



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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SUSTAINABLE ENERGY

Valid to: June 30, 2020

Certificate Number: 3301.01

In recognition of the successful completion of the A2LA accreditation is granted to this laboratory to perform the following tests on Photovoltaic Equipment:

**Test Technology:**

Preconditioning /  
Stabilization /  
Outdoor Exposure /  
Light Soaking

**Test Methods:**

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 62108 (2007 & 2016);  
IEC 61646;  
IEC 62108 (2007 & 2016);  
UL Subject 8703

Incidence Angle Effects /  
Incident Angle Modifier

IEC 61853-2

Visual Inspection

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2011 & 2016);  
UL 61730;  
IEC 61646;  
IEC 62108 (2007 & 2016);  
UL Subject 8703-29

Electrical Performance, I-V  
Characteristics & Max Power  
*(at STC, NOCT/NMOT, Low Irradiance,  
High Temperature, Low Temperature, or  
multiple irradiance and temperature  
conditions in Table 2 of IEC 61853-1)*

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61853-1;  
IEC 61730 (2016);  
UL 61730;  
IEC 61646;  
IEC 62108 (2007 & 2016);  
IEC 60904-1;  
IEC 60904-3;  
ANSI/UL 1703;  
ULC/ORD C1703;  
UL Subject 8703

**Test Technology:**

Electrical Insulation (*Wet or Dry*)

**Test Methods:**

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2011 & 2016);  
UL 61730;  
IEC 61646;  
IEC 62108 (2007 & 2016);  
ANSI/UL 1703;  
ULC/ORD C1703;  
UL Subject 8703

Temperature Coefficients

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61646; IEC 60891

Nominal Operating Cell Temperature /  
Nominal Module Operating Temperature

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61853-2; IEC 61646

Hot Spot Endurance

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2011 & 2016);  
UL 61730;  
IEC 62108 (2007 & 2016);  
IEC 61646;  
ANSI/UL 1703; ULC/ORD C1703;  
UL Subject 8703

UV Preconditioning / Conditioning

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2011 & 2016);  
UL 61730;  
IEC 62108 (2007 & 2016);  
IEC 61646 (2008);  
UL Subject 8703

Thermal Cycling / Cold Conditioning /  
Dry Heat Conditioning

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2011 & 2016);  
UL 61730;  
IEC 62108 (2007 & 2016);  
IEC 61646;  
ANSI/UL 1703;  
UL 2703; ULC/ORD C1703;  
UL Subject 8703

Humidity-Freeze Cycling

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2011 & 2016);  
UL 61730;  
IEC 62108 (2007 & 2016);  
IEC 61646;  
ANSI/UL 1703;  
UL 2703; ULC/ORD C1703;  
UL Subject 8703

**Test Technology:**

Damp Heat Testing /  
Damp Heat with Bias (PID)

**Test Methods:**

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2011 & 2016);  
UL 61730;  
IEC TS 62804-1 (PID);  
IEC 62108 (2007 & 2016);  
IEC 61646;  
UL Subject 8703

Robustness of Terminations / Terminals /  
Strain Relief Test / Terminal Torque /  
Screw Connections

IEC 61215 (2005 & 2016) – [MQT 14.1 only];  
UL 61215 – [MQT 14.1 only];  
IEC 61730 (2007 & 2016) - [MST 33 and MST 42.1  
only];  
UL 61730 - [MST 33 and MST 42.1 only];  
IEC 62108 (2007 & 2016);  
IEC 61646;  
ANSI/UL 1703; ULC/ORD C1703; UL 2703;  
UL Subject 8703

Static Mechanical Loading /  
Cyclic Mechanical Loading

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2011 & 2016);  
UL 61730;  
IEC TS 62782 (CML);  
IEC 62108 (2007 & 2016);  
IEC 61646;  
ANSI/UL 1703; ULC/ORD C1703; UL 2703;  
UL Subject 8703

Hail

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2016);  
UL 61730;  
IEC 62108 (2007 & 2016);  
IEC 61646

Bypass/Blocking Diode Functionality /  
Bypass/Blocking Diode Thermal

IEC 61215 (2005 & 2016);  
UL 61215;  
IEC 61730 (2011 & 2016);  
UL 61730;  
IEC 62108 (2007 & 2016);  
IEC 61646;  
UL Subject 8703

Water Spray

IEC 62108 (2007 & 2016);  
ANSI/UL 1703; ULC/ORD C1703;  
UL Subject 8703

Push

ANSI/UL 1703;  
ULC/ORD C1703;  
UL Subject 8703

**Test Technology:**

Accessibility

**Test Methods:**

IEC 61730 (2011 & 2016); UL 61730;  
ANSI/UL 1703; ULC/ORD C1703;  
UL Subject 8703

