



SLOVENSKI STANDARD  
SIST EN 60904-6:2001  
01-september-2001

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Photovoltaic devices -- Part 6: Requirements for reference solar modules

Photovoltaische Einrichtungen -- Teil 6: Anforderungen an Referenz-Solarmodule

Dispositifs photovoltaïques -- Partie 6: Exigences relatives aux modules solaires de référence

ITEH STANDARD PREVIEW  
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Ta slovenski standard je istoveten z: EN 60904-6:1994

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**ICS:**

27.160      Ú [ } } æ } ^ i \* æ      Solar energy engineering

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EUROPEAN STANDARD

EN 60904-6

NORME EUROPEENNE

EUROPAISCHE NORM

November 1994

ICS 31.260

Descriptors: Photovoltaic devices, solar modules, reference solar modules, requirements, calibration

## ENGLISH VERSION

Photovoltaic devices  
Part 6: Requirements for reference solar modules  
(IEC 904-6:1994)

Dispositifs photovoltaïques  
Partie 6: Exigences relatives  
aux modules solaires de  
référence  
(CEI 904-6:1994)

Photovoltaische Einrichtungen  
Teil 6: Anforderungen an  
Referenz-Solarmodule  
(IEC 904-6:1994)

This European Standard was approved by CENELEC on 1994-10-04. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

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Ref. No. EN 60904-6:1994 E

### FOREWORD

The text of document 82(CO)76, as prepared by IEC Technical Committee 82: Solar photovoltaic energy systems, was submitted to the IEC-CENELEC parallel vote in March 1994.

The reference document was approved by CENELEC as EN 60904-6 on 4 October 1994.

The following dates were fixed:

- latest date of publication of  
an identical national standard (dop) 1995-10-01
- latest date of withdrawal of  
conflicting national standards (dow) 1995-10-01

Annexes designated "normative" are part of the body of the standard. In this standard, annex ZA is normative.

### ENDORSEMENT NOTICE

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The text of the International Standard IEC 904-6:1994 was approved by CENELEC as a European Standard without any modification.

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## ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD  
WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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

IEC Publication	Date	Title	EN/HD	Date
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891	1987	Procedures for temperature and irradiance corrections to measured I-V characteristics of crystalline silicon photovoltaic devices	EN 60891	1994
904-1	1987	Photovoltaic devices Part 1: Measurements of photovoltaic current-voltage characteristics	EN 60904-1	1993
904-2	1989	Part 2: Requirements for reference solar cells	EN 60904-2	1993
904-xx	-	Part xx: Computation of spectral mismatch error introduced in the testing of a photovoltaic device (IEC/DIS 82(CO)12)	-	-

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\* EN 60891 includes A1:1992 to IEC 891

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NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD

CEI  
IEC  
904-6

Première édition  
First edition  
1994-09

**Dispositifs photovoltaïques –**

**Partie 6:**

Exigences relatives aux modules solaires  
de référence

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**Photovoltaic devices –**

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**Part 6.**

Requirements for reference solar modules

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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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For price, see current catalogue

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## PHOTOVOLTAIC DEVICES -

## Part 6: Requirements for reference solar modules

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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. The 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 the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

International Standard IEC 904-6 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

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

DIS	Report on voting
82(CO)76	82(CO)77

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 standard is intended to supplement IEC 904-2.



## PHOTOVOLTAIC DEVICES –

### Part 6: Requirements for reference solar modules

#### 1 General

##### 1.1 Scope

This part of IEC 904 gives requirements for the selection, packaging, calibration, marking, and care of reference solar modules. It is intended to supplement IEC 904-2.

##### 1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 904. At the time of publication of this standard, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 904 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 891: 1987, *Procedures for temperature and irradiance corrections to measured I-V characteristics of crystalline silicon photovoltaic devices*

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IEC 904-1: 1987, *Photovoltaic devices – Part 1: Measurements of photovoltaic current-voltage characteristics*

IEC 904-2: 1989, *Photovoltaic devices – Part 2: Requirements for reference solar cells*  
<https://standards.iteh.ai/catalog/standards/sist/595d6ba2-461e-480c-b4f1-8553cd8d54d5/sist-en-60904-6-2001>

IEC/DIS 82(CO)12, *Photovoltaic devices – Part xx: Computation of spectral mismatch error introduced in the testing of a photovoltaic device (future IEC 904-xx)<sup>1)</sup>*

#### 2 Description

A reference solar module is a specially calibrated module which is used to measure natural or simulated irradiance or set simulator irradiance levels for measuring the performance of other modules having similar spectral response, optical characteristics, dimensions and electrical circuitry.

#### 3 Selection

A module selected for calibration as a reference module shall meet the following requirements:

- 1) its photovoltaic characteristics shall be stable (see clause 9);
- 2) it should not contain by-pass diodes;
- 3) if it is made from discrete cells, they shall be matched in short-circuit current and fill factor within  $\pm 2\%$ ;
- 4) the short-circuit current of the reference module shall vary linearly with irradiance over the range of interest.

<sup>1)</sup> At present at the stage of Draft International Standard.