

Cutting edge quality assurance
beyond the standards
Technical bankability for PV modules

The VDE Institute is offering a new level of quality assurance for photovoltaic (PV) modules beyond established international standards. The new PV module certification program draws on the considerable technical expertise of VDE and from the field experience of veteran industry partners. It builds upon and further improves the certification process which is based on existing international testing standards. The program offers the added

benefits of more stringent module testing sequences, in-line production testing and regular monitoring of manufacturing sites.

Overall system quality begins on the component level, and this new certification product is tailored to support technical bankability on both the component and system-wide level.

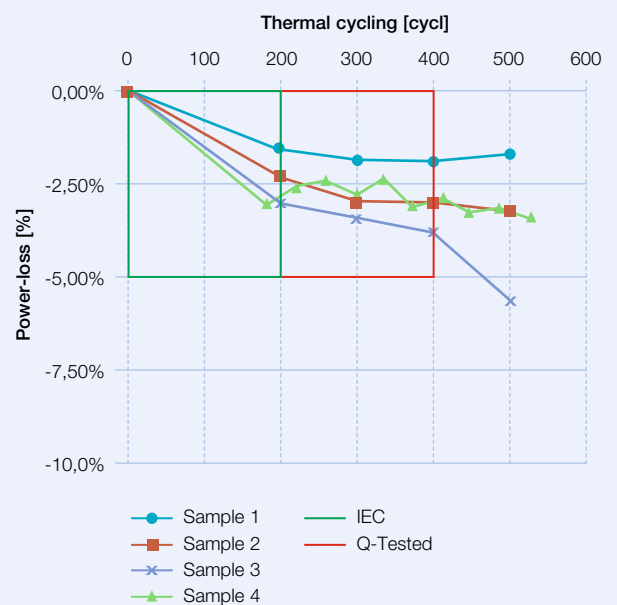
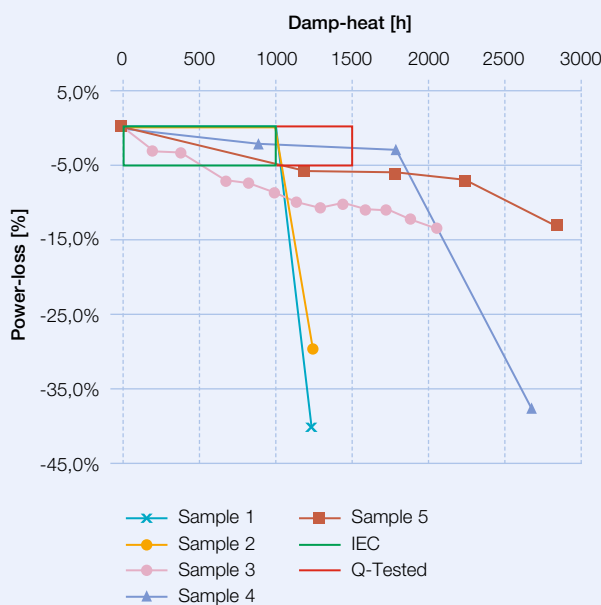
Trustworthy component quality to support bankability

PV module technology has made significant strides in the past several years. This can be attributed to the large number of companies that entered the industry and invested in their R&D efforts. Another factor is the high amount of competition between players to improve module performance, which directly affects the bottom line of a PV system.

Current market dynamics have led to challenging times for the industry. In an environment of ongoing tough competition, prices have dropped rapidly and margins

are thin for all players. Investors and lenders have therefore become more stringent with their selection criteria, especially from the perspective of technical bankability.

Taking into account this redefinition of technical bankability criteria, it is clear that manufacturers must be able to reliably and consistently prove that they can maintain a high level of quality while reducing production costs. This calls for a premium level of certification and quality assurance that goes beyond the standards commonly used throughout the industry today.



Research done by Fraunhofer ISE and VDE into module failures through damp-heat and thermal cycling tests clearly show that critical power loss often occurs after the standard testing time.

Optimized adjustments to testing parameters, in the case of the new quality assurance product of VDE from 200 to 400 cycles, can significantly improve confidence in module design while maximizing value for money for quality assurance.



Testing and certification beyond the standards

Initial module design certification and snapshot-wise control of manufacturing processes are both critical in ensuring high quality and reliable products in mass production. The VDE Institute has created a new premium quality assurance product for PV modules that covers the development stage until volume production to ensure more sustainable product quality.

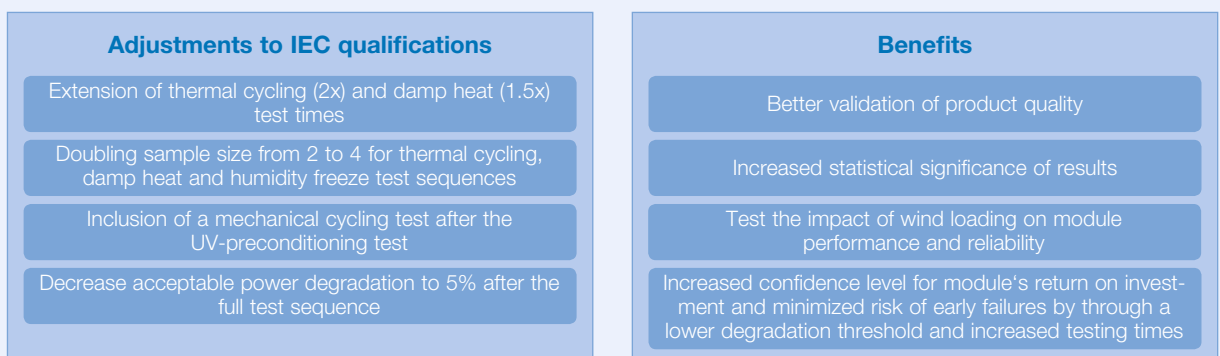
The VDE Quality Tested mark for PV Modules features a stringent and optimized testing program tailored to achieving technical bankability. The program offers

significant advancements in quality assurance in the following key areas:

