



BSI Standards Publication

## Renewable energy and hybrid systems for rural electrification

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Part 9-8: Integrated systems – Requirements for stand-alone renewable energy products with power ratings less than or equal to 350 W

## National foreword

This Published Document is the UK implementation of IEC TS 62257-9-8:2020.

The UK participation in its preparation was entrusted to Technical Committee GEL/82, Photovoltaic Energy Systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2020

ISBN 978 0 539 02445 6

ICS 27.160

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 June 2020.

### Amendments/corrigenda issued since publication

| Date | Text affected |
|------|---------------|
|------|---------------|

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# IEC TS 62257-9-8

Edition 1.0 2020-06

# TECHNICAL SPECIFICATION

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**Renewable energy and hybrid systems for rural electrification –  
Part 9-8: Integrated systems – Requirements for stand-alone renewable energy  
products with power ratings less than or equal to 350 W**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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ICS 27.160

ISBN 978-2-8322-8239-7

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## CONTENTS

|   |    |
|---|----|
| FOREWORD.....   | 5  |
| INTRODUCTION.....   | 7  |
| 1 Scope.....  | 8  |
| 2 Normative references .....  | 9  |
| 3 Terms and definitions .....   | 10 |
| 4 Test requirements.....  | 15 |
| 4.1 General.....  | 15 |
| 4.2 Initial testing requirements.....                                     | 17 |
| 4.2.1 General .....   | 17 |
| 4.2.2 Quality test method.....  | 17 |
| 4.2.3 Accelerated verification method .....                               | 17 |
| 4.2.4 Pay-as-you-go targeted testing .....                                | 18 |
| 4.2.5 Product families.....   | 19 |
| 4.2.6 Similar products.....   | 19 |
| 4.2.7 Verification of product identity .....                              | 20 |
| 4.2.8 Reference to other standards.....                                   | 20 |
| 4.3 Recurring testing requirements .....                                  | 22 |
| 4.4 Retesting of non-conforming products.....                             | 22 |
| 4.5 General testing requirements applicable to all testing pathways.....  | 23 |
| 4.5.1 General .....   | 23 |
| 4.5.2 Exception for accessory lights .....                                | 23 |
| 5 Quality requirements .....  | 24 |
| 5.1 General.....  | 24 |
| 5.2 Truth in advertising.....   | 26 |
| 5.2.1 General .....   | 26 |
| 5.2.2 Assessment of run time values .....                                 | 27 |
| 5.2.3 Information and performance reporting requirements .....            | 28 |
| 5.2.4 Fee-for service or pay-as-you-go (PAYG) metering requirements ..... | 31 |
| 5.2.5 Included appliances requirements.....                               | 31 |
| 5.2.6 Assessment of ingress protection advertisements.....                | 31 |
| 5.3 Ports requirements.....   | 32 |
| 5.3.1 General .....   | 32 |
| 5.3.2 Voltage converters.....   | 33 |
| 5.3.3 Ports with multiple output voltages .....                           | 33 |
| 5.3.4 Appliance voltage compatibility requirements.....                   | 33 |
| 5.3.5 Truth-in-advertising requirements .....                             | 33 |
| 5.3.6 Functionality requirements.....                                     | 34 |
| 5.4 Lumen maintenance.....  | 37 |
| 5.5 Health and safety.....  | 37 |
| 5.5.1 AC-DC power supply safety .....                                     | 37 |
| 5.5.2 Hazardous substances .....  | 37 |
| 5.5.3 Circuit and overload protection .....                               | 38 |
| 5.5.4 Wiring and connector safety .....                                   | 38 |
| 5.5.5 Additional tests for PV modules .....                               | 38 |
| 5.5.6 Requirements for systems with large PV modules or arrays.....       | 41 |
| 5.6 Battery requirements.....   | 41 |

