

PV Module Product Qualification Program: Test Sequences

We update our PV Module Product Qualification Program (PQP) regularly using feedback from the PV module buyer community, leading global research institutes, independent engineers and manufacturers. These updates ensure that our PQP meets the evolving needs of downstream solar project developers, investors and asset owners around the world.

PVEL's PV Module PQP

Factory Witness								
Characterization								
Light-Induced Degradation								
Characterization								
Thermal Cycling	Damp Heat	Backsheet Durability Sequence	Mechanical Stress Sequence	Hail Stress Sequence	Potential-Induced Degradation	LETID Sensitivity	PAN File & IAM Profile	Field Exposure
TC 200	DH 1000	DH 1000	Static Mechanical Load	Hail	85°C, 85%RH MSV (+ and/or -) 192 hrs	LETID 162 hrs (75°C, Isc-Imp)	PAN File	Field Exposure 6 Months
Characterization	Characterization	UV 65 kWh/m ²		Characterization		Characterization	IAM Profile	
TC 200	DH 1000	Characterization	Dynamic Mechanical Load	Dynamic Mechanical Load	Characterization	LETID 162 hrs (75°C, Isc-Imp)		Field Exposure 6 Months
Characterization	Characterization	TC 50 + HF 10	Characterization	Characterization		Characterization		Characterization
TC 200	Stabilization 80°C, Isc, 48 hrs	UV 65 kWh/m ²	TC 50 + HF 10	TC 50 + HF 10		LETID 162 hrs (75°C, Isc-Imp)		Characterization
Characterization	Characterization	Characterization	Characterization	TC 50 + HF 10		Characterization		
		TC 50 + HF 10						
		UV 65 kWh/m ²						
		Characterization						
		TC 50 + HF 10						
		UV 6.5 kWh/m ²						
		Characterization						

PVEL conducts additional field exposure studies and rear side characterizations to evaluate the performance of bifacial modules. Supplementary testing is available for extended hail stress and tracker-specific mechanical stress evaluations.

Factory Witness

All bills of materials submitted for testing are witnessed in production through every step of the production process from the opening of raw materials packages to final packaging with tamper-proof tape.

Testing Abbreviations

TC: Thermal cycling	HF: Humidity freeze	LETID: Light and elevated temperature-induced degradation
DH: Damp heat	MSV: Maximum system voltage	
UV: Ultraviolet	IAM: Incidence angle modifier	

Characterizations

IV: Flash test at STC	LCEL: EL image at 1/10 ³ Isc	Diode: Diode test
EL: EL image at Isc	VI: Visual inspection	Color: Backsheet color measurement
LIC: Flash test at 200W/m ²	WL: Wet leakage	Capacity: Capacity testing

Note: Not all characterization measurements are taken at each step.

For more information about PVEL's PV Module PQP, please contact: Tristan Erion-Lorico, Head of PV Module Business, info@pvel.com