

PV+Test 2.0 from TÜV Rheinland and Solarpraxis: Benchmark test for photovoltaic modules expanded.

TÜV Rheinland and Solarpraxis have given PV+Test for solar modules a technical overhaul: The benchmark test for photovoltaic modules has been expanded to include, among others, new tests of initial and potential-induced degradation. Other changes include the new, more stringent climate chamber test requirements and the revised tests for the low-light response and temperature dependency of modules. "Test programs for photovoltaics are evolving, just like the market and the technology itself. This is why we will continue to monitor PV+Test to make sure it is effective and delivers meaningful results, and if necessary we will make the appropriate changes," explains Willi Vaaßen, head of the Solar Energy division at TÜV Rheinland. In the process, PV+Test 2.0 not only widens the scope of the previous tests, but the tests have now also been made more stringent. It goes without saying, though, that all tests carried out to date in accordance with the previous conditions remain valid.

For the last two years, the benchmark test PV+Test has offered consumers and investors answers to their questions about "good" solar modules that reliably deliver the expected performance. To date, PV+Test has already tested 21 different module types and awarded them grades in line with the grading system used in German schools. A maximum of 100 points can be awarded, with a minimum of 90 points required for the highest grade ("Very good") and a score above 50 points required for the lowest pass grade ("Adequate").

One of the new additions to PV+Test is the investigation and assessment of a potential slight power drop during the first few days under solar radiation: the "initial degradation" – or "light-induced degradation" (LID) – of photovoltaic modules that can affect some solar cells. Manufacturers of crystalline modules do not always take into account potential LID effects in the power specifications on the identification plate. If a manufacturer fails to take initial degradation into account in their power classification this will lead to a points deduction in PV+Test 2.0.

Since the high system voltage and complex associated physical effects have recently been identified as key factors contributing to reduced yield in large photovoltaic systems, PV+Test now also includes a test for "potential-induced degradation" (PID). The environmental tests in climate chambers have been revised and are now more exacting than before. For example, the modules now have to pass a temperature fluctuation test comprising two series of 200 cycles alternating between -40°C and +85°C. In the damp heat test, which has also been expanded, the modules now need to withstand two tests of 1,000 hours each at 85°C and 85% relative humidity.

In the future, PV+Test will be able to make more accurate assessments of the connection between low light, temperature fluctuations, and the individual power output of a module. In the previous test design, examination of the temperature coefficient and module response in low-light conditions was conducted largely separately from each other. In PV+Test 2.0, both of these variables are evaluated in a "matrix measurement", which is based on the standard IEC 61853 – Part 1 and enables a more nuanced assessment of the module power under fluctuating temperature and light conditions. This in turn enables more accurate conclusions to be drawn about the energy yield. The results are assessed with the aid of a weighting system based on the climatic conditions in Central Europe.

The tests carried out on the modules with the aid of electroluminescence investigations (EL)

have also been widened; these tests highlight damage to the modules in similar fashion to an X-ray image. EL is used once all the mechanical stress tests have been carried out, and the results form part of the individual scores in the test program.

PV+Test: Positive list of "good" solar modules on the market

PV+Test is a positive list intended to serve as guidance for consumers and investors. The participating manufacturers can decide themselves whether to have the test results published. So far, several participating manufacturers have decided not to publish the results of a total of nine tested module types. Most recently, the Solarworld Sunmodule Plus SW 245 poly was rated "Very good" (just like a previous module from Solon), with two more rated "Very good (-)" and twelve module types rated "Good".

TÜV Rheinland and Solarpraxis buy the modules for the tests anonymously in normal retail outlets and then put them through many months of tests at TÜV Rheinland's solar laboratory in Cologne. Ongoing recording of power output measurements is of particular importance and takes place both before the tests and after the relevant test phases. This is because power output – particularly after special loads and a longer service life – is a decisive factor for returns.

The basic factors looked at in PV+Test are resistance to aging, electrical safety, workmanship, documentation and installation instructions, ease of installation and warranty. The PV+Test test program itself is continuously reviewed and – as has now happened – updated to take account of technological advances. This is done by TÜV Rheinland and Solarpraxis in consultation with an industry advisory board, which has been monitoring the benchmark tests for photovoltaic modules since they were first introduced.

Further information and all PV+Test results are published online at <http://www.pv-magazine.de/modultest> and <http://www.pvtest.de/>. The June 2013 issue of pv magazine Deutschland also contains a detailed test report and a discussion of the current test conditions.

[Inquiries]

TÜV Rheinland Japan Ltd.
Customer Service Center
E-mail: info@jpn.tuv.com Tel: 045-470-1850 / 06-6355-5400

Copyright 2013 TÜV Rheinland Japan Ltd. All rights reserved.