|  |   |    |
|--|---|----|
| 5.6.1  | Provision of battery specification sheets .....   | 41 |
| 5.6.2  | Battery charge control .....  | 41 |
| 5.6.3  | Specific requirements for lithium-based batteries .....                                       | 43 |
| 5.6.4  | Battery durability .....  | 44 |
| 5.7  | Quality and durability .....  | 44 |
| 5.7.1  | General .....   | 44 |
| 5.7.2  | Physical and water ingress protection .....   | 44 |
| 5.7.3  | Drop test requirements .....  | 47 |
| 5.7.4  | Soldering and electronics quality .....   | 49 |
| 5.7.5  | Switch, gooseneck, connector, and moving parts durability .....                               | 49 |
| 5.7.6  | Strain relief durability .....  | 49 |
| 5.7.7  | Outdoor cable durability (size B products only) .....   | 49 |
| 5.7.8  | PV overvoltage requirement .....  | 50 |
| 5.7.9  | Miswiring protection requirement .....  | 51 |
| 5.7.10   | Requirements specific to systems with non-plug-and-play connections .....                     | 51 |
| 5.8  | Consumer information .....  | 52 |
| 5.8.1  | Warranty requirements .....   | 52 |
| 5.8.2  | Date of manufacture .....   | 53 |
| 5.8.3  | User manual requirements (size B products only) .....   | 53 |
| 5.8.4  | Component replacement methods (size B products only) .....                                    | 54 |
| Annex A (normative) Testing of similar products .....                                    |   | 55 |
| A.1  | General .....   | 55 |
| A.2  | Guidelines .....  | 55 |
| A.2.1  | Visual screening .....  | 55 |
| A.2.2  | Lumen maintenance and light output .....  | 55 |
| A.2.3  | Charge controller testing .....   | 56 |
| A.2.4  | PV modules .....  | 56 |
| A.2.5  | Battery durability testing .....  | 56 |
| A.2.6  | Connector durability testing .....  | 56 |
| A.2.7  | Battery testing, full-battery run time, solar run time, and energy service calculations ..... | 56 |
| A.2.8  | Miswiring protection .....  | 57 |
| A.2.9  | Output overload .....   | 57 |
| A.2.10   | PV overvoltage .....  | 57 |
| A.2.11   | Assessment of DC ports .....  | 57 |
| A.2.12   | Power consumption and charging efficiency .....   | 57 |
| A.2.13   | Voltage range .....   | 57 |
| A.2.14   | Changes to firmware or software .....   | 58 |
| Annex B (normative) Partial shading test for photovoltaic modules .....                  |   | 59 |
| B.1  | General .....   | 59 |
| B.2  | Equipment requirements .....  | 59 |
| B.3  | Test prerequisites .....  | 60 |
| B.4  | Procedure .....   | 60 |
| B.5  | Calculations .....  | 62 |
| B.6  | Pass criteria .....   | 62 |
| B.7  | Reporting .....   | 62 |
| Annex C (normative) Visual screening and durability tests for photovoltaic modules ..... |   | 64 |
| C.1  | General .....   | 64 |
| C.2  | Durability of markings test .....   | 64 |

|  |                                |    |
|--|--------------------------------|----|
| C.2.1  | Equipment requirements .....   | 64 |
| C.2.2  | Test prerequisites .....       | 64 |
| C.2.3  | Procedure.....                 | 64 |
| C.3  | Sharp edge test .....          | 64 |
| C.3.1  | Test prerequisites .....       | 64 |
| C.3.2  | Procedure.....                 | 65 |
| C.4  | Screw connections test .....   | 65 |
| C.4.1  | Equipment requirements .....   | 65 |
| C.4.2  | Test prerequisites .....       | 65 |
| C.4.3  | Required test conditions ..... | 65 |
| C.4.4  | Procedure.....                 | 65 |
| C.5  | Impact test.....               | 67 |
| C.5.1  | Equipment requirements .....   | 67 |
| C.5.2  | Test prerequisites .....       | 67 |
| C.5.3  | Procedure.....                 | 67 |
| C.6  | Bending or folding test .....  | 67 |
| C.6.1  | General .....                  | 67 |
| C.6.2  | Equipment requirements .....   | 67 |
| C.6.3  | Test prerequisites .....       | 67 |
| C.6.4  | Required test conditions ..... | 68 |
| C.6.5  | Procedure.....                 | 68 |
| C.6.6  | Pass criteria .....            | 68 |
| C.7  | Reporting .....                | 68 |
| Bibliography.....  |                                | 70 |
| Figure 1 – Example water protection warning label or instruction .....   |                                | 47 |
| Figure 2 – Decision process to determine whether or not a component is subject to the drop test .....                              |                                | 48 |
| Table 1 – Summary of test requirements and alternatives – initial testing requirements to determine compliance with Clause 5 ..... |                                | 16 |
| Table 2 – Summary of test requirements – recurring testing requirements to ensure continued compliance with Clause 5 .....         |                                | 16 |
| Table 3 – Summary of quality requirements .....  |                                | 25 |
| Table 4 – Sample size and renewal requirements for PV tests .....  |                                | 38 |
| Table 5 – Examples of maximum current ratings .....  |                                | 39 |
| Table 6 – Default battery deep discharge protection voltage specifications .....   |                                | 42 |
| Table 7 – Default battery overcharge protection voltage specifications.....  |                                | 42 |
| Table 8 – Physical ingress protection requirements .....   |                                | 45 |
| Table 9 – Water protection requirements .....  |                                | 45 |
| Table C.1 – Torque tests on screws per IEC 61730-2 .....   |                                | 66 |

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RENEWABLE ENERGY AND HYBRID SYSTEMS  
FOR RURAL ELECTRIFICATION –****Part 9-8: Integrated systems – Requirements for stand-alone renewable  
energy products with power ratings less than or equal to 350 W**

## 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 TS 62257-9-8, which is a Technical Specification, has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

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

| Enquiry draft | Report on voting                |
|---------------|---------------------------------|
| 82/1643/DTS   | 82/1685/RVDTS<br>82/1685A/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.

