

# TECHNICAL SPECIFICATION

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

WITHDRAWN

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# TECHNICAL SPECIFICATION

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**Recommendations for small renewable energy and hybrid systems for rural  
electrification –  
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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms and definitions .....	10
4 Responsibilities of the participants .....	11
4.1 Introduction .....	11
4.2 General specification.....	13
5 Contractual relationship between participants.....	13
5.1 Introduction .....	13
5.2 Notion of contract.....	13
5.3 Contractual commitments .....	14
5.4 Contractual commitment verification procedures.....	16
5.5 Consequences of non-adherence to the commitments.....	16
5.6 Technical considerations .....	16
5.7 Documentation .....	17
5.8 Operational/technician documentation.....	17
6 Relevant tests for small renewable energy electrification systems .....	20
6.1 Purpose .....	20
6.2 References to standards .....	20
6.3 Conditions of environment.....	20
6.4 Tests.....	21
7 Minimum quality assurance provisions for project implementation .....	36
7.1 Purpose.....	36
7.2 Quality assurance targets.....	36
7.3 Quality assurance basic principles.....	37
7.4 Quality assurance phases and participants.....	37
7.5 Procedures.....	39
7.6 Quality plan.....	39
8 Protection of the environment, recycling and decommissioning.....	41
8.1 Purpose .....	41
8.2 Protection of environment.....	42
8.3 Recycling process and decommissioning.....	42
Annex A (informative) Technical considerations on contractual liabilities between project participants .....	43
A.1 Technical guarantees .....	43
A.2 Sizing.....	43
A.3 Design.....	43
A.4 Procurement items .....	44
A.5 Installation.....	44
A.6 System commissioning .....	44
A.7 Operator or technician training .....	44

A.8	User training syllabus .....	45
A.9	Contractual warranty .....	45
A.10	Maintenance contract .....	45
A.11	Replacement of components .....	46
A.12	Maintenance organization.....	46
Figure 1	– Contractual relationship between project participants.....	14
Figure 2	– Verification of operation of differential current device.....	26
Figure 3	– Distribution of the impacts of an impact test.....	28
Figure 4	– Layout for overturning test .....	31
Table 1	– Responsibilities of the different participants .....	12
Table 2	– List of tests .....	22
Table 3	– List of tests .....	28
Table 4	– Analysis of the requirements and definition of quality targets.....	40
Table 5	– Analysis of risks .....	40
Table 6	– Sequence of actions and corresponding results.....	40
Table 7	– Quality assurance implementing supervisors.....	41

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

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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 technical specification is based on IEC/PAS 62111(1999); it cancels and replaces the relevant parts of IEC/PAS 62111.

This technical specification is to be used in conjunction with

IEC 62257-1: *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 1: General introduction to rural electrification*

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

It is also to be used with future parts of this series as and when they are published.

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

Enquiry draft	Report on voting
82/337/DTS	82/359/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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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

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

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## INTRODUCTION

The IEC 62257 series of documents intends to provide to the 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 a.c. voltage below 500 V, d.c. voltage below 50 V and power below 50 kVA.

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 (CO<sub>2</sub> 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.

The purpose of this part of IEC 62257 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 SMALL 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 small 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

The following referenced documents are indispensable for the application 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 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: Tests – Tests A: Cold*

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

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

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

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

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

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

IEC 60068-2-32: *Environmental testing – Part 2: Tests – Test Ed: Free fall*

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 60364-6-61: *Electrical installations of buildings – Part 6-61: Verification – Initial 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 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: Classification of groups of environmental parameters and their severities – Section 1: Storage*

IEC 60721-3-2: *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 2: 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 weather-protected locations*

IEC 60721-3-4: *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 4: 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  $\leq 16$  A per phase)*

IEC 61000-3-5: *Electromagnetic compatibility (EMC) – Part 3: Limits – Section 5: Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 16A*

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: Generic standards – Section 3: 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 62257-1, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 1: General introduction to rural electrification*

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

IEC 62257-4, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 4: System selection and design*<sup>1</sup>

IEC 62257-5, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 5: Safety rules*<sup>1</sup>

IEC 62257-6, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 6: Acceptance, operation, maintenance and replacement*<sup>1</sup>

IEC 62257-7, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 7: Technical specifications: generators*<sup>1</sup>

IEC 62257-8, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 8: Technical specifications: batteries and converters*<sup>1</sup>

IEC 62257-9, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 9: Technical specifications: integrated systems*<sup>1</sup>

IEC 62257-10, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 10: Technical specifications: energy manager*<sup>1</sup>

IEC 62257-11, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 11: Technical specifications: considerations for grid connection*<sup>1</sup>

IEC 62257-12, *Recommendations for small renewable energy and hybrid systems for rural electrification – Part 12: Other topics*<sup>1</sup>

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 systems*

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<sup>1</sup> Under consideration.

### 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 or 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

#### 3.8

##### **maintenance contractor**

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

#### 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 Introduction**

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 document.

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"> <li>- locally available materials and local skills</li> <li>- local laws</li> <li>- time schedule</li> <li>- system level specifications according to what has been written in the tender</li> <li>- warranty</li> <li>- quality assurance plan (if specified), including acceptance requirements</li> <li>- commissioning plan, maintenance plan, decommissioning plan (including responsibility)</li> <li>- training initial operators</li> <li>- education of initial users</li> <li>- delivering documentation as described in the quality assurance plan</li> <li>- other information as required</li> </ul> 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