



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Energy Assurance, LLC
2350 Centennial Drive
Gainesville, GA 30504

Fulfills the requirements of

ISO/IEC 17025:2017

In the field of

TESTING

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

A handwritten signature in black ink, appearing to read 'R. Douglas Leonard Jr.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 08 January 2022

Certificate Number: AT-1601



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
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).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Energy Assurance, LLC

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TESTING

Valid to: **January 8, 2022**

Certificate Number: **AT-1601**

Electrical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Preconditioning (Battery cycling)	UN Manual of Tests-UN 38.3, IEC 62281, UL 1642	Solid Cathode Primary Lithium and Secondary Li Ion Cells and Batteries	Battery Cycling Equipment
(T1) Altitude Simulation (Low Pressure)	UN Manual of Tests-UN 38.3, IEC 62281, IEC 62133, UL62133, IEC 62133-1, IEC 62133-2	Solid Cathode Primary Lithium and Secondary Li Ion Cells and Batteries and Secondary Nickel cells and Batteries	Vacuum Chamber
(T2) Thermal Test	UN Manual of Tests-UN 38.3, IEC 62281	Solid Cathode Primary Lithium and Secondary Li Ion Cells and Batteries	Temperature Chamber
(T3) Vibration	UN Manual of Tests-UN 38.3, IEC 62281, UL 62133, IEC 62133, UL 2054, UL 1642, IEC 62133-1, IEC 62133-2, RTCA DO-293	Solid Cathode Primary Lithium and Secondary Li Ion Cells and Batteries and Secondary Nickel cells and Batteries	Vibration / Slip Table Vibration Controller Accelerometer
(T4) Shock (Mechanical Shock)	UN Manual of Tests-UN 38.3, IEC 62281, UL 62133, IEC 62133, UL 2054, UL 1642, IEC 62133-1 and IEC 62133-2, RTCA DO-293	Solid Cathode Primary Lithium and Secondary Li Ion Cells and Batteries and Secondary Nickel cells and batteries	Mechanical Shock System Accelerometer
(T5) Short Circuit	UN Manual of Tests-UN 38.3, IEC 62281, UL 1642, IEC 62133-1, IEC 62133-2, RTCA DO-293, RTCA DO-311	Solid Cathode Primary Lithium and Secondary Li Ion Cells and Batteries and Secondary Nickel cells and batteries	Temperature Chamber Shorting Apparatus Datalogger



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(T6) Impact/Crush	UN Manual of Tests-UN 38.3, IEC 62281, UL 62133, IEC 62133, UL 2054, UL 1642, IEC 62133-1, IEC 62133-2	Solid Cathode Primary Lithium and Secondary Li Ion Cells and Batteries and Secondary Nickel cells and batteries	Test Chamber (Impact) Hydraulic Press (Crush)
(T7) Overcharge	UN Manual of Tests-UN 38.3 and IEC 62281	Solid Cathode Primary Lithium and Secondary Li Ion Cells and Batteries	Power Supply Containment Chamber Datalogger
(T8) Forced Discharge	UN Manual of Tests-UN 38.3, IEC 62281	Solid Cathode Primary Lithium and Secondary Li Ion Cells and Batteries	Test Chamber Power Supply Resistance Network
Continuous Charge (Low Rate Charging)	IEC 62133, UL 62133, IEC 62133-1, IEC 62133-2	Secondary Li Ion and Nickel Cells	Battery Cycling Equipment
Thermal Abuse (Heating Test)	IEC 62133, UL 62133, UL 2054, UL 1642, IEC 62133-1, IEC 62133-2, IEC 62133, UL 62133	Secondary Li Ion and Secondary Nickel Cells	Blast Oven Datalogger Stopwatch
Molded Case Stress (physical integrity at high temperature)	IEC 62133, UL 62133, UL 2054, IEC 62133-1, IEC 62133-2, RTCA DO-293, EN 60950-1, EN 62368-1	Secondary Li Ion and Nickel Batteries	Oven or Temperature Chamber
Temperature Cycling	IEC 62133, UL 62133, UL 2054, UL 1642, IEC 62133-1, IEC 62133-2	Secondary Li Ion and Secondary Nickel Cells and Batteries	Temperature Chamber
External Short Circuit	IEC 62133, UL 62133, RTCA DO-347, UL 2054, IEC 62133-1, IEC 62133-2	Secondary Li Ion, and Secondary Nickel Cells and Batteries	Temperature Chamber Shorting Apparatus Datalogger
Free Fall/Drop Impact	IEC 62133, UL 62133, RTCA DO-347, UL 2054, UL 1642, IEC 62133-1, IEC 62133-2, EN 60950-1, EN 62368-1, RTCA DO-311,	Secondary Li Ion and Secondary Nickel Cells and Batteries	Steel Rule Drop Surfaces
Overcharge of Nickel Systems	IEC 62133, UL 62133, IEC 62133-1	Secondary Nickel Cells and Batteries	Power Supply Containment Chamber Datalogger
Overcharge (for Lithium Systems)	IEC 62133, UL 62133, RTCA DO-347, IEC 62133-2, RTCA DO-311	Secondary Li Ion Cells and Batteries	Power Supply Containment Chamber Datalogger
Forced Discharge	IEC 62133, UL 62133, IEC 62133-1, IEC 62133-2	Secondary Li Ion Cells and Batteries	Power Supply Containment Chamber Datalogger