This part of IEC 62257 is to be used in conjunction with IEC TS 62257-9-5.

A list of all parts in the IEC 62257 series, published 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.

## INTRODUCTION

IEC 62257 (all parts) provides support and strategies for institutions involved in rural electrification projects. It documents technical approaches for designing, building, testing, and maintaining off-grid renewable energy and hybrid systems with AC nominal voltage below 500 V, DC nominal voltage below 750 V and nominal power below 100 kVA.

These documents are recommendations to support buyers who want to connect with good quality options in the market:

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

These documents are focused only on technical aspects of rural off-grid electrification concentrating on, but not specific to, developing countries. They are not considered as all inclusive to rural electrification. The documents do not describe a range of factors that can determine project or product success: environmental, social, economic, service capabilities, and others. 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 costs. The main objectives are to support the capabilities of households and communities that use small renewable energy and hybrid off-grid systems and inform organizations and institutions in the off-grid power market.

The purpose of this document is to provide baseline standards for quality, durability and truth-in-advertising to protect consumers of stand-alone renewable energy products. This document is specifically related to renewable energy products that are packaged and made available to end-use consumers at the point of purchase as single, stand-alone products that do not require additional system components to function. This document applies to products with peak power ratings of 350 W or less. While most provisions apply to all products in this range, a few are applicable only to products with peak power ratings greater than 10 W and less than or equal to 350 W.

The term "stand-alone renewable energy product" is used in this document to describe this class of products. Other equivalent terms, including "off-grid solar" or "rechargeable," are often used by manufacturers, distributors, and other stakeholders to describe these products. Many of these systems meet the definition of type T<sub>2</sub>l (individual electrification systems with energy storage) in IEC TS 62257-2.

The intended users of this document are:

- market support programmes that support the off-grid lighting market with financing, consumer education, awareness, and other services;
- manufacturers and distributors that need to verify the quality and performance of products;
- bulk procurement programmes that facilitate or place large orders of products; and,
- trade regulators such as government policymakers and officials who craft and implement trade and tax policy.

This document establishes minimum requirements for quality standards and warranty requirements. Products are compared to specifications based on test results from IEC TS 62257-9-5 and other information about the product. The requirements are designed to be widely applicable across different markets, countries, and regions.

## RENEWABLE ENERGY AND HYBRID SYSTEMS FOR RURAL ELECTRIFICATION –

### Part 9-8: Integrated systems – Requirements for stand-alone renewable energy products with power ratings less than or equal to 350 W

#### 1 Scope

This part of IEC 62257 provides baseline requirements for quality, durability and truth in advertising to protect consumers of off-grid renewable energy products. Evaluation of these requirements is based on tests described in IEC TS 62257-9-5. This document can be used alone or in conjunction with other international standards that address the safety and durability of components of off-grid renewable energy products.

This document applies to stand-alone renewable energy products having the following characteristics:

- The products are powered by photovoltaic (PV) modules or electromechanical power generating devices (such as dynamos), or are designed to use grid electricity to charge a battery or other energy-storage device for off-grid use. The requirements may also be appropriate as guidance for evaluating the quality of devices with other power sources, such as thermoelectric generators.
- The peak power rating of the PV module or other power generating device is less than or equal to 350 W.
- All components required to provide basic energy services are sold/installed as a kit, included as a part of family of products as defined in 4.2.5, or integrated into a single component, including at a minimum:
  - a battery/batteries or other energy storage device(s);
  - power generating device, such as a solar panel, capable of charging the battery/batteries or other energy storage device(s);
  - cables, switches, wiring, connectors and protective devices sufficient to connect the power generating device, power control unit(s) and energy storage device(s).
- The system evaluated includes all the loads (lighting, television, radio, fan, etc.) and load adapter cables that are sold or included as part of the kit or integrated into kit components.
- The PV module maximum power point voltage and the working voltage of any other components in the kit do not exceed 35 V. Exceptions are made for AC-to-DC converters that meet appropriate safety standards. Systems that include PV modules (or combinations of PV modules) with ratings that exceed 240 W at peak power, 35 V at open circuit or 8 A at short circuit are subject to additional safety requirements beyond those assessed in IEC TS 62257-9-5.

NOTE This voltage limit corresponds to the definition of decisive voltage classification A (DVC-A) for wet locations in Table 6 of IEC 62109-1:2010. The limits of 240 W, 35 V and 8 A are consistent with the definition of Class III in IEC 61730-1.

- These requirements cover only DC outputs and loads. Products that include inverters, AC outputs/outlets, or AC appliances are not within the scope of this document. Products can have AC inputs.
- No design expertise is required to choose appropriate system components.
- All electrical connections, except for permanent connections made at the time of installation, can be made using plug-and-socket connectors without the use of any tools. All connections made in the field are straightforward to make and do not require technical expertise, such as wrapping wire in a specific direction, soldering, or crimping.