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INTERNATIONAL STANDARD

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Photovoltaic (PV) arrays – Part 1: Design requirements

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

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

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CONTENTS

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FOREWORD

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IEC 62548-1 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems. It is an International Standard.

This first edition cancels and replaces IEC 62548 published in 2016. This edition constitutes a technical revision.

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

a) Revised provisions for systems including DC to DC conditioning units.
b) Revision of mounting structure requirements.
c) Revised cable requirements.
d) Revision of Clause 6 on safety issues which includes provisions for protection against electric shock including array insulation monitoring and earth fault detection.
e) Revision of 7.2.7 and 7.3 with respect to isolation means.

f) Provisions for use of bifacial modules and modules mounted in non-optimal orientations.

g) New Annex F containing: K_I factor calculations for bifacial and non-optimally oriented systems; anti-PID equipment and arc flash.

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

Draft	Report on voting
82/2174/FDIS	82/2193/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.

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.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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PHOTOVOLTAIC (PV) ARRAYS – Part 1: DESIGN REQUIREMENTS

1 Scope

This document sets out design requirements for photovoltaic (PV) arrays including DC array wiring, electrical protection devices, switching and earthing provisions. The scope includes all parts of the PV array and final power conversion equipment (PCE), but not including energy storage devices, loads or AC or DC distribution network supplying loads.

The object of this document is to address the design safety requirements arising from the particular characteristics of photovoltaic systems. Direct current systems, and PV arrays in particular, pose some hazards in addition to those derived from conventional AC power systems, including the ability to produce and sustain electrical arcs with currents that are not greater than normal operating currents.

In systems supplying AC loads or circuits, the safety requirements mentioned in this document are however critically dependent on the inverters associated with PV arrays complying with the requirements of IEC 62109-1, IEC 62109-2 and IEC 62109-3.

Installation requirements are also critically dependent on compliance with the IEC 60364 series (see Clause 4).

PV arrays of less than 100 W and less than 35 V DC open circuit voltage at STC are not covered by this document.

PV arrays in grid interconnected systems connected to medium or high voltage systems are not covered in this document, except as required by IEC TS 62738. Variations and additional requirements for large-scale ground mounted PV power plants with restricted access to personnel are addressed in IEC TS 62738.

Additional requirements may be needed for more specialized installations, for example concentrating systems, tracking systems or building integrated PV.

This document also includes extra protection requirements of PV arrays when they are directly connected with batteries at the DC level.

Attention is drawn to the co-existence of IEC 60364-7-712 and IEC 62548. Both standards have been developed in close coordination, respectively by IEC technical committees 64 and 82.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60228, *Conductors of insulated cables*

IEC 60269-1, *Low-voltage fuses – Part 1: General requirements*

IEC 60269-6, *Low-voltage fuses – Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems*