



**AUTOMOTIVE  
BATTERIES**



**STATIONARY  
ENERGY STORAGE**



**BATTERIES FOR  
CONSUMER PRODUCTS**

# TESTING AND APPROVAL SERVICES FOR **LITHIUM ION BATTERIES**



## TESTING AND APPROVAL SERVICES FOR LITHIUM ION BATTERIES

SGS is the world's leading company in the fields of inspection, testing and certification with more than 85,000 employees. We test batteries in accordance with international standards to ensure that they meet all requirements for safety, reliability, endurance (life cycle) and performance.

Our testing services for batteries include many areas of application such as electric and hybrid road vehicles, stationary batteries, industrial batteries, mobile machinery, aviation, shipping, medical technology and consumer products.

Batteries in all applications must go through the UN 38.3 transport test for lithium batteries. These tests are carried out in line with our accreditation according to DIN/EN ISO/IEC 17025.

The test procedure is continually advanced by SGS. We successfully work in various research projects involving lithium batteries together with renowned partners from industry and research.

SGS is also active in the battery standardisation committees DKE, VDA and IEC.

### WE OFFER OUR CUSTOMERS THE FOLLOWING TEST CATEGORIES FOR LITHIUM BATTERIES:

- Life cycle/performance testing
- Safety or misuse tests
- Simulation of environmental conditions
- EMC testing
- Transport tests

**ON THE RESPECTIVE PAGES, YOU CAN FIND OUT MORE ABOUT OUR BATTERY SERVICES FOR DIFFERENT APPLICATIONS.**



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# AUTOMOTIVE BATTERIES

The battery is the key component of the electric vehicle. Whether for performance, safety or service life – the high-voltage batteries must meet the requirements for automotive applications.

The SGS Munich-based laboratory is a recognised partner to the automotive and battery industry, offering a comprehensive range of services. The test facilities are designed for the inspection of cells, modules and battery systems ranging from 48V-mild hybrid batteries up to batteries weighing more than 500 kg for electric road vehicles.

Customers benefit from the ISO 17025 laboratory accreditation and its long-standing experience with lithium ion batteries. Over 30 years of experience with the requirements and test methods of vehicle manufacturers are an excellent basis for the comprehensive test service.

## OUR TEST EQUIPMENT MEETS THE REQUIREMENTS OF SOPHISTICATED SPECIFICATIONS

- Battery test benches for cells, modules and packs
- Characterisation/Performance
- Impedance, energy efficiency, state of charge (SoC), driving cycles
- Calendar/cyclic ageing (electrical, thermal, combined)
- Temperature, humidity and condensation tests
- Vibration, shock (300 kN Shaker) incl. electrical operation and temperature cycling
- Salt fog, corrosive gas, dipping

- IP tests, spray tests, water-splash tests, dust tests
- Altitude tests
- EMC laboratory for EV and HV batteries
- Safety/misuse tests in test bunkers
- Nail penetration, crushing (crush)
- Simulation of internal short circuits
- Drop tests
- Intrusion with pendulum
- Overcharge, over-discharge
- Thermal stability
- Thermal propagation tests
- Fuel fire
- External short circuit
- High-voltage safety, insulation testing

## COVERED SPECIFICATIONS/STANDARDS

If cell, module or battery pack: SGS tests according to international standards and OEM specifications such as:

- ISO 12405, ISO 16750, ISO 6469,
- ISO 26262
- IEC 62660, IEC 60086, IEC 62281
- UN ECE R100/2, UN ECE R136
- UN 38.3
- SAE J2464, SAE J2929, SAE J2380
- LV 124, LV 123, LV 148
- AK LH 5.21
- Sand 2005-3123
- FreedomCAR
- UL 2580
- China: QC/T-743, GB/T-31467, GB/T-31485

and many more.



## MASTERING THE CHALLENGES OF ELECTRO MOBILITY

SGS experts are actively involved with standardisation bodies. We align testing and consultancy services to the rapid technological change of electro mobility. We are able to assist our customers using the global SGS network with economically viable qualification concepts.

