SLOVENSKI STANDARD
SIST EN 61701:2012

01-maj-2012

Nadomešča:
SIST EN 61701:2001

Korozijsko preskušanje fotonapetostnih (PV) modulov v slani megli (IEC 61701:2011)

Salt mist corrosion testing of photovoltaic (PV) modules

Salznebel-Korrosionsprüfung von photovoltaischen (PV-) Modulen

Essai de corrosion au brouillard salin des modules photovoltaïques (PV)

Ta slovenski standard je istoveten z: EN 61701:2012

ICS:

27.160	Sončna energija	Solar energy engineering

SIST EN 61701:2012 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61701

March 2012

ICS 27.160

Supersedes EN 61701:1999

English version

Salt mist corrosion testing of photovoltaic (PV) modules
(IEC 61701:2011)

Essai de corrosion au brouillard salin des modules photovoltaïques (PV)
(CEI 61701:2011)

Salznebel-Korrosionsprüfung von photovoltaischen (PV-)Modulen
(IEC 61701:2011)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre 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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61701:2012 E

Foreword

The text of document 82/668/FDIS, future edition 2 of IEC 61701, prepared by IEC TC 82, "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61701:2012.

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)	2012-10-19
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2015-01-19

This document supersedes EN 61701:1999.

EN 61701:2012 includes the following significant technical changes with respect to EN 61701:1999:

— The scope has been updated to better reflect the applicability of the standard.

— Salt mist test is based on EN 60068-2-52 rather than EN 60068-2-11 as in EN 61701:1999 since the former standard is much more widely used in the electronic component field. According to this change EN 61701:2012 includes a cycling testing sequence that combines in each cycle a salt fog exposure followed by humidity storage under controlled temperature and relative humidity conditions. This testing sequence is more suitable to reflect the corrosion processes that happen in PV modules subjected to permanent or temporary corrosive atmospheres (NaCl). In EN 61701:1999 only a salt fog exposure was considered.

— Additional tests have also been included to verify the effect of the salt mist test not only in the PV module output but also in some of its components.

— Different testing sequences are considered depending on the PV module technology involved: crystalline silicon, thin-film and concentrator photovoltaic (CPV) modules.

— A test report clause has also been included.

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Endorsement notice

The text of the International Standard IEC 61701:2011 was approved by CENELEC as a European Standard without any modification.

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.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-52	-	Environmental testing - Part 2: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	EN 60068-2-52	-
IEC 61215	2005	Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval	EN 61215	2005
IEC 61646	2008	Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval	EN 61646	2008
IEC 61730-2 (mod)	2004	Photovoltaic (PV) module safety qualification - Part 2: Requirements for construction	EN 61730-2	2007
IEC 62108	2007	Concentrator Photovoltaic (CPV) modules and assemblies - Design qualification and type approval	EN 62108	2008
ISO/IEC 17025	-	General requirements for the competence of testing and calibration laboratories	EN ISO/IEC 17025	-

IEC 61701

Edition 2.0 2011-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Salt mist corrosion testing of photovoltaic (PV) modules

Essai de corrosion au brouillard salin des modules photovoltaïques (PV)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX N

ICS 27.160

ISBN 978-2-88912-840-2

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SALT MIST CORROSION TESTING OF PHOTOVOLTAIC (PV) MODULES

FOREWORD

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International Standard IEC 61701 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

This second edition cancels and replaces the first edition issued in 1995. This edition constitutes a technical revision.

The main technical changes with respect to the previous edition are as follows:

The scope has been updated to better reflect the applicability of the Standard.

Salt mist test is based on IEC 60068-2-52 rather than IEC 60068-2-11 as in edition 1 since the former Standard is much more widely used in the electronic component field. According to this change the new edition 2 includes a cycling testing sequence that combines in each cycle a salt fog exposure followed by humidity storage under controlled temperature and relative humidity conditions. This testing sequence is more suitable to reflect the corrosion processes that happen in PV modules subjected to permanent or temporary corrosive atmospheres (NaCl). In edition 1 only a salt fog exposure was considered.

Additional tests have also been included to verify the effect of the salt mist test not only in the PV module output but also in some of its components.

Different testing sequences are considered depending on the PV module technology involved: crystalline silicon, thin-film and concentrator photovoltaic (CPV) modules.

A test report clause has also been included.

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

FDIS	Report on voting
82/667/FDIS	82/681/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.

SALT MIST CORROSION TESTING OF PHOTOVOLTAIC (PV) MODULES

1 Scope and object

Photovoltaic (PV) modules are electrical devices intended for continuous outdoor exposure during their lifetime. Highly corrosive wet atmospheres, such as marine environments, could eventually degrade some of the PV module components (corrosion of metallic parts, deterioration of the properties of some non-metallic materials - such as protective coatings and plastics - by assimilation of salts, etc.) causing permanent damages that could impair their functioning. Temporary corrosive atmospheres are also present in places where salt is used in winter periods to melt ice formations on streets and roads.

This Standard describes test sequences useful to determine the resistance of different PV modules to corrosion from salt mist containing Cl^- (NaCl, $MgCl_2$, etc.). All tests included in the sequences, except the bypass diode functionality test, are fully described in IEC 61215, IEC 61646, IEC 62108, IEC 61730-2 and IEC 60068-2-52. They are combined in this Standard to provide means to evaluate possible faults caused in PV modules when operating under wet atmospheres having high concentration of dissolved salt (NaCl). Depending on the specific nature of the surrounding atmosphere to which the module is exposed in real operation several testing severities can be applied, as defined in IEC 60068-2-52. For example severity (1) is intended to be used for PV modules used in a marine environment, or in close proximity to the sea. Severities (3) to (6) are intended for PV modules operating in locations where there could be a change between salt-laden and dry atmospheres, for examples in places where salt is used to melt ice formations. Severity (2) is not suitable for PV modules as testing conditions are too weak (this severity is originally intended for products exposed to corrosive environments from time to time that are normally protected by an enclosure) and should be avoided when applying this Standard.

This Standard can be applied to both flat plate PV modules and concentrator PV modules and assemblies.

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 60068-2-52, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 61215:2005, *Crystalline silicon terrestrial photovoltaic (PV) modules – Design qualification and type approval*

IEC 61646:2008, *Thin-film terrestrial photovoltaic (PV) modules – Design qualification and type approval*

IEC 61730-2:2004, *Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing*

IEC 62108:2007, *Concentrator photovoltaic (CPV) modules and assemblies – Design qualification and type approval*