For more than ten years, Sonnenstromfabrik, Centrosolar’s manufacturing plant in the North German city of Wismar, has been producing solar modules which meet requirements like high manufacturing quality, high capacity or yield as well as long-term stability. The company addresses customers who care strongly about quality, long-term durability and reliability, rather than aiming at putting a large solar system on their roof at the lowest possible price. Even though module prices have dropped significantly, any solar system still represents a big investment. Customers expect a system to reliably generate power for well over 20 years. For these reasons, quality should be a key decision factor.

After all, how good is a system that appears to be a good deal at first glance, but only delivers average yields or even breaks down before the end of its expected life time at second? Centrosolar, headquartered in Hamburg, is convinced that it can keep these promises easily, because before being shipped all of their modules have passed various quality tests. This includes 60 quality-relevant measures carried out during the entire manufacturing process – before, during and after production. Some tests are already performed during the product development stage – it often takes a year or longer before a panel is introduced on the market – while others, such as process monitoring or inline quality checks, are performed during production.

Additional external tests complement the quality tests integrated into the production process. These additional tests are performed at independent testing institutions. Thus, Centrosolar modules have been tested for resistance to salty air and ammonia corrosion using this methodology. PV installations in coastal regions or agricultural areas may be exposed to such conditions. The tests confirmed that the modules are corrosion-resistant and can be used without diminished performance, even under extreme conditions.

Most on-site tests are carried out at random to ensure that any panel from the production line may be tested with regards to its capacity, workmanship or overall quality. Other tests, such as the electroluminescence imaging test or insulation testing, are carried out on every single panel. The results of all tests for each production step are stored in a database-powered system for capturing operational data. This allows the engineers to trace any deviation, because all process parameters are recorded. This complex data capture scheme is also highly useful for customers in the event of quality claims.

Overview of the tests based on select examples

Cross-linking test
The cross-linking test is regularly carried out during production. It is used to check the encapsulation material of the solar panel, which consists of a highly transparent, durable film. For the panel to remain fully operable for over 25 years, the encapsulation film must permanently and seamlessly bind to the glass, rear-side film and the cells. The film ensures that the solar cells and their electrical connections are hermetically sealed against weather conditions. This can only be guaranteed if it has a high level of cross-linking. This level is checked in a lab on site at the factory. The level of cross-linking provides a reliable indication on the panel’s durability and longevity.

Hot water test
Centrosolar developed the hot water test, which has become a standard test in the solar industry. The test is performed to determine how resistant the solar cells are against moisture. Every batch of cells delivered to the PV manufacturing is randomly checked, which involves exposing the solar cell to hot water for an extended period of time. The aluminium alloy on the
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The mechanical load test is used to check the mechanical load capacity of the solar panel.

The cross-linking test checks whether the encapsulation film seamlessly connects with the cells.

Manuela Jakobi, Press Officer at Centrosolar AG

Conclusion

Among the main tasks for planning a PV investment is extensive quality research with regard to components like modules. As PV modules from different manufacturers may at first glance look alike, information about the manufacturer and their quality philosophy is very helpful. The modules should have the relevant official product certificates for their target market; in addition, there are many other factors that attest to high quality, like e.g. a certified quality and environmental management system, many years of experience in manufacturing PV modules as well as the factory location. All these criteria can provide evidence of product quality to customers. In cases of doubts, the installer of choice will point customers in the right direction.

Manuela Jakobi, Press Officer at Centrosolar AG
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