

BUREAU OF INDIAN STANDARDS
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Draft Indian Standard

Photovoltaic (PV) Arrays Part 1: Design Requirements
(First Revision)

(ICS 27.160)

Solar Photovoltaic Energy
Systems Sectional Committee, ETD 28

Last date for comments- 02 07 2024

NATIONAL FOREWORD

This draft Indian Standard (Part 1) (First Revision) which is Identical with IEC 62548-1: 2023 'Photovoltaic (PV) Arrays Part 1 Design Requirements' issued by the International Electrotechnical Commission (IEC) will be adopted by the Bureau of Indian Standards on the recommendation of the Solar Photovoltaic Energy Systems Sectional Committee and approval of the Electrotechnical Division Council.

This standard was originally published in 2020 identical to IEC 62548: 2016. The first revision of this standard has been undertaken to align with the latest version of IEC 62548-1: 2023.

The text of the IEC Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appears referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker, while in Indian Standards the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to International Standards for which Indian Standards also exists. The corresponding Indian Standards, which are to be substituted, are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
IEC 60228, Conductors of insulated cables	IS 8130 : 2013 Conductors For Insulated Electric Cables And Flexible Cords — Specification <i>(Second Revision)</i>	Modified/Technically Equivalent

IEC 60269-1, Low-voltage fuses – Part 1: General requirements	IS/IEC 60269-1 : 2014 Low-Voltage Fuses Part 1 General Requirements	Identical
IEC 60269-6, Low-voltage fuses – Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems	IS/IEC 60269-6 : 2010 Low-Voltage Fuses Part 6 Supplementary Requirements for Fuse-Links for the Protection of Solar Photovoltaic Energy Systems	Identical
IEC 60529, Degrees of protection provided by enclosures (IP Code)	IS/ IEC 60529 : 2001 Degrees Of Protection Provided By Enclosures (IP CODE)	Identical
IEC 60898-2, Circuit-breakers for overcurrent protection for household and similar installations – Part 2: Circuit-breakers for AC and DC operation	IS/IEC 60898-2 : 2016 Electrical Accessories — Circuit Breakers for Overcurrent Protection for Household and Similar Installations Part 2 Circuit-Breakers for a.c. and d.c. Operation (<i>First Revision</i>)	Identical
IEC 60898-3, Circuit-breakers for overcurrent protection for household and similar installations – Part 3: Circuit-breakers for DC operation	IS/IEC 60898-3 : 2019 + AMD 1 : 2022 Electrical Accessories — Circuit Breakers for Overcurrent Protection for Household and Similar Installations Part 3 Circuit-Breakers for d.c. Operation	Identical
IEC 60947-1:2020, Low-voltage switchgear and controlgear – Part 1: General rules	IS/IEC 60947-1 : 2020 Low-Voltage Switchgear and Controlgear Part 1 General Rules (<i>Second Revision</i>)	Identical
IEC 60947-2, Low-voltage switchgear and controlgear – Part 2: Circuit-breakers	IS/IEC 60947-2 : 2016 Low-Voltage Switchgear and Controlgear Part 2 Circuit-Breakers (<i>First Revision</i>)	Identical
IEC 60947-3, Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	IS/IEC 60947-3 : 2020 Low-Voltage Switchgear and Controlgear Part 3 Switches, Disconnectors, Switch Disconnectors and Fuse-Combination Units (<i>Second Revision</i>)	Identical
IEC 61439-1, Low-voltage switchgear and controlgear assemblies – Part 1: General rules	IS/IEC 61439-1 : 2020 Low-Voltage Switchgear and Controlgear Assemblies Part 1 General Rules (<i>First Revision</i>)	Identical
IEC 61439-2, Low-voltage switchgear and controlgear assemblies – Part 2: Power	IS/IEC 61439-2 : 2020 Low-Voltage Switchgear and Controlgear Assemblies Part 2	Identical