- More stringent module design and product qualification criteria to help validate module quality
- In-line tests implemented in mass production to identify critical failures impacting module safety and performance at an early stage
- Quarterly monitoring of module quality to ensure consistency and a problem-free manufacturing process

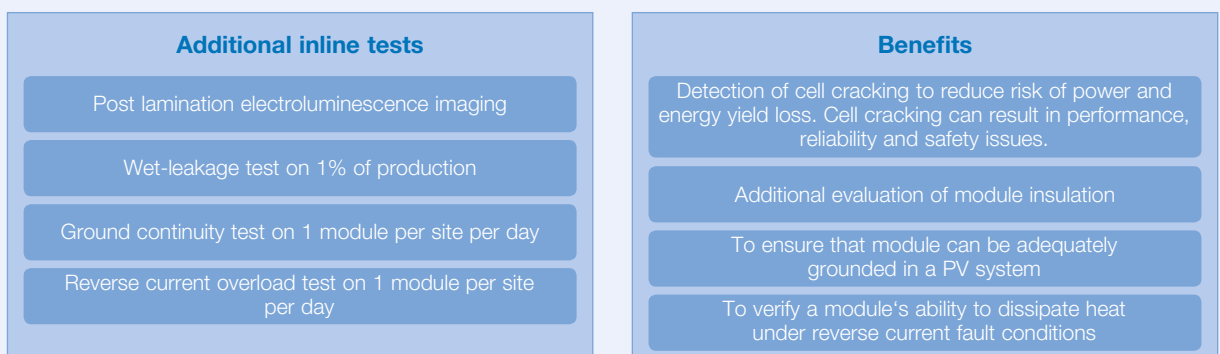
1. Module design and safety qualification

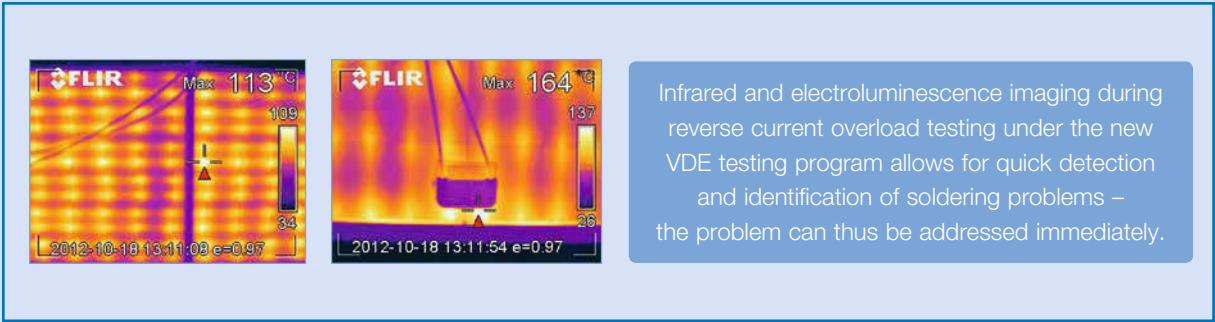
The Quality Tested program makes adjustments to IEC 61215 and IEC 61730 qualifications in order to better validate the quality and safety of modules produced.



2. Continuous inline quality monitoring

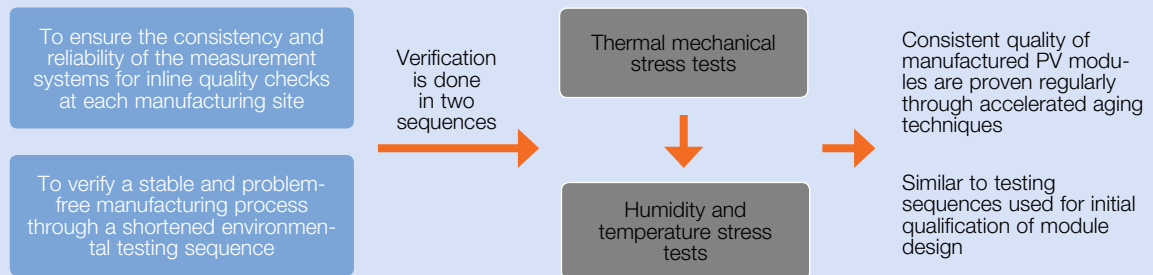
In order for a product to bear the VDE Quality Tested mark, the manufacturing facility for the product must implement specific inline tests for quality verification. This also allows for rapid problem identification and correction.





3. Continuous offline site work monitoring

The last stage in product quality verification involves actual monitoring of each site where the modules are produced on a quarterly basis. This serves two main purposes:



VDE: Your partner for premium quality

VDE's new product was designed to deliver significant benefits to the different stakeholders in the solar industry and increase the level of trust and confidence in PV modules. In order to achieve this, VDE applied its premium, no-compromise approach to quality assurance and combined this with field experience from veteran industry players. The result is a well-tailored quality assurance product that meets the redefined criteria for technical bankability and at the same time optimizes the testing parameters in order to reduce unnecessary cost and maximize value for money.

The new quality standard of the VDE Quality Tested mark for PV modules offers distinct advantages in:

- Superior level of consistent quality
- Increased safety
- Low power degradation
- Lower risk for return on investment
- Strong support for technical bankability

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