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STN	**Koncentrátorové fotovoltické (CPV) moduly a zostavy Posúdenie bezpečnosti**	**STN EN IEC 62688** 36 4650

Concentrator photovoltaic (CPV) modules and assemblies - Safety qualification

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 07/18

Obsahuje: EN IEC 62688:2018, IEC 62688:2017

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62688

February 2018

ICS 27.160

English Version

Concentrator photovoltaic (CPV) modules and assemblies - Safety qualification (IEC 62688:2017)

Modules et ensembles photovoltaïques à concentration - Qualification de la sécurité (IEC 62688:2017)

Konzentrator-Photovoltaik (CPV-)Module und -Anordnungen - Sicherheitsqualifikation (IEC 62688:2017)

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Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN IEC 62688:2018 E

EN IEC 62688:2018

European foreword

The text of document 82/1299/FDIS, future edition 1 of IEC 62688, prepared by IEC/TC 82 "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62688:2018.

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)	2018-08-02
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2021-02-02

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Endorsement notice

The text of the International Standard IEC 62688:2017 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 are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where 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.

Publication	Year	Title	EN/HD	Year
-	-	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests	EN 13501-1:2007 +A1:2009	-
IEC 60060-1	-	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60065	-	Audio, video and similar electronic apparatus - Safety requirements	EN 60065	-
IEC 60112	-	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	-
IEC 60216-5	-	Electrical insulating materials - Thermal endurance properties - Part 5: Determination of relative thermal endurance index (RTE) of an insulating material	EN 60216-5	-
IEC 60243-2	-	Electric strength of insulating materials - Test methods - Part 2: Additional requirements for tests using direct voltage	EN 60243-2	-
IEC 60417-DB	-	Graphical symbols for use on equipment	-	-
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529	-
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC/TR 60664-2-1	2011	Insulation coordination for equipment within low-voltage systems - Part 2-1: Application guide - Explanation of the application of the IEC 60664 series, dimensioning examples and dielectric testing	-	-

EN IEC 62688:2018

Publication	Year	Title	EN/HD	Year
IEC 60664-3	2016	Insulation coordination for equipment within low-voltage systems - Part 3: Use of coating, potting or moulding for protection against pollution	EN 60664-3	2017
IEC 60695-1-10	-	Fire hazard testing - Part 1-10: Guidance for assessing the fire hazard of electrotechnical products - General guidelines	EN 60695-1-10	-
IEC 60695-1-11	-	Fire hazard testing - Part 1-11: Guidance for assessing the fire hazard of electrotechnical products - Fire hazard assessment	EN 60695-1-11	-
IEC 60695-2-10	-	Fire hazard testing - Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure	EN 60695-2-10	-
IEC 60695-11-20	-	Fire hazard testing - Part 11-20: Test flames - 500 W flame test method	EN 60695-11-20	-
IEC 60904-3	-	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data	EN 60904-3	-
IEC 60947-1	-	Low-voltage switchgear and controlgear - Part 1: General rules	EN 60947-1	-
IEC 60950-1 (mod)	2005	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1 +A11 +AC +A12	2006 2009 2011 2011
IEC 61032	-	Protection of persons and equipment by enclosures - Probes for verification	EN 61032	-
IEC 61140	2016	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2016
IEC 61215-2	-	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures	EN 61215-2	-
IEC 61508	Series	Functional safety of electrical/electronic/programmable electronic safety-related systems	EN 61508	Series
IEC 61730-1	2016	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction	EN 61730-1	2016
IEC 61730-2	2016	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing	EN 61730-2	2016
IEC/TS 61836	-	Solar photovoltaic energy systems - Terms, definitions and symbols	-	-

