



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

ILNAS-EN IEC 62108:2022

**Concentrator photovoltaic (CPV)
modules and assemblies - Design
qualification and type approval**

Modules et ensembles photovoltaïques à
concentration - Qualification de la
conception et homologation

Konzentrator-Photovoltaik(CPV)-Module
und -Anordnungen - Bauarteignung und
Bauartzulassung

07/2022



National Foreword

This European Standard EN IEC 62108:2022 was adopted as Luxembourgish Standard ILNAS-EN IEC 62108:2022.

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!

ILNAS-EN IEC 62108:2022

EUROPEAN STANDARD **EN IEC 62108**

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2022

ICS 27.160

Supersedes EN 62108:2016

English Version

**Concentrator photovoltaic (CPV) modules and assemblies -
Design qualification and type approval
(IEC 62108:2022)**

Modules et ensembles photovoltaïques à concentration -
Qualification de la conception et homologation
(IEC 62108:2022)

Konzentrator-Photovoltaik(CPV)-Module und -Anordnungen
- Bauartzeichnung und Bauartzulassung
(IEC 62108:2022)

This European Standard was approved by CENELEC on 2022-07-07. 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 82/2024/FDIS, future edition 3 of IEC 62108, prepared by IEC/TC 82 "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62108:2022.

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) 2023-04-07
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-07-07

This document supersedes EN 62108:2016 and all of its amendments and corrigenda (if any).

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 62108:2022 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60664-1	2020	Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests	EN IEC 60664-1	2020
IEC 60721-2-1	-	Classification of environmental conditions - Part 2-1: Environmental conditions appearing in nature - Temperature and humidity	EN 60721-2-1	-
IEC 60904-1	2020	Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics	EN IEC 60904-1	2020
IEC 60904-1-1	2017	Photovoltaic devices - Part 1-1: Measurement of current-voltage characteristics of multi-junction photovoltaic (PV) devices	EN 60904-1-1	2017
IEC/TS 60904-1-2	2019	Photovoltaic devices - Part 1-2: Measurement of current-voltage characteristics of bifacial photovoltaic (PV) devices	-	-
IEC 60904-2	2015	Photovoltaic devices - Part 2: Requirements for photovoltaic reference devices	EN 60904-2	2015
IEC 60904-3	2019	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data	EN IEC 60904-3	2019
IEC 60904-4	2019	Photovoltaic devices - Part 4: Reference solar devices - Procedures for establishing calibration traceability	EN IEC 60904-4	2019
IEC 60904-5	2011	Photovoltaic devices - Part 5: Determination of the equivalent cell temperature (ECT) of photovoltaic (PV) devices by the open-circuit voltage method	EN 60904-5	2011

IEC 60904-7	2019	Photovoltaic devices - Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices	EN IEC 60904-7	2019
IEC 60904-8	2014	Photovoltaic devices - Part 8: Measurement of spectral responsivity of a photovoltaic (PV) device	EN 60904-8	2014
IEC 60904-8-1	2017	Photovoltaic devices - Part 8-1: Measurement of spectral responsivity of multi-junction photovoltaic (PV) devices	EN 60904-8-1	2017
IEC 61140	2016	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2016
IEC 61210 (mod)	2010	Connecting devices - Flat quick-connect terminations for electrical copper conductors - Safety requirements	EN 61210	2010
IEC 61215-1	2021	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: Test requirements	EN IEC 61215-1	2021
IEC 61215-2	2021	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures	EN IEC 61215-2	2021
IEC/TS 61836	2016	Solar photovoltaic energy systems - Terms, definitions and symbols		-
IEC 61853-1	2011	Photovoltaic (PV) module performance testing and energy rating - Part 1: Irradiance and temperature performance measurements and power rating	-	-
IEC 61853-2	2016	Photovoltaic (PV) module performance testing and energy rating - Part 2: Spectral responsivity, incidence angle and module operating temperature measurements	EN 61853-2	2016
IEC 61853-3	2018	Photovoltaic (PV) module performance testing and energy rating - Part 3: Energy rating of PV modules	EN IEC 61853-3	2018
IEC 62670-1	-	Photovoltaic concentrators (CPV) - Performance testing - Part 1: Standard conditions	EN 62670-1	-
IEC 62670-3	2017	Photovoltaic concentrators (CPV) - Performance testing - Part 3: Performance measurements and power rating	EN 62670-3	2017
IEC 62790	2020	Junction boxes for photovoltaic modules - Safety requirements and tests	EN IEC 62790	2020
IEC 62852	2014	Connectors for DC-application in photovoltaic systems - Safety requirements and tests	EN 62852	2015
+ A1	2020		+ A1	2020
-	-		+ AC	2019-02



INTERNATIONAL STANDARD

NORME INTERNATIONALE

Concentrator photovoltaic (CPV) modules and assemblies – Design qualification and type approval

