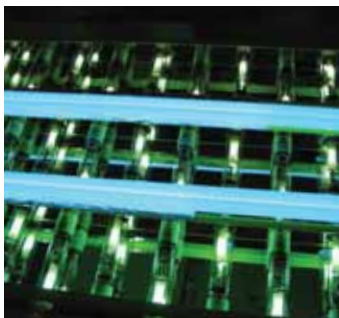


# NTS Services Spotlight: Solar Power Products

## Assuring Performance Throughout the Product Life Cycle



NTS operates several test cells dedicated to solar radiation testing with internal volumes of 1000 cubic feet



State-of-the-art solar radiation chambers can be configured to accommodate large or odd-sized test articles



NTS engineers have designed a user interface system based on LABVIEW software that provides full control of all required parameters for testing

### About Solar Power Products

NTS has the expertise and wide-ranging capabilities to assist with the tough, non-standard engineering and testing challenges you're faced with when developing and deploying Renewable Clean Energy Technologies. Our engineers will work with you to determine and even develop the requirements and evaluations you need, helping get your product to market faster and with higher reliability.

NTS with its numerous laboratories has the capacity and capability to evaluate and test PV / Solar power products to assure your product will hold up over its intended design life to the unique conditions of your specific environmental applications.

Our services encompass the standard test requirements of industry specifications such as UL1703, IEC 61215 and MIL-STD-810. The UL and IEC certifications include a variety of environmental and electrical safety tests that NTS has been performing for decades, including:

- ▶ UV radiation exposure
- ▶ Extreme temperature and humidity
- ▶ Arc tests
- ▶ Insulation resistance
- ▶ High voltage withstanding
- ▶ Resistance to hail/stone impact
- ▶ And other simulated environments

### MIL-STD-810G

Solar radiation can be very damaging to materials and equipment stored and used outdoors. MIL-STD-810, Method 505 is designed to evaluate materials as they are exposed to the radiation and heating effects of direct exposure to sunlight. NTS has developed

and is now operating state of the art facilities in Tempe, Arizona for this testing.

NTS test cells are purpose built to provide the correct environment to replicate the conditions seen in the field as required by the MIL Standard. NTS radiation sources are engineered to provide the correct spectral content, which includes UV A, UV B, visible, and infrared wavelengths and also operates several test cells which allow for economical testing of larger test articles. Multiple radiation sources are available so that the test subjects can be irradiated from any angle.

### Solar Radiation Test Suite

NTS engineers have designed a user interface system based on LABVIEW software that provides full control of all required parameters for testing. This proprietary software monitors spectral content, irradiance, airspeed, test article and chamber temperature and other selectable parameters and displays the data in real-time.

### About NTS

NTS is a world leader in assisting organizations to access domestic and international markets. We are a single source for a full range of integrated engineering solutions, product testing, standards compliance, project management staffing solutions, engineering and managed services. Globally accredited by leading regulatory agencies, NTS can provide cost-effective programs to meet your requirements at one of our many U.S. or international facilities, or we can provide on-site solutions. NTS is the nation's largest independent standards compliance and product testing company serving companies within the aerospace, defense, automotive, telecommunications, electronics, power, medical device, computer, software and financial markets.

# NTS Services Spotlight: Solar Power Products

## Assuring Performance Throughout the Product Life Cycle



NTS performed various tests on the SES Suncatcher



NTS operates various walk-in temperature and humidity chambers



NTS evaluates and tests PV / Solar Power Products to assure your product will hold up in various environments



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## Highlights and Test Specifications

### Engineering Services

- ▶ Requirements Development
- ▶ Design Evaluations / Reviews
- ▶ Stress / Thermal Analysis
- ▶ Reliability Engineering
- ▶ Performance Monitoring Systems
- ▶ Industrial Automation
- ▶ Managed Services (On-site)
- ▶ Project Management

### Supply Chain Management

- ▶ Source Inspection
- ▶ Product / Process / Program Auditing
- ▶ Supplier Improvement Plans
- ▶ Management System Auditing

### Test & Evaluation Services

- ▶ Solar Module Efficiency (coming soon)
- ▶ UL 1703 and 1741 - PV Modules and Grid Tie inverters (coming soon)
- ▶ Regulatory Certification Support
- ▶ Reliability / Performance
  - Accelerated Life Test (ALT)
  - Highly Accelerated Life (HALT)
  - Highly Accelerated Stress (HASS)
  - Thermal Cycling
- ▶ Electrical / EMI / Lightning
  - DWV-Dielectric Withstanding Voltage
  - Insulation Resistance
  - EMI / EMC
  - Direct and Indirect Effects Lightning
- ▶ Environmental / Dynamics
  - Temperature, Humidity, Altitude (Combined)
  - Water Spray / Wind Driven Rain
  - Ice Accumulation
  - Corrosive Atmosphere – Salt Fog
  - Moist Carbon Dioxide
  - Solar Loading
  - Impact Shock
  - Vibration / Seismic (Earthquake)
  - Hail Impact Testing
- ▶ Mechanical / Materials
  - Structural Loading – Wind & Snow Induced Loads
  - Push Test / Cut Test
  - Metallic Coating Thickness
- ▶ Product Safety