UL 61730-2:2026

(IEC 61730-2:2023, MOD)

STANDARD FOR SAFETY

Photovoltaic (PV) Module Safety Qualification – Part 2: Requirements for Testing

UL Standard for Safety for Photovoltaic (PV) Module Safety Qualification – Part 2: Requirements for Testing, UL 61730-2

Third Edition, Dated March 26, 2026

Summary of Topics

This new Third Edition of ANSI/UL 61730-2 dated March 26, 2026 adopts IEC 61730-2 Third Edition, issued by the IEC September 2023.

UL 61730-2 is an adoption of IEC 61730-2, Photovoltaic (PV) Module Safety Qualification – Part 2: Requirements for Testing (Third Edition, issued by the IEC September 2023). Please note that the National Difference document incorporates all of the U.S. national differences for UL 61730-2.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated November 14, 2025.

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UL 61730-2:2026
(IEC 61730-2:2023, MOD)

Photovoltaic (PV) Module Safety Qualification – Part 2: Requirements for Testing

First Edition – December, 2017
Second Edition – October, 2022

Third Edition

March 26, 2026

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

The most recent designation of ANSI/UL 61730-2 as an American National Standard (ANSI) occurred on March 26, 2026. 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 ULSE at any time. Proposals should be submitted via a Proposal Request in ULSE's Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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Bibliography

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PREFACE

This ULSE Standard is based on IEC Publication IEC 61730-2: Third Edition, Photovoltaic (PV) Module Safety Qualification – Part 2: Requirements for Testing. IEC publication IEC 61730-2 is copyrighted by the IEC.

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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 from the text of International Electrotechnical Commission (IEC) Publication IEC 61730-2, Photovoltaic (PV) Module Safety Qualification – Part 2: Requirements for Testing, copyright 2023, 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.

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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:

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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 2: Requirements for testing

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IEC 61730-2 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) MST 06: Sharp edge test revised.

b) MST 14: Impulse voltage test contains technical corrections to Figure 6.

c) MST 21: Temperature test has been removed from this standard because modules tested individually in unrestricted mounting systems in open-air climates below 40 °C operate at or below a 98^{th}-percentile operating temperature of 70 °C. As a result, the existing IEC 61730-1 requirement for a minimum

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RTI/RTE/TI of 90 °C is adequate. To address modules operating at higher temperatures, IEC TS 63126 includes an informative annex to describe tests and analysis techniques suitable for estimating the 98th-percentile operating temperature. This covers system effects such as mounting methods that restrict airflow and result in a 98th-percentile module operating temperature in excess of 70 °C.

d) MST 24: Ignitability test revised.

e) MST 26: Reverse current overload test revised.

f) MST 32: Module breakage test is no longer required for Class 0 modules.

g) MST 54: Instead of sequential test with one module now one module for sequence B shall be irradiated from the front side and another module from the backside during the 60 kWh/m^2 cycle.

h) MST 57: Evaluation of insulation coordination added.

i) All MQT references updated to revised IEC 61215 series Ed.2.0 2021.

j) Bifacial modules: Requirements updated for MST 02 Performance at STC, MST 07 Bypass diode functionality test, MST 22 Hot-spot endurance test, MST 25 Bypass diode thermal test and MST 51 Thermal cycling (TC200).

k) Term “Very large module” defined and Annex C (normative) “Usage of representative samples for very large modules” added.

l) MST 37: Materials creep test revised.

m) MST 56: Dry heat conditioning test revised.

n) MST 53: Damp heat test (1 000 h) revised.

o) Robustness of terminations test added in Sequence D for junction boxes qualified with a cemented joint.

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

Draft	Report on voting
82/2122/FDIS	82/2166/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/publications.

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.

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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,

• replaced by a revised edition, or

• amended.

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

The content of the corrigendum 1 (2024-10) has been included in this copy.