## ADDITIONAL SERVICES

Together with the battery tests, the SGS-TUV Saar services for homologation and functional safety complete the range of services for electro mobility.

In addition to the tests for traction batteries, the SGS offers tests for further components of the electric drive train, such as an E-engine or inverter.



# STATIONARY ENERGY STORAGE

The use of advanced technologies for energy storage provide a vital component for the implementation of a consistent energy revolution. Lithium ion batteries are now increasingly used here due to their high energy density and cycle stability and a fall in cost.

The regulatory requirements of the UN 38.3 and the harmonised standards for EMC and electrical safety are a prerequisite for market admission. However, they do not guarantee the prevention of unacceptable risks in energy storage systems. On the contrary: there is a safety loophole.

How is this possible? After all, many standards regulate the safety requirements for lithium ion cells, accumulators and systems. There are also standards for stationary storage systems such as the IEC 62485 "Safety requirements for secondary batteries and battery installations", but essentially these were written for lead acid and nickel-cadmium or nickel-metal hydride batteries. Specific regulations for the safety of lithium ion technology in the network-specific applications are currently missing. These standards are in the process of being generated. They are still in the proposal or draft stage. The standardisation process also means finding consensus and therefore requires time.

SGS experts help you close the safety gap today. Our professional experts are involved with the working groups. This know-how benefits you during the energy storage qualification.



*SGS is a member of the BVES  
(German Energy Storage Association)*

## WE OFFER THE FOLLOWING SERVICES FOR STATIONARY ENERGY STORAGE

- CE-relevant safety tests
- EMC testing
- Assistance during the risk assessment
- Evaluation acc. to safety guidelines for Li-ion home battery storage systems
- Testing on the basis of the VDE application regulations
- UN 38.3-Transport test
- Electrical characterisation
- Calendaric/cyclic ageing (electrical, thermal, combined)
- Performance and quality requirement verification
- Development-accompanying tests
- Standards research
- Evaluation of new battery chemicals



## COVERED NORMS/STANDARDS

We test according to recognised standards such as:

- UN 38.3-Transport test
- IEC 61427, IEC 62619, IEC 62620,
- IEC 62281, IEC 62485
- UL 1973
- KBIA 10104
- BATSO 02
- VDE-AR-E 2510-50
- Safety guidelines for Li-ion home battery storage systems



# BATTERIES FOR CONSUMER PRODUCTS

Lithium ion batteries are part of our daily lives, whether present in a mobile phone, notebook or power tool. They are also increasingly used in many other areas such as medical devices or e-bikes.



Compared to other battery technologies, lithium ion batteries offer advantages such as higher energy density or cycle stability. This is offset by a higher risk of fire in the event of a short circuit. An electronic protection circuit is also required to prevent overcharging or depth discharge.

To minimise these risks, lithium ion batteries must comply with several test procedures.

The SGS Battery Test House in Munich has more than 15 years of experience in the testing of lithium ion batteries for consumer products. We can carry out, e.g., the important UN 38.3-Transport test for lithium batteries using our accreditation according to DIN/EN/ISO/IEC 17025.

We also offer the CB certification according to IEC 62133.



## WE OFFER THE FOLLOWING SERVICES FOR LITHIUM BATTERIES

- Safety tests/misuse tests
- Short circuit, overload
- Thermal stability
- Nail penetration
- Crush
- UN 38.3-Transport test
- Electrical characterisation
- Calendar/cyclic ageing (electrical, thermal, combined)
- Environmental simulation (e.g. IP protection system)
- CB certification according to IEC 62133
- KC mark for Korea

## COVERED NORMS/STANDARDS

We test according to recognised standards such as:

- UN 38.3-Transport test
- IEC 62133, IEC 60086, IEC 61960,
- IEC 62281
- UL 62133, UL 1642, UL 2054
- BATSO 01
- KC 62133

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**SGS IS THE WORLD'S LEADING INSPECTION, VERIFICATION, TESTING AND CERTIFICATION COMPANY.**

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**WHEN YOU NEED TO BE SURE**