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Cell Protection Against a High Charging Rate (Lithium Systems only)	IEC 62133, UL 62133	Secondary Li Ion Cells and Batteries	Power Supply Containment Chamber Datalogger
Charge (Procedure 2)	IEC 62133, UL 62133, IEC 62133-2	Secondary Li Ion Cells and Batteries	Battery Cycling Equipment
Incorrect Installation	IEC 62133, UL 62133, IEC 62133-1	Secondary Nickel cells and batteries, secondary Li ion Cells and batteries	Power Supply Precision Resistor Datalogger
Insulation and Wiring (Dielectric Strength)	IEC 62133, UL 62133, IEC 62133-1, IEC 62133-2, RTCA DO-347, RTCA DO-293, RTCA DO-311, EN 60950-1, EN 62368-1	Secondary Li Ion and Secondary Nickel Cells and Batteries	Insulation Resistance Tester Stopwatch
Discharge Performance at 20 °C, and -20 °C	IEC 61960	Secondary Li Ion Cells and Batteries	Battery Cycling Equipment Temperature Chamber
High Rate Discharge Performance at 20 °C	IEC 61960	Secondary Li Ion Cells and Batteries	Battery Cycling Equipment Temperature Chamber
Charge (Capacity) Retention and Recovery	IEC 61960, RTCA DO-347, RTCA DO-293, RTCA DO-311	Secondary Li Ion Cells and Batteries and Nickel Batteries	Battery Cycling Equipment Oven Thermal Chamber
Charge (Capacity) Recovery After Long Term Storage	IEC 61960, RTCA DO-293	Secondary Li Ion Cells and Batteries and Nickel batteries	Battery Cycling Equipment
Endurance in Cycles (Cycling)	IEC 61960, RTCA DO-293 RTCA DO-311	Secondary Li Ion Cells and Batteries and Nickel batteries	Battery Cycling Equipment
Battery Internal Resistance	IEC 61960, RTCA DO-347	Secondary Li Ion Cells and Batteries	Impedance Meter
Physical Examination	RTCA DO-347, RTCA DO-293, RTCA DO-311	Secondary Li Ion Batteries and Nickel batteries	Misc. Dimensional Measurement Equipment
Rated Capacity (including at temperature testing)	RTCA DO-347, RTCA DO-293, RTCA DO-311	Secondary Li Ion Batteries and Nickel batteries	Battery Cycling Equipment
Rapid Discharge (including at temperature testing)	RTCA DO-293, RTCA DO-311	Nickel batteries	Battery Cycling Equipment
Constant Current Discharge (including at temperature testing)	RTCA DO-347	Secondary Li Ion Batteries	Battery Cycling Equipment Oven Temperature Chamber
Charge Stability	RTCA DO-293	Nickel batteries	Battery Cycling Equipment Temperature Chamber
Temperature Shock	RTCA DO-293	Nickel batteries	Temperature shock chamber

