

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Secondary cells and batteries for renewable energy storage – General requirements and methods of test –
Part 1: Photovoltaic off-grid application**

**Accumulateurs pour le stockage de l'énergie renouvelable – Exigences générales et méthodes d'essais –
Partie 1: Applications photovoltaïques hors réseaux**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SECONDARY CELLS AND BATTERIES FOR RENEWABLE ENERGY STORAGE – GENERAL REQUIREMENTS AND METHODS OF TEST –

Part 1: Photovoltaic off-grid application

FOREWORD

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International Standard IEC 61427-1 has been prepared by IEC technical committee 21: Secondary cells and batteries.

This first edition cancels and replaces the second edition of IEC 61427 published in 2005. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) a restructuration of the previous edition of the document;
- b) a clarification of the different clauses with regard to conditions of use, general requirements, functional characteristics, general tests conditions, test method and recommended use of tests, the aim being to ensure a better understanding by the end user;
- c) a clear distinction between on-grid and off-grid applications for future markets needs.

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

FDIS	Report on voting
21/793/FDIS	21/802/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 in the IEC 61427 series, published under the general title *Secondary cells and batteries for renewable energy storage – General requirements and methods of test*, 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

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SECONDARY CELLS AND BATTERIES FOR RENEWABLE ENERGY STORAGE – GENERAL REQUIREMENTS AND METHODS OF TEST –

Part 1: Photovoltaic off-grid application

1 Scope

This part of the IEC 61427 series gives general information relating to the requirements for the secondary batteries used in photovoltaic energy systems (PVES) and to the typical methods of test used for the verification of battery performances. This part deals with cells and batteries used in photovoltaic off-grid applications.

NOTE The part 2 of this series will cover cells and batteries used in “renewable energy storage in on-grid applications”.

This International Standard does not include specific information relating to battery sizing, method of charge or PVES design.

This standard is applicable to all types of secondary batteries.

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 60050 (all parts), *International Electrotechnical Vocabulary (IEV)* (available at <www.electropedia.org>)

IEC 60622, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Sealed nickel-cadmium prismatic rechargeable single cells*

IEC 60623, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells*

IEC 60896-11, *Stationary lead-acid batteries – Part 11: Vented types – General requirements and methods of test*

IEC 60896-21, *Stationary lead-acid batteries – Part 21: Valve regulated types – Methods of test*

IEC 61056-1, *General purpose lead-acid batteries (valve-regulated types) – Part 1: General requirements, functional characteristics – Methods of test*

IEC 61836, *Solar photovoltaic energy systems – Terms, definitions and symbols*

IEC 61951-1, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Portable sealed rechargeable single cells – Part 1: Nickel-cadmium*

IEC 61951-2, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Portable sealed rechargeable single cells – Part 2: Nickel-metal hydride*

IEC 61960, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for portable applications*

IEC 62259, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Nickel-cadmium prismatic secondary single cells with partial gas recombination*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-482 concerning secondary cells and batteries, and those given in IEC 61836 concerning photovoltaic generator systems apply.

4 Conditions of use

4.1 General

This clause specifies the particular operating conditions experienced by secondary batteries during their use in photovoltaic applications.

4.2 Photovoltaic energy system

The photovoltaic energy system with secondary batteries referred to in this standard can supply a constant, variable, or intermittent energy to the connected equipment (pumps, refrigerators, lighting systems, communication systems, etc.).

4.3 Secondary cells and batteries

Secondary cells and batteries mainly used in photovoltaic energy systems are of the following types:

- a) vented (flooded);
- b) valve-regulated, including those with partial gas recombination;
- c) gastight sealed.

The cells and batteries are normally delivered in the following state of charge:

- d) discharged and drained (vented nickel-cadmium batteries only);
- e) charged and filled;
- f) dry charged and unfilled (vented lead-acid batteries only);
- g) discharged and filled (nickel-cadmium batteries only).

For optimum service life, the battery manufacturer's instructions for initial charge of the battery shall be followed.

Other secondary cells and batteries such as based on sodium or vanadium electrochemical systems can be potentially used for such an application. Due to the fact that they are in a phase of adaptation for a possible use in PV systems, it is recommended that their respective supplier be contacted for the necessary planning, test and operation details.