switchgear and controlgear assemblies	Power Switchgear and Controlgear Assemblies (<i>First Revision</i>)	
IEC 61701, Photovoltaic (PV) modules – Salt mist corrosion testing	IS/IEC 61701: 1995 Salt Mist Corrosion Testing Of Photovoltaic (PV) Modules	Identical
IEC 61730-1, Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction	IS/IEC 61730-1 : 2016 Photovoltaic (PV) Module Safety Qualification Part 1 Requirements for Construction (<i>First Revision</i>)	Identical
IEC 61730-2, Photovoltaic (PV) Module Safety Qualification – Part 2: Requirements For Testing	IS/IEC 61730-2 : 2016 Photovoltaic (PV) Module Safety Qualification Part 2 Requirements for Testing (<i>First Revision</i>)	Identical
IEC TS 61836:2016, Solar Photovoltaic Energy Systems – Terms, Definitions And Symbols	IS 12834 : 2023 / IEC TS 61836 : 2016 Solar Photovoltaic Energy Systems — Terms, Definitions and Symbols (<i>Second Revision</i>)	Identical
IEC 62109-1:2010, Safety of Power Converters For Use In Photovoltaic Power Systems – Part 1: General requirements	IS 16221 (Part 1) : 2016 / IEC 62109-1 : 2010 Safety of Power Converters for use in Photovoltaic Power Systems Part 1 General Requirements	Identical
IEC 62109-2, Safety of Power Converters For Use In Photovoltaic Power Systems – Part 2: Particular Requirements For Inverters	IS 16221 (Part 2) : 2015 / IEC 62109-2 : 2011 Safety of Power Converters for Use in Photovoltaic Power Systems Part 2 Particular Requirements for Inverters	Identical
IEC 62109-3, Safety Of Power Converters For Use In Photovoltaic Power Systems – Part 3: Particular Requirements For Electronic Devices In Combination With Photovoltaic Elements	IS 16221 (Part 3) : 2023 / IEC 62109-3 : 2020 Safety of Power Converters for Use in Photovoltaic Power Systems Part 3 Particular Requirements for Electronic Devices in Combination with Photovoltaic Elements	Identical
IEC 62305-2: 2010, Protection Against Lightning – Part 2: Risk Management	IS/IEC 62305-2 : 2010 Protection Against Lightning Part 2 Risk Management	Identical
IEC 62305-3, Protection Against Lightning – Part 3: Physical Damage To Structures And Life Hazard	IS/IEC 62305-3 : 2010 Protection Against Lightning Part 3 Physical Damage to Structures and Life Hazard	Identical
IEC 62446-1, Photovoltaic (PV) Systems – Requirements For	IS 16960 (Part 1) : 2018 / IEC 62446-1 : 2016 Photovoltaic (PV)	Identical

Testing, Documentation And Maintenance – Part 1: Grid Connected Systems – Documentation, Commissioning Tests And Inspection	Systems — Requirements for Testing, Documentation and Maintenance Part 1 Grid Connected Systems — Documentation, Commissioning Tests and Inspection	
IEC 62446-2, Photovoltaic (PV) systems – Requirements For Testing, Documentation And Maintenance – Part 2: Grid Connected Systems – Maintenance of PV systems	IS 16960 (Part 2) : 2023 / IEC 62446-2 : 2020 Photovoltaic (PV) Systems — Requirements for Testing, Documentation and Maintenance Part 2 Grid Connected Systems — Maintenance of PV Systems	Identical
IEC 62716, Photovoltaic (PV) modules – Ammonia corrosion testing	IS 16664 : 2018 / IEC 62716 : 2013 Photovoltaic (PV) Modules — Ammonia Corrosion Testing	Identical
IEC TS 62738, Ground-Mounted Photovoltaic Power Plants – Design Guidelines And Recommendations	IS/IEC TS 62738 : 2018 Ground-Mounted Photovoltaic Power Plants — Design Guidelines and Recommendations	Identical
IEC TS 62804-1, Photovoltaic (PV) Modules – Test Methods For The Detection Of Potential-Induced Degradation – Part 1: Crystalline Silicon	IS 17210 (Part 1) : 2019 / IEC TS 62804-1 : 2015 Photovoltaic (PV) Modules — Test Methods for the Detection of Potential-Induced Degradation Part 1 Crystalline Silicon	Identical
IEC 62817, Photovoltaic Systems – Design Qualification Of Solar Trackers	IS/IEC 62817 : 2017 Photovoltaic System — Design Qualification of Solar Trackers	Identical
IEC 62852, Connectors for DC-application in photovoltaic systems – Safety requirements and tests	IS 16781 : 2018 / IEC 62852 : 2014 Connectors for D.C. Application in Photovoltaic Systems — Safety Requirements and Tests	Identical
IEC 62930:2017, Electric cables for photovoltaic systems with a voltage rating of 1,5 kV DC	IS 17293 : 2020 Electric Cables for Photovoltaic Systems for Rated Voltage 1 500 V d.c.	Technically Equivalent
IEC 62941, Terrestrial photovoltaic (PV) modules – Quality system for PV module manufacturing	IS 18114 : 2023 / IEC 62941 : 2019 Terrestrial Photovoltaic (PV) Modules — Quality System for PV Module Manufacturing (<i>First Revision</i>)	Identical
IEC TS 63126:2020, Guideline for qualifying PV modules, components and materials for operation at high temperatures	IS 17959 : 2023 / IEC TS 63126 : 2020 Guidelines for Qualifying PV Modules, Components and Materials for Operation at High Temperatures	Identical

