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Renewable energy off-grid systems – Part 100: Overview of the IEC 62257 series

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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RENEWABLE ENERGY OFF-GRID SYSTEMS –

Part 100: Overview of the IEC 62257 series

FOREWORD

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IEC TS 62257-100 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems. It was developed in cooperation with other IEC technical committees and subcommittees dealing with renewable energies and related matters, namely IEC technical committee 21: Secondary cells and batteries, subcommittee 21A: Secondary cells and batteries containing alkaline or other non-acid electrolytes, IEC technical committee 64: Electrical installations and protection against electric shock, IEC technical committee 88: Wind energy generation systems. It is a Technical Specification.

This first edition of IEC TS 62257-100 cancels and replaces the third edition of IEC TS 62257-1 issued in 2015. It constitutes a major technical revision. This new edition of the introductory document transitions the entire series to a 3-digit numbering scheme. The overall numbering scheme is presented, including planned topics and sub-topics, to assist in organizing future documents and to differentiate the new documents from those under the former scheme. This major re-organization and update of the series was determined by JWG1 to be necessary to accommodate major advances within this subject area.

The main technical changes with regard to the previous edition's introductory document, IEC TS 62257-1, are as follows:

– describe the major updates for the IEC 62257 series;
– new simplified title for the series “Renewable energy off-grid systems”, which will precede individual part numbers;
– provide an introduction to the entire series, including the updated organization and planned content of the IEC 62257 series;
– add example user case studies to assist various users in selecting relevant parts within the series;
– removal of content replicated in other documents and relocation of some information to other planned documents in this series;
– addition of general information on access to electricity;
– additional information on managing a renewable energy off-grid project including tendering;
– removal of an annex containing definitions, originally intended to cover all documents in the series; future documents published under this new scheme will contain definitions for individual documents within that document itself.

This technical specification should be used in conjunction with the other documents of the IEC 62257 series, as relevant.

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

Draft	Report on voting
82/2028/DTS	82/2066/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 general title *Renewable energy off-grid systems*, can be found on the IEC website.

Future standards in this series will carry the new general title and three-digit numbering. Titles and numbers of existing standards in this series will be updated at the time of their 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,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The IEC 62257 series provides technical standardization to different stakeholders (including but not limited to project developers, financing agencies, testing agencies, installers, etc.) 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 (https://sdgs.un.org/goals), 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, 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.

These technical specifications are used to:

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

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

c) operate and maintain the system.

The IEC 62257 technical specifications focus on enabling access to electricity by concentrating on, but not being specific to, 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. They promote the use of renewable energies, but at this time they do not deal with clean-energy mechanisms development (CO2 emission, carbon credit, etc.). The series does allow for other types of energy, such as diesel generators, to be included as part of a hybrid renewable energy off-grid system.

This consistent set of documents may 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 TC82 committee members may 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 field of application.

RENEWABLE ENERGY OFF-GRID SYSTEMS –

Part 100: Overview of the IEC 62257 series

1 Scope

This part of the IEC 62257 series introduces the entire series regarding off-grid renewable energy and hybrid products and systems most commonly used for rural applications and access to electricity.

This Part 100 document provides a guide for facilitating the reading and the use of the IEC 62257 series for setting up off-grid electrification in developing countries or in developed countries, the only difference being the level of service and the needed quantity of energy that the customer can afford.

This Part 100 document introduces the series. It focuses on the planned document organization and numbering structure, including a description of each topic and subtopic grouping. It contains a brief overview of the project management and tendering process. It also contains a brief overview of the concept of “access to electricity” and some of the types of renewable energy off-grid and hybrid systems. This document has several examples of case studies for various user groups, to assist them in utilizing the updated series. Additionally, it contains an informative Annex A to assist users of prior versions of the IEC 62257-x series in locating content within the updated IEC 62257-xxx series.

This document outlines the organization of documents within the updated IEC 62257-xxx series published in 2022 and later, including utilization of a new 3-digit part numbering scheme, grouped into topics and subtopics.

This series is anticipated to be of interest to the following renewable energy off-grid and hybrid system stakeholders:

- manufacturers
- testing and certification labs
- equipment distributors, importers, and bulk buyers
- government regulators, inspection, certification, safety, customs and trade agencies
- agencies developing regional-level solar lantern / kit programs
- agencies developing RFQs (Request for Quotations) for systems
- system designers, engineers, project implementers, contractors, supervisors
- installers of small PV and storage
- installers of small wind systems
- installers of large hybrid systems with multiple users
- system owners, residents, operators, maintenance personnel.

The document part numbers to be assigned within this updated IEC 62257-xxx series will be grouped into topics as follows:

- Parts -1xx: Introduction and project management
- Parts -2xx: System design and installation
- Parts -3xx: Energy system components
- Parts -4xx: User equipment and appliances
- Parts -5xx: Stand-alone products and packaged kits.

To assist users in navigating the documents within the revised IEC 62257 series, this introductory -100 document presents how the documents will be further organized into the following subtopics, see Table 1.

Table 1 – Subtopics within the IEC 62257 series

Main topic	Subtopic Part #	Subtopic
Introduction and project management	-100	Overview of the IEC 62257 series
	-11x	Project management framework
	-12x	Tendering and evaluation
	-13x	Preliminary assessments
System design and installation	-20x	Design
	-21x	Installation
	-22x	Tools for installation
	-23x	Competency evaluation
Energy system components	-30x	Generators and energy conversion
	-31x	Photovoltaic modules
	-32x	Wind turbines
	-33x	Generator sets
	-34x	Batteries and battery management systems
	-35x	Inverters
	-36x	Balance of system components – DC
	-37x	Balance of system components – AC
User equipment and appliances	-40x	Off-grid loads
	-41x	Lighting
Stand-alone products and packaged kits	-50x	Stand-alone renewable energy products

Refer to the website address www.iec.ch for a list of published documents.

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 TS 61836:2016, *Solar photovoltaic energy systems – Terms, definitions and symbols*

NOTE Refer to http://www.iec.ch for a list of the current available documents within the IEC 62257 series. Note that documents developed under the updated series referred to in this document have 3-digit part numbers, e.g. IEC TS 62257-100.