastic film capacitors;
- IEC 61881-2: Aluminium electrolytic capacitors with non-solid electrolyte.

Guidance for installation and operation is given in Clause 9.

### 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.

IEC 60068-1:1988, *Environmental testing – Part 1: General and guidance*  
and Amendment 1:1992

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-17:1994, *Environmental testing – Part 2-17: Tests. Test Q: Sealing*

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 60571:1998, *Electronic equipment used on rail vehicles*  
and Amendment 1:2006

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

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