



# UL 61730-1

## STANDARD FOR SAFETY

Photovoltaic (PV) Module Safety  
Qualification – Part 1: Requirements for  
Construction

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UL Standard for Safety for Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction, UL 61730-1

Second Edition, Dated October 28, 2022

### **Summary of Topics**

***This new edition of ANSI/UL 61730-1 dated October 28, 2022 includes updating IEC TS 62915 references to UL 62915.***

***UL 61730-1 is an adoption of IEC 61730-1, Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction (Second Edition, issued by the IEC August 2016). Please note that the National Difference document incorporates all of the U.S. national differences for UL 61730-1.***

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated September 16, 2022.

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ANSI/UL 61730-1-2022

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**UL 61730-1**

**Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for  
Construction**

First Edition – December, 2017

**Second Edition**

**October 28, 2022**

This ANSI/UL Standard for Safety consists of the Second Edition.

The most recent designation of ANSI/UL 61730-1 as an American National Standard (ANSI) occurred on October 28, 2022. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, or Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <https://csds.ul.com>.

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## PREFACE

This UL Standard is based on IEC Publication IEC 61730-1: Second edition Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction. IEC publication IEC 61730-1 is copyrighted by the IEC.

This edition has been issued to satisfy UL Standards policy and to align the UL edition number with the IEC edition number.

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Note – Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.

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## NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 61730-1, Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction, copyright 2016, are indicated by notations (differences) and are presented in bold text.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

**DR** – These are National Differences based on the **national regulatory requirements**.

**D1** – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

**D2** – These are National Differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

**DC** – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

**DE** – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

**Addition / Add** - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

**Modification / Modify** - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

**Deletion / Delete** - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

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# FOREWORD

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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

This second edition cancels and replaces the first edition of IEC 61730-1, issued in 2004, and its amendments 1 (2011) and 2 (2013); it constitutes a technical revision.

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

- a) Adaption of horizontal standards and inclusion of IEC 60664 and IEC 61140.
- b) Implementation of insulation coordination, overvoltage category, classes, pollution degree (PD), and material groups (MG).
- c) Implementation of component qualification.

d) IEC Guide 108 *Guidelines for ensuring the coherency of IEC publications – Application of horizontal standards*.

e) Definition of creepage (cr), clearance (cl) and distance through insulation.

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

FDIS	Report on voting
82/1128/FDIS	82/1146/RVD

Full information on the voting for the approval of this standard 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.

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

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

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

## 1 Scope

This part of IEC 61730 specifies and describes the fundamental construction requirements for photovoltaic (PV) modules in order to provide safe electrical and mechanical operation. Specific topics are provided to assess the prevention of electrical shock, fire hazards, and personal injury due to mechanical and environmental stresses. This part of IEC 61730 pertains to the particular requirements of construction. IEC 61730-2 defines the requirements for testing.

This International Standard series lays down IEC requirements of terrestrial photovoltaic modules suitable for long-term operation in open-air climates. This standard is intended to apply to all terrestrial flat plate module materials such as crystalline silicon module types as well as thin-film modules.

PV modules covered by this standard are limited to a maximum DC system voltage of 1 500 V.

This International Standard defines the basic requirements for various applications of PV modules, but it cannot be considered to encompass all national or regional codes. Specific requirements, e.g. for building, marine and vehicle applications, are not covered.

This International Standard does not address specific requirements for products that combine a PV module with power conversion equipment, monitoring or control electronics, such as integrated inverters, converters or output disabling functions.

While parts of this standard may be applicable to flat plate PV modules with internally generated low level concentration below 3 times, it was not written specifically to address these concerns.

This International Standard is designed to coordinate with the test sequences in the IEC 61215 series, so that a single set of samples may be used to perform both the safety and qualification of a photovoltaic module design.

The object of this International Standard is to define the requirements for the construction of photovoltaic modules with respect to safety. These requirements are intended to minimize the misapplication and misuse of PV modules or the failure of their components which could result in fire, electric shock and personal injury.

Additional construction requirements outlined in relevant ISO standards, or the national or local codes which govern the installation and use of these PV modules in their intended locations, should be considered in addition to the requirements contained within this standard.

## 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 60050 (all parts), *International Electrotechnical Vocabulary*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*