SLOVENSKI STANDARD

SIST EN 62093:2005

november 2005

Sistemska tehnika fotonapetostnih sistemov - Ocena zasnove za naravna okolja (IEC 62093:2005)

Balance-of-system components for photovoltaic systems – Design qualification natural environments (IEC 62093:2005)

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SIST EN 62093:2005(en)

EUROPEAN STANDARD **EN 62093**

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English version

Balance-of-system components for photovoltaic systems – Design qualification natural environments
(IEC 62093:2005)

Composants BOS des systèmes photovoltaïques – Qualification et essais d'environnement (CEI 62093:2005)

BOS-Bauteile für photovoltaische Systeme – Bauarteignung natürliche Umgebung (IEC 62093:2005)

This European Standard was approved by CENELEC on 2005-04-01. 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.

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

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

The text of document 82/374/FDIS, future edition 1 of IEC 62093, prepared by IEC TC 82, Solar photovoltaic energy systems, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62093 on 2005-04-01.

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)	2006-01-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2008-04-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62093:2005 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 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 Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60068-1	- [1)]	Environmental testing Part 1: General and guidance	EN 60068-1	1994 [2)]
IEC 60068-2-6	- [1)]	Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995 [2)]
IEC 60068-2-21	- [1)]	Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN 60068-2-21	1999 [2)]
IEC 60068-2-27	- [1)]	Part 2: Tests - Test Ea and guidance: Shock	EN 60068-2-27	1993 [2)]
IEC 60068-2-30	- [1)]	Part 2: Tests - Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)	EN 60068-2-30	1999 [2)]
IEC 60068-2-75	- [1)]	Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	1997 [2)]
IEC 60068-2-78	- [1)]	Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	2001 [2)]
IEC 60068-3-6	- [1)]	Part 3-6: Supporting documentation and guidance - Confirmation of the performance of temperature/humidity chambers	EN 60068-3-6	2002 [2)]
IEC 60410	- [1)]	Sampling plans and procedures for inspection by attributes	-	-
IEC 60529	- [1)]	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 [2)] 1993
IEC 60721-2-1	- [1)]	Classification of environmental conditions Part 2: Environmental conditions appearing in nature - Temperature and humidity	HD 478.2.1 S1	1989 [2)]

1) Undated reference.

2) Valid edition at date of issue.

Publication	Year	Title	EN/HD	Year
IEC 60904-3	1989	Photovoltaic devices Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data	EN 60904-3	1993
IEC 61215	- [1)]	Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval	EN 61215	2005 [2)]
IEC 61345	- [1)]	UV test for photovoltaic (PV) modules	EN 61345	1998 [2)]
IEC 61427	2005	Secondary cells and batteries for photovoltaic energy systemes (PVES) - General requirements and methods of test	EN 61427	- [3)]
IEC 61646	- [1)]	Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval	EN 61646	1997 [2)]
IEC 61683	- [1)]	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency	EN 61683	2000 [2)]
IEC 62262	- [1)]	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)	EN 62262	2002 [2)]
ISO/IEC 17025	- [1)]	General requirements for the competence of testing and calibration laboratories	EN ISO/IEC 17025	2000 [2)]

3) To be published.

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Composants BOS des systèmes photovoltaïques – Qualification et essais d'environnement

Balance-of-system components for photovoltaic systems – Design qualification natural environments

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For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

BALANCE-OF-SYSTEM COMPONENTS FOR PHOTOVOLTAIC SYSTEMS – DESIGN QUALIFICATION NATURAL ENVIRONMENTS

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 62093 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

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

FDIS	Report on voting
82/374/FDIS	82/380/RVD

Full information on the voting for approval 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 maintenance result 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.

BALANCE-OF-SYSTEM COMPONENTS FOR PHOTOVOLTAIC SYSTEMS – DESIGN QUALIFICATION NATURAL ENVIRONMENTS

1 Scope and object

This International Standard establishes requirements for the design qualification of balance-of-system (BOS) components used in terrestrial photovoltaic (PV) systems. This standard is suitable for operation in indoor, conditioned or unconditioned; or outdoor in general open-air climates as defined in IEC 60721-2-1, protected or unprotected. It is written for dedicated solar components such as batteries, inverters, charge controllers, system diode packages, heat sinks, surge protectors, system junction boxes, maximum power point tracking devices and switch gear, but may be applicable to other BOS system components.

This standard is based on that which is specified in IEC 61215 and IEC 61646 for the design qualification of PV modules. However, changes have been made to account for the special features of the balance-of-system components, and to add different levels of severity for the different service environments. Dust, fungus, insects, shipping vibration and shock, and protection class have been added to the appropriate environmental categories. The high and low temperature and humidity limits have also been modified for the appropriate service environments.

This standard does not apply to photovoltaic modules. These are covered by IEC 61215 or IEC 61646. Also, this standard does not apply to concentrator modules or to complete PV systems. Specific electrical safety aspects are not part of this standard.

This standard is applicable to lead-acid and nickel-cadmium cells and batteries. Other electrochemical storage systems will be included when they become available.

The object of this test sequence is to determine the performance characteristics of each BOS components and to show, as far as possible within reasonable constraints of cost and time, that the component is capable of maintaining this performance after exposure to the simulated service natural environmental conditions for which it is intended to be applicable as specified by the manufacturer. The actual life expectancy of components so qualified will depend on their design, their environment and the system conditions under which they are operated.

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 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-6, *Environmental testing – Part 2: Tests – Test Fc: vibration (sinusoidal)*

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

IEC 60068-2-27, *Environmental testing – Part 2: Tests. Test Ea and guidance: Shock*

IEC 60068-2-30, *Environmental testing – Part 2: Tests. Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

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

IEC 60068-3-6, *Environmental testing – Part 3-6: Supporting documentation and guidance –* Confirmation *of the performance of temperature/ humidity chambers*

IEC 60410, *Sampling plans and procedures for inspection by attributes*

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

IEC 60721-2-1, *Classification of environmental conditions – Part 2-1: Environmental conditions appearing in nature – Temperature and humidity*

IEC 60904-3:1989, *Photovoltaic devices – Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data*

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

IEC 61345, *UV test for photovoltaic (PV) modules*

IEC 61427:2005, *Secondary cells and batteries for solar photovoltaic energy systems – General requirements and methods of test*

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

IEC 61683, *Photovoltaic systems – Power conditioners – Procedure for measuring efficiency*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Sampling

For qualification testing a quantity of at least three samples of a component (plus spares as desired) shall be taken at random from a production batch or batches, in accordance with the procedure given in IEC 60410. The components shall have been manufactured from specified materials and components in accordance with the relevant drawings and process sheets and shall have been subjected to the manufacturer's normal inspection, quality control and production acceptance procedures. The components shall be complete in every detail and shall be accompanied by the manufacturer's handling, mounting and connection instructions, including the maximum permissible system voltage.

In the case of items, for example wires and cables, that do not have previously defined measures, a sufficient amount for the testing purposes shall be taken at random from a production batch or batches, in accordance with the procedure given in IEC 60410.