



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 61215-2:2017

Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures

Modules photovoltaïques (PV) pour
applications terrestres - Qualification de
la conception et homologation - Partie 2:
Procédures d'essai

Terrestrische Photovoltaik(PV)-Module -
Bauarteignung und Bauartzulassung -
Teil 2: Prüfverfahren

National Foreword

This European Standard EN 61215-2:2017 was adopted as Luxembourgish Standard ILNAS-EN 61215-2:2017.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

<https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html>

THIS PUBLICATION IS COPYRIGHT PROTECTED

Nothing from this publication may be reproduced or utilized in any form or by any mean - electronic, mechanical, photocopying or any other data carries without prior permission!

English Version

Terrestrial photovoltaic (PV) modules - Design qualification and
type approval - Part 2: Test procedures
(IEC 61215-2:2016)

Modules photovoltaïques (PV) pour applications terrestres -
Qualification de la conception et homologation - Partie 2:
Procédures d'essai
(IEC 61215-2:2016)

Terrestrische Photovoltaik (PV) Module - Bauartefnung
und Bauartzulassung - Teil 2: Prüfverfahren
(IEC 61215-2:2016)

This European Standard was approved by CENELEC on 2016-04-13. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 82/1048/FDIS, future edition 1 of IEC 61215-2, prepared by IEC/TC 82 "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61215-2:2017.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-08-10
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-02-10

This document supersedes EN 61215:2005 (partially).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61215-2:2016 was approved by CENELEC as a European Standard without any modification.

Annex ZA

(normative)

**Normative references to international publications
with their corresponding European publications**

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here:
www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
	series			series
IEC 60050	-	International Electrotechnical Vocabulary	-	-
IEC 60068-1	-	Environmental testing -- Part 1: General and guidance	EN 60068-1	-
IEC 60068-2-21	-	Environmental testing -- Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN 60068-2-21	-
IEC 60068-2-78	-	Environmental testing -- Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60721-2-1	-	Classification of environmental conditions - Part 2-1: Environmental conditions appearing in nature - Temperature and humidity	EN 60721-2-1	-
IEC 60891	-	Photovoltaic devices - Procedures for temperature and irradiance corrections to measured I-V characteristics	EN 60891	-
IEC 60904-1	-	Photovoltaic devices -- Part 1: Measurement of photovoltaic current-voltage characteristics	EN 60904-1	-
IEC 60904-2	-	Photovoltaic devices - Part 2: Requirements for photovoltaic reference devices	EN 60904-2	-
IEC 60904-3	-	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data	EN 60904-3	-
IEC 60904-7	-	Photovoltaic devices -- Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices	EN 60904-7	-
IEC 60904-8	-	Photovoltaic devices -- Part 8: Measurement of spectral response of a photovoltaic (PV) device	EN 60904-8	-
IEC 60904-9	-	Photovoltaic devices -- Part 9: Solar simulator performance requirements	EN 60904-9	-
IEC 60904-10	-	Photovoltaic devices -- Part 10: Methods of linearity measurement	EN 60904-10	-
IEC 61215-1	-	Terrestrial photovoltaic (PV) modules - Design qualification and type approval -- Part 1: Requirements for testing	EN 61215-1	-
IEC 61853-2	-	Photovoltaic (PV) module performance testing and energy rating -- Part 2: Spectral response, incidence angle and module operating temperature measurements	-	-
IEC 62790	-	Junction boxes for photovoltaic modules - Safety requirements and tests	EN 62790	-
ISO 868	-	Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)	EN ISO 868	-

IEC/TS 61836

-

Solar photovoltaic energy systems -
Terms, definitions and symbols

CLC/TS 61836

-



INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**Modules photovoltaïques (PV) pour applications terrestres – Qualification de la
conception et homologation –
Partie 2: Procédures d'essai**

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope and object.....	8
2 Normative references.....	8
3 Terms and definitions	9
4 Test procedures	10
4.1 Visual inspection (MQT 01)	10
4.1.1 Purpose	10
4.1.2 Procedure	10
4.1.3 Requirements	11
4.2 Maximum power determination (MQT 02).....	11
4.2.1 Purpose	11
4.2.2 Apparatus	11
4.2.3 Procedure	11
4.3 Insulation test (MQT 03).....	11
4.3.1 Purpose	11
4.3.2 Apparatus	12
4.3.3 Test conditions	12
4.3.4 Procedure	12
4.3.5 Test requirements	12
4.4 Measurement of temperature coefficients (MQT 04)	12
4.5 Measurement of nominal module operating temperature (NMOT) (MQT 05)	13
4.5.1 General	13
4.5.2 Principle	13
4.5.3 Test procedure.....	13
4.6 Performance at STC and NMOT (MQT 06).....	14
4.6.1 Purpose	14
4.6.2 Apparatus	14
4.6.3 Procedure	14
4.7 Performance at low irradiance (MQT 07).....	15
4.7.1 Purpose	15
4.7.2 Apparatus	15
4.7.3 Procedure	15
4.8 Outdoor exposure test (MQT 08)	15
4.8.1 Purpose	15
4.8.2 Apparatus	15
4.8.3 Procedure	16
4.8.4 Final measurements.....	16
4.8.5 Requirements	16
4.9 Hot-spot endurance test (MQT 09).....	16
4.9.1 Purpose	16
4.9.2 Hot-spot effect	16
4.9.3 Classification of cell interconnection	17
4.9.4 Apparatus	19
4.9.5 Procedure	19
4.9.6 Final measurements.....	27

4.9.7	Requirements	27
4.10	UV preconditioning test (MQT 10).....	27
4.10.1	Purpose	27
4.10.2	Apparatus	27
4.10.3	Procedure	28
4.10.4	Final measurements.....	28
4.10.5	Requirements	28
4.11	Thermal cycling test (MQT 11).....	28
4.11.1	Purpose	28
4.11.2	Apparatus	28
4.11.3	Procedure	29
4.11.4	Final measurements.....	29
4.11.5	Requirements	30
4.12	Humidity-freeze test (MQT 12).....	30
4.12.1	Purpose	30
4.12.2	Apparatus	30
4.12.3	Procedure	30
4.12.4	Final measurements.....	30
4.12.5	Requirements	30
4.13	Damp heat test (MQT 13).....	31
4.13.1	Purpose	31
4.13.2	Procedure	31
4.13.3	Final measurements.....	31
4.13.4	Requirements	31
4.14	Robustness of terminations (MQT 14).....	32
4.14.1	Purpose	32
4.14.2	Retention of junction box on mounting surface (MQT 14.1).....	32
4.14.3	Test of cord anchorage (MQT 14.2)	32
4.15	Wet leakage current test (MQT 15).....	35
4.15.1	Purpose	35
4.15.2	Apparatus	35
4.15.3	Procedure	36
4.15.4	Requirements	36
4.16	Static mechanical load test (MQT 16)	36
4.16.1	Purpose	36
4.16.2	Apparatus	37
4.16.3	Procedure	37
4.16.4	Final measurements.....	37
4.16.5	Requirements	37
4.17	Hail test (MQT 17).....	38
4.17.1	Purpose	38
4.17.2	Apparatus	38
4.17.3	Procedure	39
4.17.4	Final measurements.....	39
4.17.5	Requirements	40
4.18	Bypass diode testing (MQT 18).....	40
4.18.1	Bypass diode thermal test (MQT 18.1).....	40
4.18.2	Bypass diode functionality test (MQT 18.2)	42
4.19	Stabilization (MQT 19).....	43