

Photovoltaic (PV) modules - Transportation testing -
Part 1: Transportation and shipping of module package
units

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 62759-1:2022 sisaldab Euroopa standardi EN IEC 62759-1:2022 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 62759-1:2022 consists of the English text of the European standard EN IEC 62759-1:2022.
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English Version

Photovoltaic (PV) modules - Transportation testing - Part 1:
Transportation and shipping of module package units
(IEC 62759-1:2022)

Modules photovoltaïques (PV) - Essais de transport -
Partie 1: Transport et expédition d'unités d'emballage de
modules
(IEC 62759-1:2022)

Photovoltaik (PV)-Module - Transportprüfung - Teil 1:
Transport und Versand von PV-Modulpaketen
(IEC 62759-1:2022)

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European foreword

The text of document 82/2029/FDIS, future edition 2 of IEC 62759-1, prepared by IEC/TC 82 "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62759-1:2022.

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) 2023-05-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-08-11

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-64 NOTE Harmonized as EN 60068-2-64

ISO 13355:2016 NOTE Harmonized as EN ISO 13355:2016 (not modified)

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Photovoltaic (PV) modules – Transportation testing –
Part 1: Transportation and shipping of module package units**

**Modules photovoltaïques (PV) – Essais de transport –
Partie 1: Transport et expédition d'unités d'emballage de modules**



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INTERNATIONAL STANDARD

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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TRANSPORTATION TESTING –****Part 1: Transportation and shipping of module package units****FOREWORD**

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IEC 62759-1 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems. It is an International Standard.

This second edition cancels and replaces the first edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Cancellation of tests and references to relevant standards for CPV.
- b) Deletion of different classes for PV modules.
- c) Deletion of requirement for minimum 10 modules per shipping unit.
- d) Implementation of stabilization as intermediate measurement.
- e) Addition of pass/fail criteria.
- f) Change of requirements for retesting.

g) Change of number of cycles in dynamic mechanical load test. See also clause 6.4.2.1.

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

Draft	Report on voting
82/2029/FDIS	82/2052/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the IEC 62759 series, published under the general title *Photovoltaic (PV) modules – Transportation testing*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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- replaced by a revised edition, or
- amended.

PHOTOVOLTAIC (PV) MODULES – TRANSPORTATION TESTING –

Part 1: Transportation and shipping of module package units

1 Scope

Photovoltaic (PV) modules are electrical devices intended for continuous outdoor exposure during their lifetime. Existing type approval standards do not consider mechanical stresses that may occur during transportation to the PV installation destination.

This part of IEC 62759 describes methods for the simulation of transportation of complete package units of modules and combined subsequent environmental impacts.

A list of design modifications which require a retest is provided in Annex B.

This document applies to flat plate photovoltaic modules.

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 60068-2-27:2008, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC TS 60904-13, *Photovoltaic devices – Part 13: Electroluminescence of photovoltaic modules*

IEC 61215-1:2021, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1: Test requirements*

IEC 61215-2:2021, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures*

IEC 61730-2:2022, *Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing*

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

IEC TS 62782:2016, *Photovoltaic (PV) modules – Cyclic (dynamic) mechanical load testing*

ASTM D880-92, *Standard Test Method for Impact Testing for Shipping Containers and Systems*

ASTM D4169-16, *Standard Practice for Performance Testing of Shipping Containers and Systems*

ASTM D4728:2006, *Standard Test Method for Random Vibration Testing of Shipping Containers*

ASTM D5277-92, *Test method for performing programmed horizontal impact using an inclined impact tester*

ISTA 3E:2017, *Unitized Loads of Same Product*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC TS 61836 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

bandwidth

difference in Hz between the upper and lower limits of a frequency band

Note 1 to entry: For the purposes of the described test method, the bandwidth may be considered equivalent to the frequency resolution of a spectrum analysis.

3.2

overall g_{RMS}

square root of the integral of power spectral density over the total frequency range

Note 1 to entry: It describes the severity or harshness of the testing grade.

3.3

root mean square

RMS

square root of the mean square value

Note 1 to entry: In the exclusive case of a sine wave, the RMS value is 0,707 times peak value.

3.4

random vibration

oscillation whose instantaneous amplitude is not prescribed for any given instant in time

Note 1 to entry: The instantaneous amplitudes of a random vibration are prescribed by a probability distribution function, the integral of which, over a given amplitude range, will give the probable percentage of time that the amplitude will fall within that range.

Note 2 to entry: Random vibration contains no periodic or quasi-periodic components.

3.5

packaging

material and technology used to protect goods from transportation stresses and separate individual units from each other

3.6

power spectral density

PSD

expression of random vibration in terms of mean square acceleration per unit of frequency

Note 1 to entry: Power spectral density is the limit of the mean square amplitude in a given rectangular waveband divided by the bandwidth, as the bandwidth approaches zero.

Note 2 to entry: The units are $(m/s^2)^2/Hz$, it is equal to m^2/s^3 . The coherent non-SI unit is g^2/Hz .