

TECHNICAL SPECIFICATION

**Recommendations for renewable energy and hybrid systems for rural
electrification –
Part 3: Project development and management**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RECOMMENDATIONS FOR RENEWABLE ENERGY
AND HYBRID SYSTEMS FOR RURAL ELECTRIFICATION –****Part 3: Project development and management**

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 62257-3, which is a technical specification, has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

This second edition cancels and replaces the first edition issued in 2004. It constitutes a technical revision.

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

- redefine the maximum AC voltage from 500 V to 1 000 V, the maximum DC voltage from 750 V to 1 500 V;
- removal of the limitation of 100 kVA system size. Hence the removal of the word “small” in the title and related references in this technical specification.

This technical specification is to be used in conjunction with the latest editions of the IEC 62257 series.

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

Enquiry draft	Report on voting
82/948/DTS	82/999A/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 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 publication will remain unchanged until the stability date indicated on the IEC website 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.

A bilingual version of this publication may be issued at a later date.

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, etc.) documents for the setting up of renewable energy and hybrid systems with AC voltage below 1 000 V and DC voltage below 1 500 V.

These documents are recommendations:

- to choose the right system for the right place;
- to design the system;
- to operate and maintain the system.

These documents are focused only on rural electrification concentrating on, but not specific to, developing countries. They should 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 mechanism 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 aiming 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, renewable energy and hybrid off-grid systems.

The purpose of this part of the IEC 62257 series is to propose a framework for project development and management and includes recommended information that should be taken into consideration during all the steps of the electrification project.

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RECOMMENDATIONS FOR RENEWABLE ENERGY AND HYBRID SYSTEMS FOR RURAL ELECTRIFICATION –

Part 3: Project development and management

1 Scope

This part of IEC 62257 provides information on the responsibilities involved in the implementation of rural power systems.

In Clause 5, this technical specification presents contractual relationships to be built between the different participants to a project. Throughout the project, responsibilities are to be clearly defined and contractual commitments controlled.

Clause 6 provides relevant tests to be applied to renewable energy and hybrid electrification systems.

Clause 7 provides proposed quality assurance principles to be implemented.

In Clause 8, requirements are proposed for recycling and protection of the environment.

In Annex A of this technical specification, further technical considerations for contractual liabilities are provided.

2 Normative references

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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 60060-2, *High-voltage test techniques – Part 2: Measuring systems*

IEC 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-5, *Environmental testing – Part 2-5: Tests – Test Sa: Simulated solar radiation at ground level and guidance for solar radiation testing*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-10, *Environmental testing – Part 2-10: Tests – Test J and guidance: Mould growth*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-30, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-52, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60076-10, *Power transformers – Part 10: Determination of sound levels*

IEC 60364-6:2006, *Low-voltage electrical installations – Part 6: Verification*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60695-2-10, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-12, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60721-1, *Classification of environmental conditions – Part 1: Environmental parameters and their severities*

IEC 60721-2-1, *Classification of environmental conditions – Part 2-1: Environmental conditions appearing in nature – Temperature and humidity*

IEC 60721-3-1, *Classification of environmental conditions – Part 3-1: Classification of groups of environmental parameters and their severities – Storage*

IEC 60721-3-2, *Classification of environmental conditions – Part 3-2: Classification of groups of environmental parameters and their severities – Transportation*

IEC 60721-3-3, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weatherprotected locations*

IEC 60721-3-4, *Classification of environmental conditions – Part 3-4: Classification of groups of environmental parameters and their severities – Stationary use at non-weatherprotected locations*

IEC 61000-2-2, *Electromagnetic compatibility (EMC) – Part 2-2: Environment – Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC 61000-3-2, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-3-5, *Electromagnetic compatibility (EMC) – Part 3-5: Limits – Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 75 A*

IEC 61000-4-1, *Electromagnetic compatibility (EMC) – Part 4-1: Testing and measurement techniques – Overview of IEC 61000-4 series*

IEC 61000-4-2, *Electromagnetic compatibility – Part 4-2: Testing and measuring techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-6-3, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61180-1, *High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test and procedure requirements*

