

Photovoltaic power plants – Minimum technical requirements

All selected components as well as the complete system shall be designed and installed in accordance with the international and national standards and following the rules of good engineering practice.

All components and the complete system shall be designed and installed in a way that they withstand all ambient and operational conditions at their place of installation. Any component or material installed outside shall be resistant against the effects of solar UV irradiation.

PV systems shall be planned and designed in accordance with but not limited to the following standard: **IEC 62548:2016** Photovoltaic (PV) arrays - Design requirements

PV modules

Standard crystalline or thin film modules shall be installed.

Only PV modules tested and certified according to the minimum quality standards **IEC 61215 all parts (latest version 2016)** for crystalline modules and for thin film are eligible.

Regarding electrical safety **IEC 61730** tests and certification is required.

Module types with “PID free” (Potential induced degradation) and testing certification (**IEC TS 62804-1**) shall be selected.

Modules shall be certified for snow loads of 5400 Pascal.

Inverters

Standard inverters shall be installed. Inverter types shall comply to the relevant IEC standards (e.g. **IEC 62109-1/2**) and according to the national regulations. Especially the local standards and requirements of the grid operator for grid connection (e.g. grid code) must be met.

Instrumentation/Control

A complete Monitoring system, preferably with PV module string monitoring, shall be installed. The system shall include at least one complete meteorological station with horizontal pyranometer and pyranometer on PV module plane; ambient and PV module temperature sensor. Data logging capacities and power backup shall be provided.

The monitoring system shall provide local and remote access and should be able to record main plant performance data for a minimum of one year.

Installation and commissioning

For a safe electrical installation of the system the requirements of IEC 60364 shall be met; for the DC installation especially IEC 60364 – 7- 712.

For commissioning and testing IEC 62446 applies. The corresponding commissioning and safety tests should be documented and stored according to the standard.

Place of installation and mounting system

- Justification of structural design for foundations and module mounting structures, especially considering wind loads and snow loads according to international and local standards shall be provided for foundations and module mounting structures.
- If required geotechnical analysis and third party structural analysis shall be provided.

Warranties

- Minimum 5 years of warranty for all components, the complete installation including workmanship for replacements or repair.
- Minimum five years of warranty for inverters.
- For PV modules a product warranty at least for 10 years as well as a linear performance warranty guaranteeing a minimum output of 80% after 25 years.

Maintenance

The system documentation to be provided shall include manuals for installation and operation as well as a maintenance manual with information and a schedule for preventive maintenance works according to IEC 62446 standard.