



Global Service & Certification for Thin Film & Crystalline Photovoltaic

When Every Part Counts Choose Experience

Photovoltaic Module Testing

There are two main types of Photovoltaic Modules, Crystalline silicon and thin film silicon. While all of these technologies are used to generate electricity from solar energy, there are some differences that exist in their manufacturing process, and these differences affect the performance of the modules. TÜV Rheinland is a global leader in this area of certification.

Certification of PV modules

Manufacturers achieve a smooth entry into Europe and other markets by marking the module with the TUVdotCOM ID and DIN mark. Modules are to be tested and certified as per their applicable standards:

- IEC / EN 61215; Crystalline silicon terrestrial photovoltaic module – Design qualification and type approval.
- IEC / EN 61730-1; Photovoltaic module safety qualification-Construction.
- IEC / EN 61730-2; Photovoltaic module safety qualification-Testing.
- IEC / EN 61646; Thin film terrestrial photovoltaic modules.
- IEC 61701; Salt Mist Corrosion testing for Photovoltaic Modules.
- ANSI/UL 1703 : standard for Safety for Flat-Plate Photovoltaic Modules and Panels.

PID Test and EL Image of PV modules

High voltage can lead to module degradation by multiple mechanisms. The extent of the voltage bias degradation is linked to the leakage current or coulombs passed from the silicon active layer through the encapsulant and glass to the grounded module frame, which can be experimentally determined. Appropriate testing methods and stress levels are described that demonstrate module durability to system voltage potential-induced degradation (PID) mechanisms. The test can be conducted by using chambers (damp heat) or at ambient by wrapping modules with aluminium foils.

Long Term Outdoor Exposure (LTOE) Test

LTOE is based on the Data Acquisition System and degradation inspection method. Data acquisition of the measured parameters includes: IV-characteristic, in-plane solar irradiance, UV-A irradiance, UV-B irradiance, Relative air humidity, Ambient temperature, module temperatures, 2D wind, module deflection. The total Outdoor Exposure is for a duration of one year with the reports of results on a quarterly basis.

Test to Failure

Passing IEC 61215 and IEC 61646 is important for Crystalline and Thin film modules. However the pass criteria don't provide measure of module reliability over 25 or more years in the field. Test-to-Failure (TTF) implements a series of accelerated environmental chamber testing procedures with a bench-mark of 30% degradation.

The tests are conducted for:

- Product qualification on a comparative basis in a highly accelerated manner
- Spot-check performance and reliability of module designs
- Characterize potential performance and reliability problems for high voltages systems
- Accelerate the onset of failure so that failure mechanisms can be studied, compared to field failures, etc

Contact Us :

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Component Evaluation

- Inverter Testing as per MNRE
- Junction Box
- Cables
- Connectors
- Charge Controller
- Backsheet
- EVA
- EdgeTape

Material Tests

- EVA Gel content & Chemical Composition
- Back sheet Chemical Composition

Microbiological Tests

- On Inverters (components like PCB's)
- Junction Box and Polymeric Components
- Anti fungal Tests

Third Party Inspection

- Factory inspection
- Process inspection
- Product quality checks as per IEC Standards

BOS (Balance of System) Testing

Inverter Testing, Charge controller testing, Cables, Mounting structures, Lighting protectors, Control Panels

CSP Power Plant

Site evaluation, Design verification, Component evaluation, Installation verification, Project Management