IEC 61215-1-1

Edition 1.0 2016-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules

Modules photovoltaïques (PV) pour applications terrestres – Qualification de la conception et homologation –
Partie 1-1: Exigences particulières d'essai des modules photovoltaïques (PV) au silicium cristallin

IEC 61215-1-1:2016-03(en-fr)

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FOREWORD

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International Standard IEC 61215-1-1 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

This edition cancels and replaces the second edition of IEC 61215, issued in 2005, and constitutes a technical revision.

This standard is to be read in conjunction with IEC 61215-1:2016 and IEC 61215-2:2016.

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

FDIS	Report on voting
82/1047/FDIS	82/1075/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.

A list of all parts in the IEC 61215 series, published under the general title *Terrestrial photovoltaic (PV) modules – Design qualification and type approval,* can be found on the IEC website.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site 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- withdrawn,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.

TERRESTRIAL PHOTOVOLTAIC (PV) MODULES – DESIGN QUALIFICATION AND TYPE APPROVAL –

Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules

1 Scope and object

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.

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.

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.

This standard defines PV technology dependent modifications to the testing procedures and requirements per IEC 61215-1:2016 and IEC 61215-2:2016.

2 Normative references

The normative references of IEC 61215-1:2016 and IEC 61215-2:2016 are applicable without modifications.

3 Terms and definitions

This clause of IEC 61215-1:2016 is applicable without modifications.

4 Test samples

This clause of IEC 61215-1:2016 is applicable without modifications.

5 Marking and documentation

This clause of IEC 61215-1:2016 is applicable without modifications.

6 Testing

This clause of IEC 61215-1:2016 is applicable without modifications.

7 Pass criteria

This clause of IEC 61215-1:2016 is applicable without modifications.

The maximum allowable value of reproducibility is set to r = 1,0 %.

8 Major visual defects

This clause of IEC 61215-1:2016 is applicable without modifications.

9 Report

This clause of IEC 61215-1:2016 is applicable without modifications.

10 Modifications

This clause of IEC 61215-1:2016 is applicable without modifications.

11 Test flow and procedures

The test flow from IEC 61215-1:2016 is applicable.

11.1 Visual inspection (MQT 01)

This test of IEC 61215-2:2016 is applicable without modifications.

11.2 Maximum power determination (MQT 02)

This test of IEC 61215-2:2016 is applicable without modifications.

11.3 Insulation test (MQT 03)

This test of IEC 61215-2:2016 is applicable without modifications.

11.4 Measurement of temperature coefficients (MQT 04)

This test of IEC 61215-2:2016 is applicable without modifications.

11.5 Measurement of nominal module operating temperature (NMOT) (MQT 05)

This test of IEC 61215-2:2016 is applicable without modifications.

11.6 Performance at STC (MQT 06.1) and NMOT (MQT 06.2)

This test of IEC 61215-2:2016 is applicable without modifications.

11.7 Performance at low irradiance (MQT 07)

This test of IEC 61215-2:2016 is applicable without modifications.

11.8 Outdoor exposure test (MQT 08)

This test of IEC 61215-2:2016 is applicable without modifications.

11.9 Hot-spot endurance test (MQT 09)

The relevant subclause of IEC 61215-2:2016, test MQT 09, is applicable without modifications.

11.9.1 Purpose

The relevant subclause of IEC 61215-2:2016, test MQT 09, is applicable without modifications.

11.9.2 Classification of cell interconnection

The relevant subclause of IEC 61215-2:2016, test MQT 09, is applicable without modifications.

11.9.3 Apparatus

The relevant subclause of IEC 61215-2:2016, test MQT 09, is applicable without modifications.

11.9.4 Procedure

MQT 09.1 shall be performed in accordance to IEC 61215-2:2016.

11.9.5 Final measurements

The relevant subclause of IEC 61215-2:2016, test MQT 09, is applicable without modifications.

11.9.6 Requirements

The relevant subclause of IEC 61215-2:2016, test MQT 09, is applicable without modifications.

11.10 UV preconditioning test (MQT 10)

This test of IEC 61215-2:2016 is applicable without modifications.

11.11 Thermal cycling test (MQT 11)

This test of IEC 61215-2:2016 is applicable without modifications.

The technology specific current which needs to be applied according to test MQT 11 of IEC 61215-2:2016, shall be equal to the STC peak power current.

11.12 Humidity-freeze test (MQT 12)

This test of IEC 61215-2:2016 is applicable without modifications.

11.13 Damp heat test (MQT 13)

This test of IEC 61215-2:2016 is applicable without modifications.

11.14 Robustness of terminations test (MQT 14)

This test of IEC 61215-2:2016 is applicable without modifications.

11.15 Wet leakage current test (MQT 15)

This test of IEC 61215-2:2016 is applicable without modifications.

11.16 Static mechanical load test (MQT 16)

This test of IEC 61215-2:2016 is applicable without modifications.

11.17 Hail test (MQT 17)

This test of IEC 61215-2:2016 is applicable without modifications.

11.18 Bypass diode thermal test (MQT 18)

This test of IEC 61215-2:2016 is applicable without modifications.

11.19 Stabilization (MQT 19)

This test of IEC 61215-2:2016 is applicable with the following modifications:

For the definition of stabilization as per test MQT 19 of IEC 61215-2:2016, x = 0,01 shall be used for crystalline silicon PV modules.

Temperature is a critical parameter. For the measurement MQT 06.1 of IEC 61215-2:2016 it shall be ensured that measurement is performed at (25 ± 2) °C module temperature.

11.19.4 Other stabilization procedures

At present no alternative stabilization methods are applicable.

11.19.5 Initial stabilization (MQT 19.1)

Initial stabilization of c-Si modules shall be obtained by exposing all modules to sunlight (either real or simulated) to an irradiation dose level of ≥ 10 kWh/m^2. After this preconditioning all of the test modules shall be measured for STC power (MQT 06.1).

To fulfil MQT 19 requirements two intervals of at least 5 kWh/m^2 each are required.

If stabilization is performed outdoors no module temperature limits apply.

After stabilization time is not critical. Perform all measurements within a comparable timeframe and state time in report.

11.19.6 Final stabilization (MQT 19.2)

Final stabilization (MQT 19.2) is not required.
