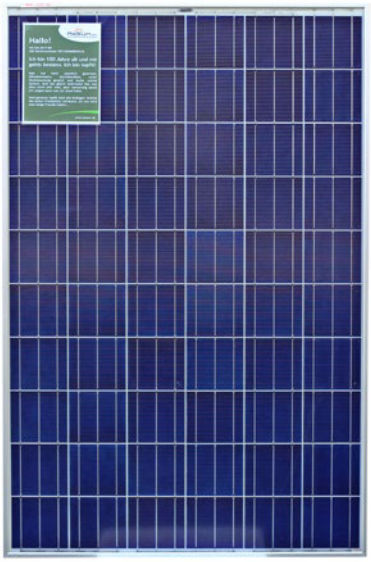
AxSun - feel good cause you can trust your solar modules!

AxSun Solar
„German Modules with Character"



*I am almost **100 years** old!*
*Well preserved, am I?*

# Hello!

**My name is 09110560004525 and I am an AX P-60 from AxSun. I am 100 years old and still feel very great. I am fit as a fiddle!!!**

**I have been under a lot of stress: They have put me in a climate chamber with ever changing conditions from hot to cold, from dampness to wetness and back to dust-dry. Electrolumenescensed, put under high voltage and other fancy tests. I have suffered this torture over and over, and over again.... This was not funny at all, but the AxSun guy says it was necessary to show how strong I am. And for what reason? Just to make me old very fast! But why have they simulated 100 years? Other manufacturers do these test to show what happens after 30 years, I have demonstrated how strong and persistent I am even after 100 years!**
**And as fit as I am, so are all my colleagues which leave the AxSun production line daily. We provide long-lasting fun to our owners. I have proven it...**

# *Design certification according to IEC 61215 - What is it all about ?*

Solar modules are exposed to severe weather and climate conditons for a very long time. The longevity and high quality performance of our products are dear to AxSun's heart. Therefore, we at AxSun decided to figure out how efficient our modules really are when tested for very long periods. It was clear that we could not wait for 30 years until our modules have been matured in the open actual outdoor environments.
The IEC 61215 standard involves the consideration of all influencing values which are responsible for the ageing of photovoltaic modules. The standard describes different qualification tests on the basis of artificial stresses on the materials. In detail a distinction is drawn between stress caused by radiation, thermal stress and mechanical stress. So called climate chambers are able to simulate the most extreme changes in temperature and humidity.

## Test cycle

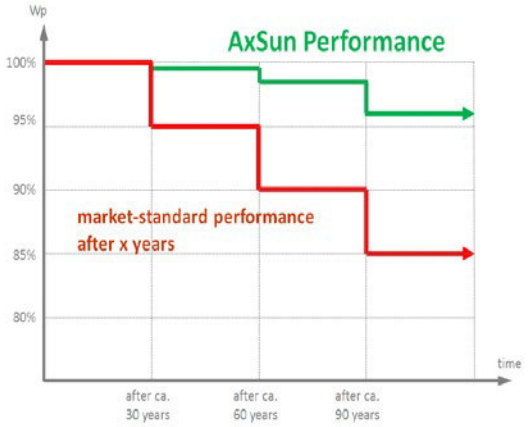
Each test cycle follows a standard pattern and consists of the following parts:

| | |
|---|---|
| Initiale test<br>check, measurements | Visual check, electroluminescence check (screening of the module), characteristic line check (power measurement according STC), insulation test, creepage current test |
| DH1000 Damp Heat Test | Constantly changing conditions such as extremly high air humidity, drought, temperature cycling between +85 °C and -40 °C. This way artificial ageing of the test object can be simulated for periods in excess of 30 years! |
| Inspection after test, comparison with initial values | Visual check, electroluminescence check (screening of the module), characteristic line check (power measurement according to STC), insulation test, creepage current test |
| Acceptance criteria according IEC 61215 | The power output must not exceed a drop of 5 %. Must pass insulation strength (1000V), creepage current test in water quench (>500V), must not show noteworthy visual abnormalities (bursts, cracks, delamination of the surface, loss of mechanical stability) |

**The AxSun Solar Modul has been exposed to this test cycle not only 1x but 3x!!! This comes up to almost 100 years of operation of our PV module after 3 test cycles!**

## Test results

| Power | | Pmpp [W] | relative tolerance |
|---|---|---|---|
| | Initial value | 240,13 W | 0,00% |
| Cycle 1 | DH1000 ( >30years) | 239,42 W | -0,29% |
| Cycle 2 | DH2000 ( >60years) | 238,72 W | -0,58% |
| Cycle 3 | DH3000 ( >90years) | 230,13 W | -4,16% |




Our module has met the IEC performance criteria completely after each of the 3 cycles. The very little output losses are far within the demanded tolerance. The visual test has shown nothing but a minor colouring of one of the solder connections.

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# CERTIFICATION

We ordered an independent institution to carry out a triple cycle test with our „100 year old module" AX P-60 serial number 09110560004525. It was the scope of the test to determine how our solar module will perform after approximately 100 years of artifically simulated operation.

**Purpose of the tests**
was the test and documentation of an AxSun Solar module regarding

- Visual inspection
- Electroluminescence measurement
- Characteristic line check (power measurement according to STC)
- Insulation test
- Creepage current test

after Damp-Heat-Test, after 1000, 2000 and 3000 hours of testing.

**Test result**
Even after 3 test cycles, the output power of the AxSun Solar module is far within the IEC51215 demanded tolerances. The extraordinary test scores are the result of the exclusively processing of high quality components, an ongoing in-house quality check and of course our well known Upper Swabian quality demand.

.....
Axel Skuthan, CEO

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Matthias Lachenmaier, Head of R&D

**Please don‘t hesitate to contact us**

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