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PHOTOVOLTAIC (PV) MODULE SAFETY QUALIFICATION – Part 2: Requirements for testing

1 Scope

The scope of IEC 61730-1 is also applicable to this part of IEC 61730. While IEC 61730-1 outlines the requirements of construction, this document lists the tests a PV module is required to fulfill for safety qualification. This document applies for safety qualification only in conjunction with IEC 61730-1.

The sequence of tests required in this document may not test for all possible safety aspects associated with the use of PV modules in all possible applications. This document utilizes the best sequence of tests available at the time of its writing.

The objective of this document is to provide the testing sequence intended to verify the safety of PV modules whose construction has been assessed by IEC 61730-1. The test sequence and pass criteria are designed to detect the potential breakdown of internal and external components of PV modules that would result in fire, electric shock, and/or personal injury. This document defines the basic safety test requirements and additional tests that are a function of the PV module end-use applications. Test categories include general inspection, electrical shock hazard, fire hazard, mechanical stress, and environmental stress.

The additional testing requirements outlined in relevant ISO documents, or the national or local codes which govern the installation and use of these PV modules in their intended locations, are considered in addition to the requirements contained within this document.

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 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-3-5, *Environmental testing – Part 3-5: Supporting documentation and guidance – Confirmation of the performance of temperature chambers*

IEC 60598-1:2020, *Luminaires – Part 1: General requirements and tests*

IEC 60664-1:2020, *Insulation co-ordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60695-2-10, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60950-1:2005, *Information technology equipment – Safety – Part 1: General requirements*
IEC 60950-1:2005/AMD1:2009
IEC 60950-1:2005/AMD2:2013

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IEC 61010-1, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61215 (all parts), *Terrestrial photovoltaic (PV) modules – Design qualification and type approval*

IEC 61215-2, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures*

IEC 61730-1:2023, *Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction*

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

IEC 62788-2-1:2023, *Measurement procedures for materials used in photovoltaic modules – Part 2-1: Polymeric materials – Frontsheet and backsheet – Safety requirements*

IEC 62790:2020, *Junction boxes for photovoltaic modules – Safety requirements and tests*

IEC TS 62915, *Photovoltaic (PV) modules – Type approval, design and safety qualification – Retesting*

ISO 813, *Rubber, vulcanized or thermoplastic – Determination of adhesion to a rigid substrate – 90 degree peel method*

ISO 4587:2003, *Adhesives – Determination of tensile lap-shear strength of rigid-to-rigid bonded assemblies*

ISO 5893, *Rubber and plastics test equipment – Tensile, flexural and compression types (constant rate of traverse) – Specification*

ISO 11925-2:2020, *Reaction to fire tests – Ignitability of products subjected to direct impingement of flame – Part 2: Single-flame source test*

ISO 23529, *Rubber – General procedures for preparing and conditioning test pieces for physical test methods*

ANSI/UL 1703:2015, *Flat-plate photovoltaic modules and panels*

ANSI Z97.1:2009, *Standard – Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test*

2DV DR *Modification of Clause 2 to add the following:*

UL 790, *Standard Test Methods for Fire Tests of Roof Coverings*

UL 2703, *Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels*

UL 61215-2, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures*

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UL 62915, *Photovoltaic (PV) Modules – Type Approval, Design and Safety Qualification – Retesting*

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

IEC 63163, *Terrestrial photovoltaic (PV) modules for consumer products – Design qualification and type approval*

IEC TS 62916, *Photovoltaic modules – Bypass diode electrostatic discharge susceptibility testing*

IEC 62941, *Terrestrial photovoltaic (PV) modules – Quality system for PV module manufacturing*

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3 Terms and definitions

For the purposes of this document, the terms and definitions in IEC 61730-1 and IEC TS 61836, as well as the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

• IEC Electropedia: available at http://www.electropedia.org/

• ISO Online browsing platform: available at http://www.iso.org/obp

3.1
representative sample
sample that includes all the components of the module, except some repeated parts

3.2
very large module
module that exceeds 2,2 m in any dimension or exceeds 1,5 m in both dimensions

EXAMPLE: a 2,3 m × 0,3 m module is considered very large, as is a 1,6 m × 1,6 m module.

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