Modules et ensembles photovoltaïques à concentration – Qualification de la conception et homologation

CONTENTS

FOREWORD	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	9
4 Sampling	10
5 Marking	11
6 Testing	11
7 Pass criteria	12
8 Report	20
9 Modifications	21
10 Test procedures	21
10.1 Visual inspection	21
10.1.1 General	21
10.1.2 Procedure	21
10.1.3 Major visual defects	22
10.1.4 Requirements	22
10.2 Electrical performance measurement	22
10.2.1 Purpose	22
10.2.2 Outdoor side-by-side I-V measurement	22
10.2.3 Solar simulator I-V measurement	24
10.2.4 Dark I-V measurement	24
10.3 Ground path continuity test	25
10.3.1 General	25
10.3.2 Purpose	25
10.3.3 Procedure	25
10.3.4 Requirements	25
10.4 Electrical insulation test	26
10.4.1 Purpose	26
10.4.2 Procedure	26
10.4.3 Requirements	26
10.5 Wet insulation test	27
10.5.1 Purpose	27
10.5.2 Procedure	27
10.5.3 Requirements	27
10.6 Thermal cycling test	27
10.6.1 Purpose	27
10.6.2 Test sample	28
10.6.3 Procedure	28
10.6.4 Procedure for active cooling system	30
10.6.5 Requirements	30
10.7 Damp heat test	31
10.7.1 Purpose	31
10.7.2 Test sample	31
10.7.3 Procedure	31
10.7.4 Requirements	32

10.8	Humidity freeze test	32
10.8.1	Purpose	32
10.8.2	Test sample	32
10.8.3	Procedure	32
10.8.4	Requirements	32
10.9	Hail impact test	33
10.9.1	Purpose	33
10.9.2	Apparatus	33
10.9.3	Procedure	34
10.9.4	Requirements	34
10.10	Dust and water ingress protection test	34
10.10.1	Purpose	34
10.10.2	Procedure	35
10.10.3	Requirements	35
10.11	Bypass/blocking diode thermal test	35
10.11.1	Purpose	35
10.11.2	Test sample	35
10.11.3	Apparatus	35
10.11.4	Procedure	36
10.11.5	Requirements	36
10.11.6	Procedure 2 – Alternate method	36
10.12	Robustness of terminations test	37
10.12.1	Purpose	37
10.12.2	Procedure	38
10.12.3	Requirements	38
10.13	Mechanical load test	38
10.13.1	Purpose	38
10.13.2	Procedure	39
10.13.3	Requirements	39
10.14	Off-axis beam damage test	39
10.14.1	General	39
10.14.2	Purpose	39
10.14.3	Special case	39
10.14.4	Procedure	40
10.14.5	Requirements	40
10.15	Outdoor exposure test	40
10.15.1	Purpose	40
10.15.2	Procedure	40
10.15.3	Requirements	41
10.16	Hot-spot endurance test	41
Annex A	(informative) Summary of test conditions and requirements	42
Annex B	(normative) Retesting guideline	45
B.1	Product or process modifications requiring limited retesting to maintain certification	45
B.2	Modifications of CPV cell technology	45
B.3	Modifications in optical encapsulation on the cell (Includes optical coupling between the cell and a glass secondary optical element bonded to the cell)	46
B.4	Modification in cell encapsulation outside of intended light path	46
B.5	Modification of cell package substrate used for heat transfer	46

B.6	Accessible optics (primary or secondary)	47
B.7	Inaccessible optics (secondary)	47
B.8	Frame and/or mounting structure	47
B.9	Enclosure	48
B.10	Wiring compartment/junction box	48
B.11	Interconnection terminals	48
B.12	Interconnection materials or technique (to cells and between receivers)	49
B.13	Change in electrical circuit design in an identical package	49
B.14	Output power	49
B.15	Thermal energy transfer means	50
B.16	Adhesives	50
Figure 1	– Schematic of point-focus dish PV concentrator.....	14
Figure 2	– Schematic of linear-focus trough PV concentrator	15
Figure 3	– Schematic of point-focus Fresnel lens PV concentrator	16
Figure 4	– Schematic of linear-focus Fresnel lens PV concentrator	17
Figure 5	– Schematic of a heliostat CPV	18
Figure 6	– Qualification test sequence for CPV modules	19
Figure 7	– Qualification test sequence for CPV assemblies.....	20
Figure 8	– Temperature and current profile of thermal cycle test (not to scale)	31
Figure 9	– Profile of humidity-freeze test conditions	33
Figure 10	– Bypass diode thermal test	37
Table 1	– Terms used for CPV	10
Table 2	– Allocation of test samples to typical test sequences	12
Table 3	– Thermal cycle test options for sequence A	29
Table 4	– Humidity freeze test options for sequence B.....	32
Table 5	– Minimum wind loads	38
Table A.1	– Summary of test conditions and requirements	42