Surface Cut / Cut Susceptibility

IEC 61730 (2011 & 2016); UL 61730;  
ANSI/UL 1703; ULC/ORD C1703;  
UL Subject 8703

Ground Continuity / Continuity of  
Equipotential Bonding / Bonding Path  
Resistance

IEC 61730 (2011 & 2016);  
UL 61730;  
IEC 62108 (2007 & 2016);  
ANSI/UL 1703;  
ULC/ORD C1703;  
UL 2703; UL Subject 8703

Impulse Voltage

IEC 61730 (2011 & 2016);  
UL 61730

Temperature

IEC 61730 (2011 & 2016);  
UL 61730;  
ANSI/UL 1703; ULC/ORD C1703;  
UL Subject 8703

Reverse Current Overload

IEC 61730 (2011 & 2016);  
UL 61730;  
ANSI/UL 1703; ULC/ORD C1703;  
UL Subject 8703

Bonding Conductor

UL 2703 (22.1-a only)

Module Breakage

IEC 61730 (2011 & 2016);  
UL 61730

Impact

ANSI/UL 1703; ULC/ORD C1703;  
UL Subject 8703

Wiring Compartment Securement

ANSI/UL 1703; ULC/ORD C1703;  
UL Subject 8703

Creepage and Clearance / Materials Creep

IEC 61730 (2011 & 2016);  
UL 61730

Off-Axis Beam Damage

IEC 62108 (2007 & 2016);  
UL Subject 8703

Durability of Markings

IEC 61730;  
UL 61730 (2017)

Sharp Edge

IEC 61730 (2016);  
UL 61730 (2017)

Photovoltaic (PV) module testing protocol  
for quality assurance programs

CSA EXP450-17

The following IEC documents make use of, or relate to, selected tests from the above list of methods for which accreditation is granted:

IEC 60904-2 (Photovoltaic devices – Part 2: Requirements for reference solar cells),

IEC 60904-3 (Photovoltaic devices – Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data),

IEC 60904-6 (Photovoltaic devices – Part 6: Requirements for reference solar modules),

IEC 60904-7 (Photovoltaic devices – Part 7: Computation of spectral mismatch error introduced in the test of a photovoltaic device),

IEC 60904-9 (Photovoltaic devices – Part 9: Solar simulator performance requirements), and

IEC 60904-10 (Photovoltaic devices – Part 10: Methods of linear measurement).

New standards for IEC 61215 and IEC 61730 were released in 2016. The laboratory is maintaining the ability to perform testing against both the latest and the previous versions of the standards. This is to allow for a transition period for NRTLs/IECEE and a grace period for the manufacturers.

The 2016 version of IEC 61215 is a multi-part document with the following parts:

- IEC 61215-1  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1: Test requirements
- IEC 61215-1-1  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules
- IEC 61215-1-2  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-2: Special requirements for testing of thin-film Cadmium Telluride (CdTe) based photovoltaic (PV) modules
- IEC 61215-1-3  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-3: Special requirements for testing of thin-film amorphous silicon based photovoltaic (PV) modules
- IEC 61215-1-4  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-4: Special requirements for testing of thin-film Cu(In,Ga)(S,Se)<sub>2</sub> based photovoltaic (PV) modules
- IEC 61215-2  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures

UL 61215 is a multi-part document with the following parts:

- UL 61215-1  
Terrestrial Photovoltaic (PV) Modules – Design Qualification and Type Approval – Part 1: Test requirements
- UL 61215-1-1  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules
- UL 61215-1-2  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules
- UL 61215-1-3  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-3: Special requirements for testing of thin-film amorphous silicon based photovoltaic (PV) modules
- UL 61215-1-4  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-4: Special requirements for testing of thin-film Cu(In,Ga)(S,Se)<sub>2</sub> based photovoltaic (PV) modules
- UL 61215-2  
Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures

The 2007 and 2016 versions of IEC 61730 are multi-part documents with the following parts:

- IEC 61730-1  
Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction
- IEC 61730-2  
Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing

UL 61730 is a multi-part document with the following parts:

- UL 61730-1  
Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction
- UL 61730-2  
Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing



## *Accredited Laboratory*

A2LA has accredited

### **CFV SOLAR TEST LABORATORY, INC.**

*Albuquerque, NM*

for technical competence in the field of

### **Sustainable Energy**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 5<sup>th</sup> day of June 2018.

A handwritten signature in black ink, written over a horizontal line.

President & CEO  
For the Accreditation Council  
Certificate Number 3301.01  
Valid to June 30, 2020

*For the tests to which this accreditation applies, please refer to the laboratory's Sustainable Energy Scope of Accreditation.*