

Advanced Services addressing the Quality of PV Systems



As solar energy continues to grow rapidly, advanced research and development continues to drive the economies of scale and lower the costs of PV installations providing attractive investment opportunities on a global scale. Quality is one key factor in a financial investment; however, the testing and certification of individual products for market access do not on their own currently satisfy concerns about bankability. Hence, the PV standards and technical community is developing a globally accepted model of quality assurance, including testing and procedures on a system level. Above and beyond these basic requirements, UL is closely collaborating with various stakeholders of the PV industry to develop individual, customized solutions to accommodate different challenges.

While that work is on-going, there does exist limited industry-recognized testing procedures for end products and components of PV systems. In addition, inspection procedures can be implemented that suit a manufacturer’s perspective; for example, general industry ISO standard 2859-1 ed.2:1999, Quality control, addresses:

- Sampling rates as a function of number of products
- Inspection levels (e.g. non-destructive / destructive)
- AQL – Acceptance quality levels for mass production that define the confidence in the product/sampling, i.e. AQL of 0.1 represents a high confidence level that should be considered for some aspects of the system components
- Procedures to adjust sampling



Adequate mounting (means) to avoid system breakdown.



Messy installations cause safety risks and technical deficiencies.

Below are examples of program elements that can be customized by manufacturers, owners, operators, or investors for which UL can provide the appropriate testing, inspection and/or certification services:

Example	Description
# 1	<ol style="list-style-type: none"> 1. Technical Factory inspection 2. Short term testing <ol style="list-style-type: none"> a) Flasher-List verification (G-2-Level) b) Label verification (S-2-Level) c) Wet-Leakage Test (S-3-Level) d) Electro-Luminescence EL (G-2-Level) e) PID-Test (S-2-Level)
# 2	<ol style="list-style-type: none"> 1. PID-Test (S-2-Level) 2. Extended TC/DH/HF/Dry-H-Testing, depending on installation location (S-1-Level) 3. Mechanical load testing and Hail-testing (35mm+) (S-1-Level) 4. EVA cross-linkage test (S-1-Level) 5. Measurement of temperature coefficients (S-1-Level)
# 3	<ol style="list-style-type: none"> 1. Technical Factory inspection 2. Laboratory audit of manufacturer 3. Witness testing <ol style="list-style-type: none"> a) Flash-testing b) Electro-Luminescence EL c) Wet-Leakage Test 4. Witness testing verification in UL-Lab (x% of 3.) <ol style="list-style-type: none"> a) Flash-testing b) Electro-Luminescence EL c) Wet-Leakage Test

Customer benefits:

- Trusted source for certification, quality and reliability testing
- Independent Third-party verification of PV product performance
- Tailored, custom-specific testing
- R&D support
- Single point of contact for global market access

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