

INTERNATIONAL STANDARD

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**Photovoltaic (PV) module safety qualification –
Part 1: Requirements for construction**

**Qualification pour la sûreté de fonctionnement des modules
photovoltaïques (PV) –
Partie 1: Exigences pour la construction**



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IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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PHOTOVOLTAIC (PV) MODULE SAFETY QUALIFICATION –**Part 1: Requirements for construction**

FOREWORD

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IEC 61730-1 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems. It is an International Standard.

This third edition cancels and replaces the second edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Revision of Clauses 2 and 3.
- b) Addition of requirements for qualification of specific components according to their standard documents (junction box, connectors, frontsheets/backsheets).
- c) Significant changes to the definition and testing of relied upon insulation materials (RUI). These requirements are described in the pre-qualification document for frontsheets and backsheets (IEC 62788-2-1). This includes:
 - 1) clarifications on the concept and measurement of DTI, and related materials test requirements;

- 2) frontsheet/backsheet weathering requirements.
- d) Removal of all reference to "open rack", with updates according to an intended use for applications according to the application's 98th percentile module operating temperature.
- e) Modules meeting Class 0 for use in restricted access areas are not required to pass the breakage test, (MST 32).
- f) Marking and documentation subclauses have been revised and aligned with the IEC 61215 series.
- g) Electronic copies are now allowed instead of paper copies of required safety documentation.
- h) Requirements for bifacial modules:
 - 1) addition of new term, aBSI;
 - 2) relevant tests have been changed to account for higher current of bifacial modules;
 - 3) for bifacial modules, marking that indicates which side is designed as the front side, or if both are designed for prolonged exposure to direct sunlight ($> 300 \text{ W/m}^2$);
 - 4) relevant parameters for installing bifacial modules clarified;
 - 5) overprotection rating;
 - 6) documentation has been modified.
- i) In 6.2, marking requirements for connectors have been added.
- j) Related to the intended use temperature range:
 - 1) Clause 5 and 6.2 have been modified to include temperature ratings, with $> 70 \text{ °C}$ 98th percentile module operating temperature as the default maximum. Guidance for factors which could impact the module operating temperature for a system design/location are provided, and responsibility for proper installation is placed upon the installer.
 - 2) Changes to insulation coordination sections (6.6, Annex B and Annex C).
 - 3) Subclauses on insulation coordination (6.6.3) and distance through solid insulation (6.6.4) have been updated to clearly state the insulation coordination requirements, and are aligned with Annex B.
 - 4) Annex B has been revised to show the basis for the dimensioning related to insulation coordination and is aligned with 6.6.3 and 6.6.4.
 - 5) Annex C has been created to show specific use cases and describe how changes to materials or use of additional testing can modify the required dimensioning. Diagrams have been updated.
 - 6) A new term, distance through functional insulation (DTFI), has been defined to describe the spacing between fully encapsulated live parts of different potential (the larger of creepage and clearance for the relevant voltage).
 - 7) Testing requirements to verify a clearance value less than the listed value (but not below the creepage distance) are defined.
 - 8) Requirements for junction boxes, cables and connectors, and polymeric frontsheets/backsheets have been removed (these are now covered in their respective standards).
 - 9) In Table 2, functional insulation is required for insulation between live parts of different potential inside a PV module for all module types.
 - 10) In Table 3 and Table 4:
 - i) lines related to pollution degree 3 have been removed, since this is not applicable to module laminates passing the requirements of IEC 61730-2;
 - ii) the minimum values for DTI have been increased to include the minimum 0,030 mm thickness (pinhole considerations);
 - iii) lines related to reinforced insulation have been combined;
 - iv) lines related to basic insulation have been combined, and functional insulation included on those lines;

v) lines for DTFI have been added.

11) Insulation coordination requirements for Class III modules have been removed from Table 4, and functional insulation requirements are included in text (no DTI thickness requirement).

The text of this International Standard is based on the following documents:

Draft	Report on voting
82/2140/FDIS	82/2165/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the IEC 61730 series, under the general title *Photovoltaic (PV) module safety qualification*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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