IEC TR 63226:2021, Managing risk related to photovoltaic (PV) systems on buildings	IS 17963 : 2024 / IEC TR 63226 : 2021 Managing Fire Risk Related To Photovoltaic (PV) Systems On Buildings	Identical
IEC TR 63227, Lightning And Surge Voltage Protection For Photovoltaic (PV) Power Supply Systems	IS 17978 : 2022 / IEC TR 63227 : 2020 Lightning and Surge Voltage Protection for Photovoltaic (PV) Power Supply Systems (<i>First Revision</i>)	Identical

The technical committee has reviewed the provision of the following International Standard referred in this adopted standard and has decided that it is acceptable for use in conjunction with this standard:

<i>International Standard</i>	<i>Title</i>
IEC 60364-1	Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions
IEC 60364-4 (all parts)	Low-voltage electrical installations – Part 4: Protection for safety
IEC 60364-4-41:2005 IEC 60364-4-41:2005/AMD1:2017	Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock
IEC 60364-4-44:2007 IEC 60364-4-44:2007/AMD1:2015 IEC 60364-4-44:2007/AMD2:2018	Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances
IEC 60364-5 (all parts)	Electrical installations of buildings – Part 5: Selection and erection of electrical equipment
IEC 60364-5-52	Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems
IEC 60364-5-54	Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors
IEC 60364-6	Low-voltage electrical installations – Part 6: Verification
IEC 61215 (all parts)	Terrestrial photovoltaic (PV) modules – Design qualification and type approval
IEC 61643-21	Low-voltage surge protective devices – Part 21: Surge protective devices connected to telecommunications and signalling networks – Performance requirements and testing methods
IEC 61643-22	Low-voltage surge protective devices – Part 22: Surge protective devices connected to telecommunications and signalling networks – Selection and application principles
IEC 61643-31: 2018	Low-voltage surge protective devices – Part 31: Requirements and test methods for SPDs for photovoltaic installations
IEC 62440: 2008	Electric cables with a rated voltage not exceeding 450/750 V – Guide to use
IEC 62938	Photovoltaic (PV) modules – Non-uniform snow load testing
IEC 63027	Photovoltaic power systems – DC arc detection and interruption

IEC 63104	Solar trackers – Safety requirements
IEC 63112: 2021	Photovoltaic (PV) arrays – Earth fault protection equipment – Safety and safety-related functionality
IEC TS 63209-1	Photovoltaic modules – Extended-stress testing – Part 1: Modules

Only English language text has been retained while adopting it in this Indian Standard, and as such the page numbers given here are not the same as in the International Standard.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test, shall be rounded off in accordance with IS 2: 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

NOTE — The technical content of their document has not been enclosed as there are identical with the corresponding IEC standards for details, please refer the corresponding IEC 62548-1: 2023 or kindly contact:

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