

Summary of test levels according to IEC 61215: 2005

Tests		Test conditions
10.1	Visual inspection	Detection of visual defects like broken cells, bubbles, delaminations, faulty interconnections etc.
10.2	Performance at STC	Cell temperature: 25 °C, irradiance: 1.000 W·m ⁻² with IEC 904-3 reference solar spectral irradiance distribution.
10.3	Insulation test	Dielectric withstand at 1.000 V _{DC} plus twice the maximum systems voltage for 1 minute. For modules with an area of less than 0,1 m ² the insulation resistance shall be not less than 400 MΩ. For modules with an area larger than 0,1 m ² the measured insulation resistance times the area of the module shall be not less than 40 MΩ·m ² to be measured at 500 V or maximum systems voltage, whichever is greater.
10.4	Measurement of temperature coefficients	Determination of temperature coefficients of current (α) and voltage (β).
10.5	Measurement of NOCT	Total solar irradiance: 800 W·m ⁻² . Ambient temperature: 20 °C. Wind speed: 1 m·s ⁻¹ .
10.6	Performance at STC and NOCT	Cell temperature: 25 °C and NOCT. Irradiance: 1000 W·m ⁻² and 800 W·m ⁻² with IEC 60904-3 reference solar spectral irradiance distribution.
10.7	Performance at low irradiance	Cell temperature: 25 °C. Irradiance: 200 W·m ⁻² with IEC 60904-3 reference solar spectral irradiance distribution.
10.8	Outdoor exposure test	60 kWh·m ⁻² total solar irradiance.
10.9	Hot-spot endurance test	Five-hour exposure to 1.000 W·m ⁻² , irradiance in worst-case hot-spot condition.
10.10	UV preconditioning	15 kWh·m ⁻² total UV irradiation in the wavelength range from 280 nm to 385 nm with 5 kWh·m ⁻² UV irradiation in the wavelength range from 280 nm to 320 nm.

10.11	Thermal cycling test	50 and 200 cycles from $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ with STC peak power current during 200 cycles.
10.12	Humidity freeze test	10 cycles from $+85\text{ }^{\circ}\text{C}$, 85 % RH to $-40\text{ }^{\circ}\text{C}$.
10.13	Damp heat test	1.000 h at $+85\text{ }^{\circ}\text{C}$, 85% RH.
10.14	Robustness of termination test	As in IEC 60068-2-21.
10.15	Wet leakage current test	For modules with an area of less than $0,1\text{ m}^2$ the insulation resistance shall be not less than $400\text{ M}\Omega$. For modules with an area larger than $0,1\text{ m}^2$ the measured insulation resistance times the area of the module shall be not less than $40\text{ M}\Omega\cdot\text{m}^2$ to be measured at 500 V or maximum systems voltage, whichever is greater.
10.16	Mechanical load test	Three cycles of 2.400 Pa uniform load, applied for 1 h to front and back surfaces in turn. Optional snow load of 5.400 Pa during last front cycle.
10.17	Hail test	25 mm diameter ice ball at $23,0\text{ m}\cdot\text{s}^{-1}$, directed at 11 impact locations.
10.18	Bypass diode thermal test	One hour at I_{SC} and $75\text{ }^{\circ}\text{C}$. One hour at 1,25 times I_{SC} and $75\text{ }^{\circ}\text{C}$.