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Photovoltaic systems - Power conditioners - Procedure for measuring efficiency

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 61683:2002 sisaldab Euroopa standardi EN 61683:2000 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 18.12.2002 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 61683:2002 consists of the English text of the European standard EN 61683:2000.</p> <p>This document is endorsed on 18.12.2002 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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English version

**Photovoltaic systems - Power conditioners
Procedure for measuring efficiency
(IEC 61683:1999)**

Systemes photovoltaïques
Conditionneurs de puissance
Procédure de mesure du rendement
(CEI 61683:1999)

Photovoltaische Systeme
Stromrichter - Verfahren zu Messung
des Wirkungsgrades
(IEC 61683:1999)

This European Standard was approved by CENELEC on 2000-01-01. 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.

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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

Foreword

The text of document 82/229/FDIS, future edition 1 of IEC 61683, prepared by IEC TC 82, Solar photovoltaic energy systems, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61683 on 2000-01-01.

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) 2000-10-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2003-01-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annexes A, B, C and D are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61683:1999 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

**Normative references to international publications
with their corresponding 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 (including amendments).

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 60146-1-1	1991	Semiconductor convertors - General requirements and line commutated convertors Part 1-1: Specifications of basic requirements	EN 60146-1-1	1993

INTERNATIONAL
STANDARD

IEC
61683

First edition
1999-11

**Photovoltaic systems –
Power conditioners –
Procedure for measuring efficiency**

*Systèmes photovoltaïques –
Conditionneurs de puissance –
Procédure de mesure du rendement*



Reference number
IEC 61683:1999(E)

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Terminology, graphical and letter symbols

For general terminology, readers are referred to IEC 60050: *International Electrotechnical Vocabulary* (IEV).

For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to publications IEC 60027: *Letter symbols to be used in electrical technology*, IEC 60417: *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets* and IEC 60617: *Graphical symbols for diagrams*.

* See web site address on title page.

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*Systèmes photovoltaïques –
Conditionneurs de puissance –
Procédure de mesure du rendement*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PHOTOVOLTAIC SYSTEMS – POWER CONDITIONERS –
PROCEDURE FOR MEASURING EFFICIENCY**

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 co-operation 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.
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International Standard IEC 61683 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
82/229/FDIS	82/233/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 3.

Annexes A, B, C and D are for information only.

A bilingual version of this standard may be issued at a later date.

The committee has decided that this publication remains valid until 2003. At this date, in accordance with the committee's decision, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

Among the principal characteristics of power conditioners, efficiency is considered as an important factor. A standardized procedure for measuring the efficiency of power conditioners is necessary for their widespread use in photovoltaic systems by increasing the reliability of their claimed efficiency.

Generally speaking, power conditioner efficiency is affected by the following parameters:

- power level;
- input voltage;
- output voltage;
- power factor;
- harmonic content;
- load non-linearity;
- temperature.

These parameters are considered to be included in the test condition of this standard explicitly or implicitly.

The purpose of this standard is to provide the means to evaluate the intrinsic efficiency of power conditioners by a direct measurement of input and output power in the factory. Therefore, indirect items such as maximum power-point tracking accuracy are outside the scope of this document. It is expected that those will be dealt with in future relevant IEC standard(s).

PHOTOVOLTAIC SYSTEMS – POWER CONDITIONERS – PROCEDURE FOR MEASURING EFFICIENCY

1 Scope

This standard describes guidelines for measuring the efficiency of power conditioners used in stand-alone and utility-interactive photovoltaic systems, where the output of the power conditioner is a stable a.c. voltage of constant frequency or a stable d.c. voltage. The efficiency is calculated from a direct measurement of input and output power in the factory. An isolation transformer is included where it is applicable.

2 Normative reference

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60146-1-1:1991, *Semiconductor convertors – General requirements and line commutated convertors – Part 1-1: Specifications of basic requirements*

3 Definitions

For the purposes of this standard, the following definitions apply. All efficiency definitions are applied to electric power conversion alone and do not consider any heat production. The above normative references contain other definitions.

In annex A, the definition of power conditioner is given. Power efficiency and conversion factor are explained in annex B.

3.1

rated output efficiency

ratio of output power to input power when the power conditioner is operating at its rated output

3.2

partial output efficiency

ratio of output power to input power when the power conditioner is operating below its rated output

3.3

energy efficiency

ratio of output energy to input energy during an identified period