Publication	Year	Title	EN/HD	Year
IEC 62108	2016	Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval	EN 62108	2016
IEC 62305-2	-	Protection against lightning - Part 2: Risk management	EN 62305-2	-
IEC 62305-3	-	Protection against lightning - Part 3: Physical damage to structures and life hazard	EN 62305-3	-
IEC 62548	-	Photovoltaic (PV) arrays - Design requirements	-	-
IEC 62670-1	-	Photovoltaic concentrators (CPV) - Performance testing - Part 1: Standard conditions	EN 62670-1	-
IEC 62790	-	Junction boxes for photovoltaic modules - Safety requirements and tests	EN 62790	-
IEC 62852	2014	Connectors for DC-application in photovoltaic systems - Safety requirements and tests	EN 62852	2015
ISO 179-1	-	Plastics - Determination of Charpy impact properties - Part 1: Non-instrumented impact test	EN ISO 179-1	-
ISO 261	-	ISO general-purpose metric screw threads - General plan	-	-
ISO 262	-	ISO general purpose metric screw threads - Selected sizes for screws, bolts and nuts	-	-
ISO 527	Series	Plastics - Determination of tensile properties	EN ISO 527	Series
ISO 834-1	-	Fire-resistance tests - Elements of building construction - Part 1: General requirements	-	-
ISO/TR 834-3	-	Fire-resistance tests - Elements of building construction - Part 3: Commentary on test method and guide to the application of the outputs from the fire-resistance test	-	-
ISO 1456	-	Metallic and other inorganic coatings - Electrodeposited coatings of nickel, nickel plus chromium, copper plus nickel and of copper plus nickel plus chromium	EN ISO 1456	-
ISO 1461	-	Hot dip galvanized coatings on fabricated iron and steel articles_- Specifications and test methods	EN ISO 1461	-
ISO 2081	-	Metallic and other inorganic coatings - Electroplated coatings of zinc with supplementary treatments on iron or steel	EN ISO 2081	-
ISO 2093	-	Electroplated coatings of tin; Specification and test methods	-	-

EN IEC 62688:2018

Publication	Year	Title	EN/HD	Year
ISO 4892-2	-	Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps	EN ISO 4892-2	-
ISO 5657	-	Reaction to fire tests - Ignitability of building products using a radiant heat source	-	-
ISO 8124-1	-	Safety of toys - Part 1: Safety aspects related to mechanical and physical properties	-	-
ENV 1187-1 to -4		Test methods for roof coverings under the influence of a thermal attack of burning brands and radiant heat		
ANSI/UL 790	2004	Standard for Standard Test Methods for Fire Tests of Roof Coverings	-	-
ANSI/UL 746B	-	Standard for Polymeric Materials - Long Term Property Evaluations	-	-
ANSI/UL 746C	-	Standard for Polymeric Materials - Use in Electrical Equipment Evaluations	-	-
ANSI/UL 1703	-	Standard for Flat-Plate Photovoltaic Modules and Panels	-	-
ASTM E162-13	-	Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source	-	-
ASTM D3755-14	-	Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials Under Direct-Voltage Stress	-	-
ASTM D257-14	-	Standard Test Methods for DC Resistance or Conductance of Insulating Materials	-	-
ASTM D1002-10	-	Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)	-	-

IEC 62688

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INTERNATIONAL STANDARD

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Concentrator photovoltaic (CPV) modules and assemblies – Safety qualification

IEC 62688:2017-09(en)

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Concentrator photovoltaic (CPV) modules and assemblies – Safety qualification

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ELECTROTECHNICAL
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CONTENTS

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CONCENTRATOR PHOTOVOLTAIC (CPV) MODULES AND ASSEMBLIES – SAFETY QUALIFICATION

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.
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International Standard IEC 62688 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
82/1299/FDIS	82/1323/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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CONCENTRATOR PHOTOVOLTAIC (CPV) MODULES AND ASSEMBLIES – SAFETY QUALIFICATION

1 Scope

This document describes the fundamental construction and testing requirements for Concentrator Photovoltaic (CPV) modules and assemblies in order to provide safe electrical and mechanical operation during their expected lifetime. Specific topics are provided to assess the prevention of electrical shock, fire hazards, and personal injury due to mechanical and environmental stresses.

This document attempts to define the basic requirements for various application classes of concentrator photovoltaic modules and assemblies, but it cannot be considered to encompass all national and regional codes.

This document is designed so that its test sequence can coordinate with those of IEC 62108, so that a single set of samples may be used to perform both the safety and performance evaluation of a CPV module and assembly.