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

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

IEC TS 62257-6, *Recommendations for renewable energy and hybrid systems for rural electrification – Part 6: Acceptance, operation, maintenance and replacement*¹

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

CISPR 22, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

ISO 14000 (all parts), *Environmental management*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

general specification

specification prepared by the project developer using the present series of IEC 62257 documents which mainly defines the level and cost of services to be reached and project conditions including the administrative frame and techno-economic context of the project as well as of the project timetable

3.2

identification file

IF

document describing the equipment in terms of detailed technical specification, design and associated performance

3.3**project developer**

organization, company or person who defines and promotes the rural electrification project, assigns the project implementer, determines compliance with the specifications and is also responsible for obtaining resources for financing the project

3.4**engineering consultant**

organization, company or person responsible for translating the needs of the potential user into technical requirements, in accordance with the relevant IEC technical specifications, and preparing the call for tenders

3.5**project implementer
general contractor**

organization, company or person entrusted by the project developer to perform the work or have this work performed pursuant to the general specification (possibly through some subcontractors)

3.6**subcontractor**

organization, company or person in charge of the execution of a selected part of the work relative to the project

3.7**operator**

organization, company or person in charge of system operations, management and maintenance

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3.8**maintenance contractor**

organization, corporate company, operator or person contracted by the operator for performing maintenance operations on the installation

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3.9**user**

person or organization that makes use of the installation service(s) to satisfy their energy demand

3.10**training provider**

organization, company or person contracted by the project developer to provide training to the different participants in charge of using, operating and maintaining the system

3.11**owner**

organization, company or person financially responsible for the whole system and maintaining titles of all the equipment. The owner could have also another role, such as project developer or operator, but may be a completely separate organization

4 Responsibilities of the participants**4.1 Overview**

The participants mentioned in this clause refer to the terms defined in Clause 3.

The responsibilities described herein are intended to indicate function. They may be combined into different parties depending on the structure and participants in the implementation

programme. In some cases, such as government-implemented programmes, many of the different roles may actually be fulfilled by the same institution. If this is the case, it does not dispense with the need for the different development steps discussed in this technical specification.

Table 1 summarizes the main responsibilities to be achieved by the different participants involved in a project.

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Table 1 – Responsibilities of the different participants

Participants	Responsibilities
Project developer	To obtain resources for financing the project To define the general specification To define environmental constraints, requirements and decommissioning plan To designate a project implementer To decide if a quality assurance plan is necessary and to launch it To prepare a warranty plan To check the compliance of the installation with the general specification
Engineering consultant	To translate user needs into technical requirements To prepare the call for tenders
Project implementer or general contractor	To perform the sizing of the system complying with the general specification To build the project on behalf of the project developer To achieve the whole installation or to achieve appropriate parts of the latter pursuant to the general specification To implement the quality assurance process with the subcontractors decided by the project developer Responsible to the project developer for the conformity of the installation with the following parts of the general specification: <ul style="list-style-type: none"> – locally available materials and local skills – local laws – time schedule – system level specifications according to what has been written in the tender – warranty – quality assurance plan (if specified), including acceptance requirements – commissioning plan, maintenance plan, decommissioning plan (including responsibility) – training initial operators – education of initial users – delivering documentation as described in the quality assurance plan – other information as required To negotiate the best possible warranty for system and components To check the conformity of all or part of the installation-related work performed by other subcontractors involved with the project
Subcontractor	Responsible to the project implementer for the satisfactory execution of the selected part of the work as agreed with the project implementer or satisfactory supply of the equipment lot under the project implementer's supervision
Operator	To comply with the quality assurance plan To operate the system in accordance to safety rules for assets and persons To provide the quality of service as contractually agreed by the user To collect the fees To plan the renewal of parts and components To manage connection of new customers
Maintenance contractor	To manage maintenance and repair pursuant to the contract with the operator including the supply of spare parts
Training provider	To organize and implement the training supports and courses for operating and maintenance agents and for users
User	To use the installation according to the contract with the operator