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Humidity	RTCA DO-293	Nickel batteries	Battery Cycling Equipment Temperature Chamber
Handle Strength	RTCA DO-293 RTCA DO-311	Nickel batteries	Hand Scale
Strength of connector receptacle	RTCA DO-293	Nickel batteries	Hand Scale
Constant Voltage Discharge (including at temperature testing)	RTCA DO-347, RTCA DO-293, RTCA DO-311	Secondary Li Ion Batteries and Nickel batteries	Battery Cycling Equipment Oven Temperature Chamber
Charge Acceptance	RTCA DO-347, RTCA DO-293, RTCA DO-311,	Secondary Li Ion Batteries	Battery Cycling Equipment Oven Temperature Chamber
Duty Cycle Performance	RTCA DO-347, RTCA DO-293	Secondary Li Ion Batteries	Power Supply Electronic Load Datalogger Containment Chamber
Deep Discharge (Overdischarge)	RTCA DO-347, RTCA DO-293, RTCA DO-311	Secondary Li Ion Batteries, and Nickel batteries	Electronic Load Precision Resistor Battery Cycling Equipment
Short Circuit with Protection Disabled	RTCA DO-347, UL 2054, RTCA DO-311,	Secondary Li Ion Batteries	Temperature Chamber Shorting Apparatus Electronic Load Datalogger
Overcharge with Protection Disabled	RTCA DO-347, RTCA DO-311	Secondary Li Ion Batteries	Power Supply Containment Chamber Datalogger
Thermal Runaway Containment (Explosion Containment)	RTCA DO-347, RTCA DO-311	Secondary Li Ion Batteries	Containment Chamber Power Supply Ignition Source Point Heat Apparatus Datalogger
Shelf Life	RTCA DO-347	Secondary Li Ion Batteries	Battery Cycling Equipment Oven Temperature Chamber
Float Life	RTCA DO-347	Secondary Li Ion Batteries	Battery Cycling Equipment Oven Temperature Chamber
Abnormal Charging Test	UL 2054, UL 1642	Secondary Li Ion Cells and Batteries	Power Supply Containment Chamber Datalogger



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Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Abusive Overcharge Test	UL 1642, UL 2054	Secondary Li Ion Cells and Batteries	Power Supply Containment Chamber Datalogger
Forced Discharge Test	UL 2054, UL 1642	Secondary Li Ion Cells and Batteries	Temperature Chamber Shorting Apparatus Datalogger
Limited Power Source	UL 2054, EN 60950-1, EN 62368-1	Secondary Li Ion Cells and Batteries	Electronic Load Stopwatch
Battery Pack Component and Surface Temperature Tests	UL 2054	Secondary Li Ion Batteries	Power Supply Electronic Load Containment Chamber Datalogger
250N Steady Force Test	UL 2054, EN 60950-1, EN 62368-1	Secondary Li Ion Batteries	Force Indicator Mechanical Press
Induced Destructive Overcharge	RTCA DO-293	Nickel batteries	Power Supply Containment Chamber Datalogger
Cell and Battery Application Testing	ANSI C18.1M, Part 1:2015 and IEC 60086-2:2011	Portable Primary Cells and Batteries with Aqueous Electrolyte	Battery Cycling Equipment Misc. Mechanical Measurement Equipment

Note:

1. This scope is formatted as part of a single document including Certificate of Accreditation No. AT-1601.

R. Douglas Leonard Jr., VP, PILR SBU