

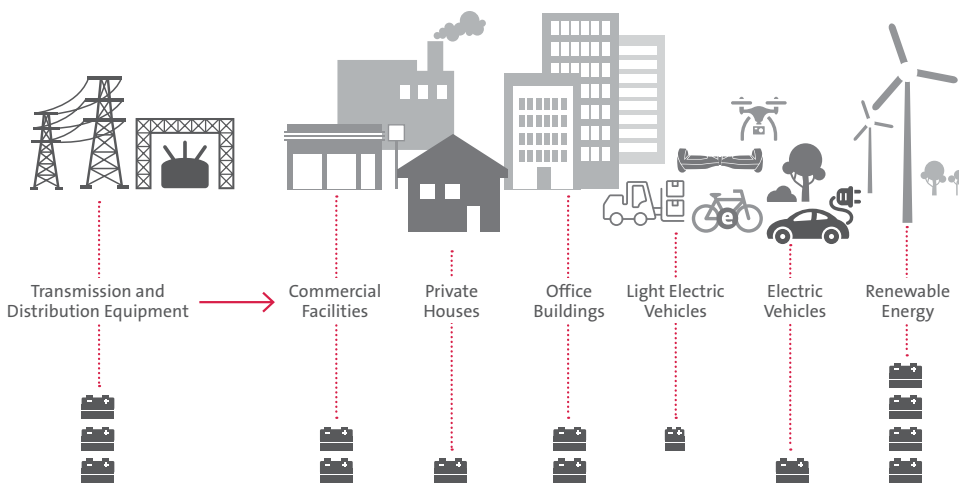


Supercharge Market Acceptance for Batteries & Energy Storage for Use in Motive & Stationary Applications

Rapid innovation combined with recent battery-operated product fires – from hoverboards to airplanes – have raised public concern over the fire and electric shock hazards of lithium-ion batteries and other related technologies. UL tests to ensure compliance and provides an unparalleled assurance, confidence & competitive edge in the marketplace.

Battery and energy storage technology has rapidly advanced in recent years, driven by breakthrough science and accelerating product applications. Many of the world's leading cell, battery module/pack, system integrators, and end product manufacturers rely on UL as a technical and safety science expert to help navigate the risks to battery safety, reliability, and performance.

UL Battery & Energy Storage
Facilitate Safety, Reliability
and Performance



New Requirements for Batteries & Energy Storage

As batteries and product applications change, so do the safety issues. Today's battery and energy storage technology stakeholders (electric vehicle makers, residential home users, office building owners/managers, operators of commercial facilities, data centers, energy parks, utilities, government safety agencies, etc.) demand information about personal protection, handling electrical grid voltage, and the need for independent third party review and testing.

To address these key industry challenges, UL has developed standards for motive and stationary applications that have been approved with key stakeholders and ultimately approved as national standards for various countries. In addition, UL's performance verification programs can give battery and energy storage manufacturers competitive differentiation and product makers assurance when assessing systems for end use.

Working with UL

Knowledge & Expertise

As active participants in the world's leading working groups and standard bodies, such as IEC, ISO, NEMA, NFPA, SAE, GB (China), BSMI (Taiwan), UL provides valuable clarity and insight into the current landscape and future direction of battery and energy storage safety.

Speed & Efficiency

From our highly-flexible modular engagement program to our unique component sourcing tools, we can help accelerate product development and acceptance from the design phase onward.

Global Market Access

UL can help make sense of the various international standards, identify harmonized requirements and gaps, plus develop a testing approach that can expand your markets to save you time and money.

For more information, contact EnergyTechQuote@ul.com, call us at 877.UL.HELPS (877.854.3577) or visit UL.com/batteries



Back your Product Performance with UL's Trusted Name

In addition to the services, standards, and testing below, UL provides customized solutions based on your needs. Contact us to discuss further.

Product Safety Services

Component Recognition

Listing Classification

System Failure Mode and Effect Analysis/
Functionality Safety

Follow-up Services

Field Evaluation/Listing Services

Reliability & Performance Services

to customer specified needs and buyer requirements

Abuse Test

Internal Short Circuit Test /Internal Fire Test

Charge-Discharge Cycling

Capacity Validation

Environmental Performance Simulations

Research Services

Large Scale Fire Propagation

Battery Aging Study

Computer Modeling & Scaling

Failure Propagation/Investigation

Construction Assessment

Applicable Standards

UL 9540 Energy Storage Systems & Equipment

UL 2580 Batteries for Use in Electric Vehicles (EV)

UL 2743 Portable Power Packs

UL 2271 Batteries for Use in Light Electric Vehicles (LEV)

UL 2272 Battery Systems for Use in Self Balancing Scooters

UL 1973 Batteries, Large Format for Light Electric Rail and Stationary Applications

UL 2849 Electric Bicycles, Electrically Power Assisted Cycles (EPAC Bicycles), Electric Scooters, and Electric Motorcycles

UL 3030 Unmanned Aerial Vehicles

UN Manual of Tests and Criteria for Dangerous Goods, Section 38.3 (lithium battery transportation requirements)

IEC 62619 Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications

EN 50604-1 Secondary lithium batteries for light EV (electric vehicle) applications - Part 1: General safety requirements and test methods

IEC 62260-1, Secondary lithium-ion cells for the propulsion of electric road vehicles – Part 1: Performance testing

IEC 62260-2, Secondary lithium-ion cells for the propulsion of electric road vehicles – Part 2: Reliability and abuse testing

ISO 12405-1 Electrically propelled road vehicles – Test specification for lithium-ion traction battery packs and systems – Part 1: High-power applications

ISO 12405-2 Electrically propelled road vehicles – Test specification for lithium-ion traction battery packs and systems – Part 2: High energy applications

ISO 12405-3 Electrically propelled road vehicles – Test specification for lithium-ion traction battery packs and systems – Part 3: Safety performance requirements

SBA S 1101 (JIS C 8715-2) Secondary lithium cells and batteries for use in industrial applications: Tests and requirements of safety (Japan S-mark)

CNS 15387 Safety testing method for secondary lithium batteries for electric motorcycles (Taiwan BSMI mark)

CNS 15424-1 Electric motorcycles battery system – Part 1: The safety requirements of removable battery system (Taiwan BSMI mark)

CNS 15424-2 Electric motorcycles battery system – Part 1: The safety requirements of stationary battery system (Taiwan BSMI mark)

SAE J2929 Safety Standard for Electric and Hybrid Vehicle Propulsion Battery Systems Utilizing Lithium-based Rechargeable Cells

Test Methods for Packs/Systems

Electrical tests

- Overcharge
- Short Circuit
- Over-discharge Protection
- Temperature
- Imbalanced Charging
- Dielectric Voltage Withstand
- Insulation Resistance
- Continuity
- Failure of Cooling/Thermal Stability System

Cell & Material Level tests

- Forced internal short circuit (FISC)
- Indentation induced short circuit (IISC)
- Thermal Analysis - Accelerating Rate Calorimetry
- Electrochemical Impedance Spectroscopy (EIS)
- Analysis
- CT Scan
- Material component analysis
- Material property analysis
- Separator Test Program

Mechanical tests

- Rotation
- Vibration Endurance
- Shock
- Drop
- Crush

Environmental tests

- Thermal Cycling
- Salt Spray
- Immersion
- External Fire Exposure
- Internal Fire Exposure

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