



NSAI
Standards

Irish Standard
I.S. EN 61853-1:2011

Photovoltaic (PV) module performance testing and energy rating -- Part 1: Irradiance and temperature performance measurements and power rating (IEC 61853-1:2011 (EQV))

I.S. EN 61853-1:2011

Incorporating amendments/corrigenda issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

<i>This document replaces:</i>	<i>This document is based on:</i> EN 61853-1:2011	<i>Published:</i> 4 March, 2011
This document was published under the authority of the NSAI and comes into effect on: 21 March, 2011		ICS number: 27.160
NSAI 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie
Údarás um Chaighdeán Náisiúnta na hÉireann		

**Photovoltaic (PV) module performance testing and energy rating -
Part 1: Irradiance and temperature performance measurements and power
rating
(IEC 61853-1:2011)**

Essais de performance et caractéristiques
assignées d'énergie des modules
photovoltaïques (PV) -
Partie 1: Mesures de performance en
fonction de l'éclairement et de la
température, et caractéristiques de
puissance
(CEI 61853-1:2011)

Prüfung des Leistungsverhaltens von
photovoltaischen (PV-)Modulen und
Energiebemessung -
Teil 1: Leistungsmessung in Bezug auf
Bestrahlungsstärke und Temperatur sowie
Leistungsbemessung
(IEC 61853-1:2011)

This European Standard was approved by CENELEC on 2011-03-02. 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 Central Secretariat 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 Central Secretariat 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

I.S. EN 61853-1:2011

EN 61853-1:2011

- 2 -

Foreword

The text of document 82/613/FDIS, future edition 1 of IEC 61853-1, prepared by IEC TC 82, Solar photovoltaic energy systems, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61853-1 on 2011-03-02.

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

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2011-12-02
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2014-03-02

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61853-1:2011 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 referenced documents are indispensable for the application 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.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60410	-	Sampling plans and procedures for inspection by attributes	-	-
IEC 60891	2009	Photovoltaic devices - Procedures for temperature and irradiance corrections to measured I-V characteristics	EN 60891	2010
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 reference solar 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 60904-5	-	Photovoltaic devices - Part 5: Determination of the equivalent cell temperature (ECT) of photovoltaic (PV) devices by the open-circuit voltage method	EN 60904-5	-
IEC 60904-7	-	Photovoltaic devices - Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices	EN 60904-7	-
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	2005	Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval	EN 61215	2005
IEC 61646	2008	Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval	EN 61646	2008

This page is intentionally left BLANK.

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope and object.....	6
2 Normative references	6
3 Sampling	7
4 Marking	7
5 Testing and pass criteria	7
6 Report.....	8
7 Power rating conditions	8
7.1 General	8
7.2 STC (Standard Test Conditions).....	9
7.3 NOCT (Nominal Operating Cell Temperature).....	9
7.4 LIC (Low Irradiance Condition).....	9
7.5 HTC (High Temperature Condition)	9
7.6 LTC (Low Temperature Condition).....	9
8 Procedure for irradiance and temperature performance measurements	9
8.1 Purpose	9
8.2 Simplified procedure for linear modules.....	10
8.3 Procedure in natural sunlight with tracker.....	11
8.4 Procedure in natural sunlight without tracker	13
8.5 Procedure with a solar simulator	13
9 Rating of power	15
9.1 Interpolation of I_{SC} , V_{OC} , V_{max} and P_{max}	15
9.1.1 General	15
9.1.2 Interpolation of I_{SC} , V_{OC} , V_{max} and P_{max} with respect to temperature	15
9.1.3 Interpolation of I_{SC} with respect to irradiance	15
9.1.4 Interpolation of V_{OC} with respect to irradiance	15
9.1.5 Interpolation of P_{max} with respect to irradiance	16
9.1.6 Appropriateness of fitting method	16
9.2 Power rating.....	16
Figure 1 – Positions for measuring the temperature of the test module behind the cells	11
Table 1 – Summary of reference power conditions (at AM 1,5).....	9
Table 2 – I_{SC} , P_{max} , V_{OC} and V_{max} versus irradiance and temperature.....	10

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PHOTOVOLTAIC (PV) MODULE
PERFORMANCE TESTING AND ENERGY RATING –**
**Part 1: Irradiance and temperature performance
measurements and power rating**

FOREWORD

- 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 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 61853-1 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

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

FDIS	Report on voting
82/613/FDIS	82/622/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 of the IEC 61853 series can be found, under the general title *Photovoltaic (PV) module performance testing and energy rating*, 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 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.

INTRODUCTION

This International Standard series establishes IEC requirements for evaluating PV module performance based on power (watts), energy (watt-hours) and performance ratio (PR). It is written to be applicable to all PV technologies including non-linear devices, but the methodology does not take into account transient behaviour such as light induced changes and/or thermal annealing.

Included in the IEC 61853 series of standards are: a guide to mapping module performance over a wide range of temperature and irradiance conditions; methods for characterising spectral and angular effects; definition of reference climatic profiles (temperature and irradiance); methods for evaluating instantaneous power and energy results; and a method for stating these results in the form of a numerical rating.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-