

ATLAS 25+

Comprehensive
PV Durability Testing



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Atlas has been pioneering weathering testing for over 85 years. Our industry-leading accelerated weathering equipment along with our consulting services provide our customers with superior, easy-to-use technology and advanced testing solutions.

Durability Testing Designed for PV

To address the unique needs of the Photovoltaic industry, Atlas has developed a comprehensive durability testing program specifically for PV modules – Atlas 25^{PLUS}.

Long-term Environmental Exposure

Atlas 25^{PLUS} provides a crucial missing component to the IEC type design qualification tests, that of predicting the effects of long-term environmental exposure during the product lifetime. Instead of comprising isolated, individual stresses targeted at “infant mortality,” Atlas 25^{PLUS} consists of a series of combined stresses applied to PV modules, providing a true analog of the effects of long-term ageing resulting from exposure to the elements.

To put it simply, Atlas 25^{PLUS} is a proprietary multi-dimensional durability test program designed to subject photovoltaic modules to the environmental degradation stresses which can be expected over long-term service.

Data, Support and Independent Validation

Atlas 25^{PLUS} provides manufacturers with the data they need to demonstrate long-term durability and to support warranty and performance claims while reducing the costs associated with aftermarket product failure.

The Atlas 25^{PLUS} mark serves as a key product differentiator and provides customers and financial stakeholders with the proof of independent third-party environmental durability testing by the recognized industry leader.



The Atlas 25^{PLUS} Testing Process

Module A

One PV module is run through the Atlas 25^{PLUS} testing sequence over the course of 12 months.

1 UV Conditioning



2 Salt Spray Corrosion



3 Condensing Humidity



Modules B & C

Two modules provide baseline data using outdoor solar tracking in subtropical South Florida and the arid Arizona Sonoran desert for one year.



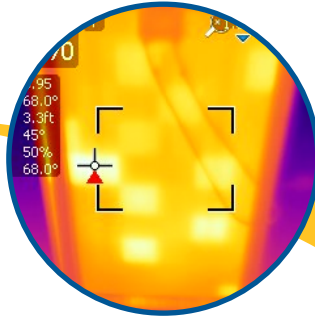
8 Results and data

Completion of the Atlas 25^{PLUS} program provides test data that would be otherwise unattainable with current test methods.

A report details all data, images and analyses at the end of the one year test sequence.

7 Initial, final and multiple interval measurements

Visual inspections, IV curves, infrared thermographs and digital photography included.



6 Arizona Solar Tracking including peak summer



5 Solar/Thermal/Humidity/Freeze Cycle



REPEATING CYCLE

4 Solar/Thermal/Humidity Cycle

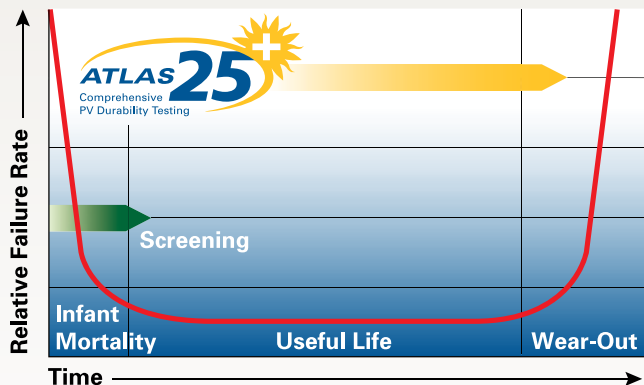


To learn more about the Atlas 25^{PLUS} Program, contact your local Atlas Sales Representative or visit us online at www.solardurability.com

Atlas 25^{PLUS} and IEC Testing

IEC tests for terrestrial PV modules

- Qualification, safety and infant mortality
- Isolated, individual stress tests
- Premature, catastrophic failure over short time frames



Atlas 25^{PLUS} – Comprehensive PV Durability Testing

- Simulates long-term environmental exposure effects
- Subjects modules to combined stresses
- Natural simultaneous exposure to solar radiation load with temperature/humidity and freeze/thaw cycles; additional corrosion and condensing humidity
- Short-term diurnal and long-term seasonal cycles closely simulate nature
- True analog of the synergistic effects of weathering in end-use conditions
- Complements short term IEC qualification tests with long-term durability and reliability assessment to support warranty and performance claims

	DESIGN QUALIFICATION ENVIRONMENTAL TESTS	ATLAS 25 ^{PLUS} ENVIRONMENTAL LIFE TESTS
INTENT	<ul style="list-style-type: none"> • Accelerated tests to screen for major material, design and manufacturing flaws resulting in premature, "infant mortality" failures 	<ul style="list-style-type: none"> • Accelerated environmental durability testing for accumulated damage of long-term exposure
CLIMATE STRESSES	<ul style="list-style-type: none"> • Delivered to separate modules • Temperature-only cycling • UV preconditioning • Humidity/Freeze cycling, Damp heat test 	<ul style="list-style-type: none"> • Alternating temperature/humidity cycling and temperature/humidity/freeze cycling with full spectrum solar load and forward bias • UV, salt spray and condensing humidity
STRESS LEVELS & DELIVERY	<ul style="list-style-type: none"> • No module goes through all tests • Limited to one or two stresses 	<ul style="list-style-type: none"> • Select module goes through full test sequence • Climate derived conditions • Multiple, simultaneous stresses • Short- and long-term cycles • Global composite climate conditions • Alternate hot arid desert, tropical/subtropical or northern temperate climate conditions available • Optional modifiers: coastal/marine; alpine/snow load; urban/industrial; dust/dirt/mildew effects
CORROSION TESTING	<ul style="list-style-type: none"> • Damp heat test 	<ul style="list-style-type: none"> • Salt spray and condensing humidity tests
OUTDOOR EXPOSURES	<ul style="list-style-type: none"> • No long-term outdoor exposure 	<ul style="list-style-type: none"> • Combination of laboratory and accelerated outdoor exposures for one year
CYCLES & CONDITIONS	<ul style="list-style-type: none"> • Few cycles • Harsher Conditions 	<ul style="list-style-type: none"> • More cycles • Climate derived conditions
OPERATIONAL	<ul style="list-style-type: none"> • No forward bias • No electrically related corrosion, migration or arcing 	<ul style="list-style-type: none"> • Forward bias, resistive load • Realistic electrical operation at Max Power Point (MPP)

