

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE



Recommendations for small renewable energy and hybrid systems for rural electrification –

Part 1: General introduction to IEC 62257 series and rural electrification

Recommandations pour les petits systèmes à énergie renouvelable et hybrides pour l'électrification rurale –

Partie 1: Introduction générale à la série CEI 62257 et à l'électrification rurale



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RECOMMENDATIONS FOR SMALL RENEWABLE ENERGY
AND HYBRID SYSTEMS FOR RURAL ELECTRIFICATION –****Part 1: General introduction to IEC 62257 series and rural electrification**

FOREWORD

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- 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 62257-1, which is a technical specification, 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 technical committee 21 (Secondary cells and batteries), subcommittee 21A (Secondary cells and batteries containing alkaline or other non-acid electrolytes), technical committee 64

(Electrical installations and protection against electric shock), technical committee 88 (Wind turbines).

This second edition cancels and replaces the first edition issued in 2003. It constitutes a technical revision.

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

- Addition of a map and an up to date list of the current IEC 62257 series and a guide “how to use the IEC 62257 series” in order to implement a rural electrification project or a stand-alone hybrid system for a remote place in a developed country.

The guide is based on the different phases of an electrification project. It explains which player is in charge of which phase and which technical specification(s) of the series shall be used for this particular phase. It also includes examples of some useful tables or figures contained in each technical specification and how to use them for the project.

- Addition of a list of all the terms and definitions used in the series (Annex B).

This technical specification shall be used in conjunction with the other documents of the IEC 62257 series.

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

Enquiry draft	Report on voting
82/728/DTS	82/779/RVC

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

A list of all parts in the IEC 62257 series, published under the general title *Recommendations for small renewable energy and hybrid systems for rural electrification*, 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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

Rural electrification is one of the predominant policy actions designed to increase the well-being of rural populations together with access to clean water, improved healthcare, education, personal advancement and economic development.

Several strategies can be adopted to implement rural electrification. Rural electrification can be completed through connection to a national or regional electrification grid. The IEC 62257 series applies to cases where the grid is too far away (too costly) or the individual demand centres are too small to make grid access economic, where autonomous power systems may be used to supply these services.

This series IEC 62257 provides technical specifications to different players involved in rural electrification projects (such as project developers, project implementers, installers, etc.) for the setting up of renewable energy and hybrid systems with AC voltage below 500 V, DC voltage below 750 V and power below 100 kVA.

These documents are recommendations:

- a) to choose the right system for the right place,
- b) to design the system,
- c) to operate and maintain the system.

The documents focus on rural electrification concentrating on but not specific to developing countries. They must not be considered as all inclusive to rural electrification. That means that they could be used for rural electrification or electrification of remote sites in developed countries also. They try to promote the use of renewable energies in rural but they do not deal with clean mechanisms development 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.

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

Part 1: General introduction to IEC 62257 series and rural electrification

1 Scope

This part of IEC 62257 first introduces a methodology for implementing rural electrification using small autonomous hybrid renewable energy systems.

Secondly it provides a guide for facilitating the reading and the use of the IEC 62257 series for setting up decentralized rural electrification in developing countries or in developed countries the only difference being the level of quality of service and the needed quantity of energy that the customer can afford.

The IEC 62257 series is designed as follows:

- Parts 2 to 6 are methodological supports for the management and implementation of projects.
- Parts 7 to 12 are technical specifications for individual or collective systems and associated components.

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

IEC/TS 62257-3:2004, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 3: Project development and management*

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

IEC/TS 62257-5:2005, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 5: Protection against electrical hazards*

IEC/TS 62257-6:2005, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 6: Acceptance, operation, maintenance and replacement*

IEC/TS 62257-7, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 7: Generators*

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

IEC/TS 62257-7-3, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 7-3: Generator set – Selection of generator sets for rural electrification systems*

IEC/TS 62257-8-1:2007, *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 62257-9-1, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 9-1: Micropower systems*

IEC/TS 62257-9-2, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 9-2: Microgrids*

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 62257-9-5, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 9-5: Integrated system – Selection of stand-alone lighting kits for rural electrification projects*

IEC/TS 62257-9-6:2008, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 9-6: Integrated system – Selection of Photovoltaic Individual Electrification Systems (PV-IES)*

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*

3 Terms, definitions and abbreviations

For the purposes of this document, the following terms, definitions and abbreviations apply. The main glossary used in the IEC 62257 series is given in Annex A.

3.1

Collective Electrification System

CES

micropower plant and microgrid that supplies electricity to multiple consumption points using a single or multiple energy resource points

3.2

GS

general specification

3.3

hybrid system

multi-energy sources system

3.4

Individual Electrification System

IES

micropower plant system that supplies electricity to one consumption point usually with a single energy resource point