



# TECHNICAL SPECIFICATION

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**Terrestrial photovoltaic (PV) modules – Guidelines for increased confidence in  
PV module design qualification and type approval**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**TERRESTRIAL PHOTOVOLTAIC (PV) MODULES –  
GUIDELINES FOR INCREASED CONFIDENCE IN PV  
MODULE DESIGN QUALIFICATION AND TYPE APPROVAL****FOREWORD**

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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 TS 62941, which is a technical specification, has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

The text of this standard is based on the following documents:

FDIS	Report on voting
82/994/DTS	82/1049/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 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- withdrawn,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.

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

# **TERRESTRIAL PHOTOVOLTAIC (PV) MODULES – GUIDELINES FOR INCREASED CONFIDENCE IN PV MODULE DESIGN QUALIFICATION AND TYPE APPROVAL**

## **1 Scope**

This Technical Specification is applicable to sites manufacturing photovoltaic (PV) modules certified to IEC 61215 or IEC 61646 for design qualification and type approval. The design qualification and type approval of PV modules depend on appropriate methods for product and process design, as well as appropriate control of materials and processes used to manufacture the product. This technical specification lays out best practices for product design, manufacturing processes, and selection and control of materials used in the manufacture of PV modules that have met the requirements of IEC 61215, IEC 61646, or IEC 62108. These guidelines also form the basis for factory audit criteria of such sites by various certifying and auditory bodies.

The object of this technical specification is to provide more confidence in the ongoing consistency of performance and reliability of certified PV modules. The requirements of this technical specification are defined with the assumption that the quality management system of the organization has already fulfilled the requirements of ISO 9001 or equivalent quality management system. By maintaining a manufacturing system in accordance with this guideline, PV modules are expected to maintain their performance as determined from the test sequences in IEC 61215, IEC 61646, or IEC 62108.

This technical specification is applicable to all PV modules independent of design and technology i.e. flat panel, concentrator photovoltaic (CPV). Quality controls for CPV and nonconventional flat-plate manufacturing will differ somewhat from those of more conventional designs; this technical specification has not considered these differences.

## **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 60812, *Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)*

IEC 60891, *Photovoltaic devices – Procedure for temperature and irradiance corrections to measured I-V characteristics*

IEC 60904-1, *Photovoltaic devices – Part 1: Measurement of photovoltaic current-voltage characteristics*

IEC 60904-2, *Photovoltaic devices – Part 2: Requirements for photovoltaic reference devices*

IEC 60904-3, *Photovoltaic devices – Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data*

IEC 60904-4, *Photovoltaic devices – Part 4: Reference solar devices – Procedures for establishing calibration traceability*

IEC 60904-7, *Photovoltaic devices – Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices*

IEC 60904-9, *Photovoltaic devices – Part 9: Solar simulator performance requirements*

IEC 61215, *Crystalline silicon terrestrial photovoltaic (PV) modules – Design qualification and type approval*

IEC 61646, *Thin-film terrestrial photovoltaic (PV) modules – Design qualification and type approval*

IEC 61730-1, *Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction*

IEC 61730-2, *Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing*

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

IEC 61853-1, *Photovoltaic (PV) module performance testing and energy rating – Part 1: Irradiance and temperature performance measurements and power rating*

IEC 62108, *Concentrator photovoltaic (CPV) modules and assemblies – Design qualification and type approval*

IEC 62759-1, *Photovoltaic (PV) modules – Transportation testing – Part 1: Transportation and shipping of module package units*

IEC TS 62915, *Photovoltaic (PV) modules – Retesting for type approval, design and safety qualification<sup>1</sup>*

IEC TS 62916, *Bypass diode electrostatic discharge susceptibility testing for PV modules<sup>1</sup>*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement*

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<sup>1</sup> To be published.