



IEC TS 62257-9-6

Edition 2.0 2019-09
REDLINE VERSION

TECHNICAL SPECIFICATION



Recommendations for small Renewable energy and hybrid systems for rural electrification –
Part 9-6: Integrated system – Recommendations for selection of Photovoltaic Individual Electrification Systems (PV-IES)

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 27.160; 27.180

ISBN 978-2-8322-7454-5

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

RECOMMENDATIONS FOR SMALL RENEWABLE ENERGY AND HYBRID SYSTEMS FOR RURAL ELECTRIFICATION –

Part 9-6: Integrated systems – Recommendations for selection of Photovoltaic Individual Electrification Systems (PV-IES)

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The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62257-9-6, which is a technical specification, has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

This second edition of IEC TS 62257-9-6 cancels and replaces the first edition published in 2008. It constitutes a technical revision.

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

- Removal of the term "small" from the title of the publication and from description of rural electrification systems.
- Removal of the limits on system voltage and power; these recommendations apply to systems of all sizes.

This part of IEC 62257 is to be used in conjunction with the IEC 62257 series.

The text of this technical specification is based on the following documents:

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| Enquiry draft | Report on voting |
| 82/1279/DTS | 82/1533A/RVDTS |

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 62257 series, under the general title: *Renewable energy and hybrid systems for rural electrification*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The IEC 62257 series intends to provide ~~to~~ different players involved in rural electrification projects (such as project implementers, project contractors, project supervisors, installers, product suppliers, etc.) documents for ~~the~~ setting up ~~of~~ renewable energy and hybrid systems with a.c. voltage below ~~500 V, d.c. voltage below 750 V and power below 100 Kva~~ 1 000 V and d.c. voltage below 1 500 V.

These documents are recommendations:

- to choose the right system for the right place;
- to design the system;
- to ensure product quality and installation quality;
- to operate and maintain the system.

~~These documents are focused only on rural electrification concentrating on but not specific to developing countries. They must not be considered as all inclusive to rural electrification. The documents try to promote the use of renewable energies in rural electrification; they do not deal with clean mechanisms developments at this time (CO₂ emission, carbon credit, etc.). Further developments in this field could be introduced in future steps.~~

~~This consistent set of documents is best considered as a whole with different parts corresponding to items for safety, sustainability of systems and at the lowest life cycle cost as possible. One of the main objectives is to provide the minimum sufficient requirements, relevant to the field of application that is: small renewable energy and hybrid off-grid systems.~~

~~This document and the others of the IEC 62257 series are only guidance and so cannot be International Standards. Additionally their subject is still under technical development and so they shall be published as Technical Specifications.~~

These documents are focused on off-grid electricity access, concentrating on, but not limited to, areas with a significant fraction of the population living without reliable electric grid access. They should not be considered as providing complete coverage of all issues related to rural electrification.

This set of documents is best considered as a whole, with different parts covering topics such as safety, system design, product quality, installation and maintenance, and the sustainability of systems aiming at the lowest life cycle cost possible. One of the main objectives is to provide minimum requirements relevant to renewable energy and hybrid off-grid power systems.

RECOMMENDATIONS FOR SMALL RENEWABLE ENERGY AND HYBRID SYSTEMS FOR RURAL ELECTRIFICATION –

Part 9-6: Integrated systems – Recommendations for selection of Photovoltaic Individual Electrification Systems (PV-IES)

1 Scope

The purpose of this part of IEC 62257 is to propose simple selection procedure and cheap, comparative tests which can be performed in laboratories of developing countries, in order to identify the most suitable model of ~~small~~ Photovoltaic Individual Electrification Systems (PV-IES) up to 500 Wp for a particular rural electrification project from a number of products submitted for test.

It is different from the scope of IEC 62124, *Photovoltaic (PV) stand alone systems – Design verification*, which provides guidance for verifying the design of stand-alone PV systems and indoor and outdoor tests in order to evaluate the performance of PV systems including PV generator, battery storage and loads such as lights, TV sets, and refrigerators.

The tests provided in this document allow assessment of the performance of PV-IES according to the requirement of the General Specification (GS) of the project (see IEC TS 62257-2) and to verify their ability to provide the required service. They ~~should be~~ are performed locally, as close as possible to the real site operating conditions.

This document is not a type approval standard. It is a technical specification to be used as guidelines and does not replace any existing IEC standard on PV systems.

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

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

IEC 61730-1, *Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction*

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

IEC TS 62257-2:2004/2015, *Recommendations for ~~small~~ renewable energy and hybrid systems for rural electrification – Part 2: From requirements to a range of electrification systems*

IEC TS 62257-4, *Recommendations for ~~small~~ renewable energy and hybrid systems for rural electrification – Part 4: System selection and design*

IEC TS 62257-5, *Recommendations for ~~small~~ renewable energy and hybrid systems for rural electrification – Part 5: Protection against electrical hazards*

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

IEC TS 62257-7-1, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 7-1: Generators – Photovoltaic ~~arrays~~ generators*

IEC TS 62257-8-1:~~2007~~2018, *Recommendations for ~~small~~ renewable energy and hybrid systems for rural electrification – Part 8-1: Selection of batteries and battery management systems for stand-alone electrification systems – Specific case of automotive flooded lead-acid batteries available in developing countries*

IEC TS 62257-9-3, *Recommendations for ~~small~~ renewable energy and hybrid systems for rural electrification – Part 9-3: Integrated system – User interface*

IEC TS 62257-9-4, *Recommendations for ~~small~~ renewable energy and hybrid systems for rural electrification – Part 9-4: Integrated system – User installation*

IEC TS 62257-12-1, *Recommendations for ~~small~~ renewable energy and hybrid systems for rural electrification – Part 12-1: ~~Selection of self-ballasted lamps (CFL) for rural electrification systems and recommendations for household lighting equipment~~ Selection of lamps and lighting appliances for off-grid electricity systems*

TECHNICAL SPECIFICATION



**Renewable energy and hybrid systems for rural electrification –
Part 9-6: Integrated systems – Recommendations for selection of Photovoltaic
Individual Electrification Systems (PV-IES)**

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IEC TS 62257-9-4, *Recommendations for renewable energy and hybrid systems for rural electrification – Part 9-4: Integrated system – User installation*

IEC TS 62257-12-1, *Recommendations for renewable energy and hybrid systems for rural electrification – Part 12-1: Selection of lamps and lighting appliances for off-grid electricity systems*