CPV modules that are constructed in the flat plate module format and operate at 3X and less geometric concentration ratio are considered for evaluation to IEC 61730-1 and IEC 61730-2.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60065, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60216-5, *Electrical insulating materials – Thermal endurance properties – Part 5: Determination of relative thermal endurance index (RTE) of an insulating material*

IEC 60243-2, *Electric strength of insulating materials – Test methods – Part 2: Additional requirements for tests using direct voltage*

IEC 60417, *Graphical symbols for use on equipment – 12-month subscription to regularly updated online database comprising all graphical symbols published in IEC 60417*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2007, *Insulation co-ordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC TR 60664-2-1:2011, *Insulation coordination for equipment within low-voltage systems – Part 2-1: Application guide – Explanation of the application of the IEC 60664 series, dimensioning examples and dielectric testing*

IEC 60664-3:2016, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60695-1-10, *Fire hazard testing – Part 1-10: Guidance for assessing the fire hazard of electrotechnical products – General guidelines*

IEC 60695-1-11, *Fire hazard testing – Part 1-11: Guidance for assessing the fire hazard of electrotechnical products – Fire hazard assessment*

IEC 60695-2-10, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-11-20, *Fire hazard testing – Part 11-20: Test flames – 500 W flame test method*

IEC 60904-3, *Photovoltaic devices – Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data*

IEC 60947-1, *Low-voltage switchgear and control gear – Part 1: General rules*

IEC 60950-1:2005, *Information technology equipment – Safety – Part 1: General requirements*

IEC 61032, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

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

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

IEC 61730-1:2016, *Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction*

IEC 61730-2:2016, *Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing*

IEC TS 61836, *Solar photovoltaic energy systems – Terms, definitions and symbols*

IEC 62108:2016, *Concentrator photovoltaic (CPV) modules and assemblies – Design qualification and type approval*

IEC 62305-2, *Protection against lightning – Part 2: Risk management*

IEC 62305-3, *Protection against lightning – Part 3: Physical damage to structures and life hazard*

IEC 62548, *Photovoltaic (PV) arrays – Design requirements*

IEC 62670-1, *Concentrator photovoltaic (CPV) performance testing – Part 1: Standard conditions*

IEC 62790, *Junction boxes for photovoltaic modules – Safety requirements and tests*

IEC 62852:2014, *Connectors for DC-application in photovoltaic systems – Safety requirements and tests*

ISO 179-1, *Plastics – Determination of Charpy impact properties – Part 1: Non-instrumented impact test*

ISO 261, *ISO general-purpose metric screw threads – General plan*

ISO 262, *ISO general-purpose metric screw threads – Selected sizes for screws, bolts and nuts. Media and price*

ISO 527 (all parts), *Plastics – Determination of tensile properties*

ISO 834-1, *Fire-resistance tests – Elements of building construction – Part 1: General Requirements*

ISO TR 834-3, *Fire-resistance tests – Elements of building construction – Part 3: Commentary on test method and test data application* guide to the application of the outputs from the fire-resistance test

ISO 1456, *Metallic and other inorganic coatings – Electrodeposited coatings of nickel, nickel plus chromium, copper plus nickel and of copper plus nickel plus chromium*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods*

ISO 2081, *Metallic coatings – Electroplated coatings of zinc with supplementary treatments on iron or steel*

ISO 2093, *Electroplated coatings of tin – Specification and test methods*

ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

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ISO 8124-1, *Safety of toys – Part 1: Safety aspects related to mechanical and physical properties*

ENV 1187-1 to -4, *Test methods for roof coverings under the influence of a thermal attack of burning brands and radiant heat*

ANSI/UL 790 (April 2004), *Standard Test Methods for Fire Tests of Roof Coverings*

ANSI/UL 746B, *Standard for Polymeric Materials – Long Term Property Evaluations*

UL 746C, *Standard for Polymeric Materials – Use in Electrical Equipment Evaluations*

UL 1703, *Standard for Flat-Plate Photovoltaic Modules and Panels*

ASTM E162-13, *Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source*

ASTM D3755-14, *Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials Under Direct-Voltage Stress*

ASTM D257-14, *Standard Test Methods for DC Resistance or Conductance of Insulating Materials*

ASTM D1002-10, *Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)*

EN 13501-1:2007 + A1, *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests*