

## STANDARD INFORMATION

**Amendment 1:** See updated Effective Date in blue below.

**Standard:** UL 61215-1-1

**Standard ID:** Terrestrial Photovoltaic (Pv) Modules - Design Qualification and Type Approval - Part 1-1: Special Requirements for Testing of Crystalline Silicon Photovoltaic (Pv) Modules [UL 61215-1-1:2021 Ed.2]

**Previous Standard ID:** Terrestrial Photovoltaic (Pv) Modules - Design Qualification and Type Approval - Part 1-1: Special Requirements for Testing of Crystalline Silicon Photovoltaic (Pv) Modules [UL 61215-1-1:2017 Ed.1]

## EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

**Effective Date:** ~~August 5, 2024~~ April 1, 2025

## IMPACT, OVERVIEW, AND ACTION REQUIRED

**Impact Statement:** Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

### Overview of Changes:

- A cyclic (dynamic) mechanical load test (MQT 20) added
- test for detection of potential-induced degradation (MQT 21) added
- A bending test (MQT 22) for flexible modules added
- A procedure for stress specific stabilization – BO LID (MQT 19.3) added
- A final stabilization procedure for modules undergoing PID testing added

Specific details of new/ revised requirements are found in table below

***Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.***



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CLAUSE	VERDICT	COMMENT
		<p>Additions to existing requirements are <u>underlined</u> and deletions are shown <del>lined-out</del> below.</p>
		<p><b>Scope</b></p> <p><del>This part of IEC 61215 lays down IEC requirements for the design qualification and type approval of terrestrial photovoltaic modules suitable for long-term operation in general open air climates, as defined in IEC 60721-2-1. This standard is intended to apply to all crystalline silicon terrestrial flat plate modules.</del></p> <p><del>This standard does not apply to modules used with concentrated sunlight although it may be utilized for low concentrator modules (1 to 3 suns). For low concentration modules, all tests are performed using the current, voltage and power levels expected at the design concentration.</del></p> <p><del>The object of this test sequence is to determine the electrical and thermal characteristics of the module and to show, as far as possible within reasonable constraints of cost and time, that the module is capable of withstanding prolonged exposure in climates described in the scope. The actual lifetime expectancy of modules so qualified will depend on their design, their environment and the conditions under which they are operated.</del></p> <p>1 <u>This document lays down requirements for the design qualification of terrestrial photovoltaic modules suitable for long-term operation in open-air climates. The useful service life of modules so qualified will depend on their design, their environment and the conditions under which they are operated. Test results are not construed as a quantitative prediction of module lifetime. In climates where 98th percentile operating temperatures exceed 70 °C, users are recommended to consider testing to higher temperature test conditions as described in IEC TS 63126.</u></p> <p><u>Users desiring qualification of PV products with lesser lifetime expectations are recommended to consider testing designed for PV in consumer electronics, as described in IEC 63163 (under development). Users wishing to gain confidence that the characteristics tested in IEC 61215 appear consistently in a manufactured product may wish to utilize IEC 62941 regarding quality systems in PV manufacturing.</u></p> <p><u>This document is intended to apply to all crystalline silicon terrestrial flat plate modules.</u></p> <p><u>This document does not apply to modules used with concentrated sunlight although it may be utilized for low concentrator modules (1 to 3 suns). For low</u></p>



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		<p><u>concentration modules, all tests are performed using the irradiance, current, voltage and power levels expected at the design concentration.</u></p> <p><u>The objective of this test sequence is to determine the electrical characteristics of the module and to show, as far as possible within reasonable constraints of cost and time, that the module is capable of withstanding prolonged exposure outdoors. Accelerated test conditions are empirically based on those necessary to reproduce selected observed field failures and are applied equally across module types. Acceleration factors may vary with product design and thus not all degradation mechanisms may manifest. Further general information on accelerated test methods including definitions of terms may be found in IEC 62506.</u></p> <p><u>Some long-term degradation mechanisms can only reasonably be detected via component testing, due to long times required to produce the failure and necessity of stress conditions that are expensive to produce over large areas. Component tests that have reached a sufficient level of maturity to set pass/fail criteria with high confidence are incorporated into the IEC 61215 series via addition to Table 1 in IEC 61215-1:2021. In contrast, the tests procedures described in this series, in IEC 61215-2, are performed on modules.</u></p> <p>This document defines PV technology dependent modifications to the testing procedures and requirements per IEC 61215-1:20162021 and IEC 61215-2:20162021.</p>
7		<p><b>Pass criteria</b></p> <p>This clause of IEC 61215-1:20162021 is applicable without with the modifications listed below:</p> <p>The maximum allowable value of reproducibility is set to <math>r = 1,0 \%</math>.  The maximum allowable value of measurement uncertainty is set to <math>m1 = 3,0 \%</math>.</p>
11	Info	<p><b>Test flow and procedures</b></p> <p><i>New clause added;</i></p>
11.11		<p><b>Thermal cycling test (MQT 11)</b></p> <p>For monofacial modules, the technology specific current which needs to be applied according to test MQT 11 of IEC 61215-2:2021, shall be equal to the STC peak power current. See standard for details.</p>
11.13		<p><b>Damp heat test (MQT 13)</b></p> <p>This test of IEC 61215-2:2016 is applicable without modifications. <u>Modules shall be subject to the requirements in MQT 19.2 prior to evaluation of gate No. 2.</u></p>
11.19	Info	<p><b>Stabilization (MQT 19)</b></p>



CLAUSE	VERDICT	COMMENT
		<b><i>New clause added;</i></b>
11.19.2		<b>Light induced stabilization procedures</b>  This test of IEC 61215-2:2021 is applicable without modifications.
		<b><i>New clause added;</i></b>
		<b>Final stabilization (MQT 19.2)</b>
11.19.5		Final stabilization (MQT 19.2) is not required, except for modules that have been tested according to MQT 21, Potential induced degradation test (in sequence F), or MQT 13, Damp heat test (in sequence E). Final stabilization requirements differ depending on whether the module has been subjected to MQT 13 or MQT 21. See standard for details.
		<b><i>New clause added;</i></b>
11.20		<b>Cyclic (dynamic) mechanical load test (MQT 20)</b>  This test of IEC 61215-2:2021 is applicable without modifications.
		<b><i>New clause added;</i></b>
11.21		<b>Potential induced degradation test (MQT 21)</b>  This test of IEC 61215-2:2021 is applicable without modifications.
		<b><i>New clause added;</i></b>
11.22		<b>Bending test (MQT 22)</b>  This test of IEC 61215-2:2021 is applicable to flexible modules without modifications.