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Renewable energy off-grid systems -
Part 341: Selection of batteries and battery management systems for stand-alone electrification systems - Specific case of automotive flooded lead-acid batteries available in developing countries

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Renewable energy off-grid systems - Part 341: Selection of batteries and battery management systems for stand-alone electrification systems - Specific case of automotive flooded lead-acid batteries available in developing countries

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IEC TS 62257-341 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems. It is a Technical Specification.

This first edition cancels and replaces the second edition of IEC TS 62257-8-1 published in 2018. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 62257-8-1:2018:

a) increase of the applicable voltage levels and removal of the 100 kW power limit;
b) removal of the word "small" from the description of these systems.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
82/2562/DTS	82/2602/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62257 series, published under the title *Renewable energy off-grid systems*, can be found on the IEC website.

Future documents in this series will carry the new general title as cited above. Titles of existing documents in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

INTRODUCTION

The IEC 62257 series provides technical standardization to different stakeholders (including but not limited to project developers, financing agencies, testing agencies, installers) involved in electrification projects for access to electricity for those not solely connected to the regional grid, through the setting up of off-grid renewable energy and hybrid systems (including micro-grids) with a voltage less than or equal to 1 000 V for AC (alternating current) or a voltage less than or equal to 1 500 V for DC (direct current).

Access to electricity is one of the predominant policy actions designed to increase the well-being of populations, together with access to clean water, improved healthcare, education, personal advancement and economic development. Increasing access to electricity through utilization of renewable off-grid electricity also directly or indirectly supports various United Nations sustainability development goals [1][1], depending on the application.

Several strategies can be adopted to implement electrification and improve access to electricity in rural and urban settings, including the ability for connection to a national or regional electricity grid. The IEC 62257 series applies to cases where the utility grid is too far away or incapable to support load, the individual demand centres are too small to make grid access economical: off-grid solutions provide an economical option, and where autonomous power systems can be used to supply these services.

The 62257 series is used to

a) choose the right solution for the right place with the optimal technology,

b) design, purchase and install the product(s) and system to optimal compliancy, and

c) operate and maintain the system.

The IEC 62257 Technical Specifications focus on enabling access to electricity to concentrate on, developing countries. This series shall not be considered as all-inclusive for access to electricity. That means that the Technical Specifications could be used for rural electrification, also for electrification of remote sites in developed countries, or any requirement for electricity access that cannot be met by attaching solely to the national utility grid. The documents promote the use of renewable energies also allowing other energy sources, such as diesel generators, to be included as part of a hybrid renewable energy off-grid system.

This consistent set of documents can be considered as a whole, with different parts focusing on specific aspects of renewable energy off-grid systems. However, several parts are intended to be read as stand-alone documents depending on their intended application. IEC TS 62257-100 provides an overview of the various topics covered by this series. Additionally, the content and scopes of individual documents, available at the website webstore.iec.ch, provide potential users with the intended application for each document. For further information on planned documents to be published under the new IEC 62257 numbering scheme, IEC TC 82 committee members can refer to the annex in the JWG1 Program of Work circulated after each JWG1 meeting, or to the Planned Work Programme on the www.iec.ch TC82 website.

One of the main objectives of this series is to provide the minimum sufficient recommendations, including items for safety, sustainability of systems and at the lowest life cycle cost, relevant to the renewable energy and hybrid off-grid systems fields of application.

The purpose of IEC TS 62257-341 is to propose tests for automotive lead-acid batteries and battery management systems used in small PV individual electrification systems. Future parts of the series will carry a three-digit numbering.

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[1] Numbers in square brackets refer to the Bibliography.

1 Scope

This part of IEC 62257, which is a Technical Specification, proposes simple, inexpensive, comparative tests to determine which types of flooded lead-acid automobile batteries are acceptable for use in PV electrification systems.

It could be particularly useful for project implementers to test in laboratories of developing countries the capability of locally made car or truck batteries to be used for their project.

The tests provided in this document allow assessment of the batteries' performances according to the general specification and batteries associated with their smart battery charging systems (SBCS) in a short time and with common technical means. They can be performed locally, as close as possible to the operating conditions of the real site.

The document also provides recommendations and installation conditions to ensure the life and proper operation of the installations as well as the safety of people living in proximity to the installation.

This document offers guidelines and does not replace any existing IEC Standard on batteries.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60050-482:2004, *International Electrotechnical Vocabulary - Part 482: Primary and secondary cells and* batteries
IEC 60050-482:2004/AMD1:2016
IEC 60050-482:2004//AMD2:2020

IEC TS 62257-6, *Recommendations for renewable energy and hybrid systems for rural electrification - Part 6: Acceptance, operation, maintenance and replacement*

ISO 7010, *Graphical symbols - Safety colours and safety signs - Registered safety signs*, available at https://www.iso.org/obp

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-482 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/
– ISO Online browsing platform: available at https://www.iso.org/obp

3.1
secondary cell
cell that is designed to be electrically recharged

Note 1 to entry: The recharge is accomplished by way of a reversible chemical reaction.

[SOURCE: IEC 60050-482:2004, 482-01-03]