



# E-mobility, connectivity and onboard electronics solutions

## SGS AUTOMOTIVE SERVICES

As technology advances, electric and electronic vehicles and vehicle parts are becoming more sophisticated and commonplace. However, as vehicles become smarter and more hi-tech, a raft of regulations and compliance testing has become necessary to ensure they are safe and able to withstand everything from cyber-attacks to wear and tear from climatic aging and corrosion.



Wireless and connectivity testing



Battery testing



Environmental simulation



Functional safety and cybersecurity



EMC



Regulatory testing



Electrical measurements



Damage and failure analysis

## WIRELESS AND CONNECTIVITY TESTING

We offer a range of testing services to ensure your in-car wireless devices connect, communicate and coordinate as they should. These services cover:

- V2X (Vehicle-to-Everything)
- Bluetooth for head units
- Automotive ethernet
- Antenna performance (OTA) for telematics control units (TCU) and on-board units (OBU)
- AI (Artificial Intelligence)
- User scenarios

## BATTERY TESTING

Inspection of cells, modules and entire battery systems, from 48 V-mild hybrid batteries to those weighing more than 1,000 kg that power full electric cars. All batteries must pass the UN 38.3 transport test, which is carried out in line with our DIN/EN/ISO/IEC 17025 accreditation. We also offer:

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

Detailed specifications can also be tested.

## ENVIRONMENTAL SIMULATION

### CLIMATIC AGING

We assess product performance in hot/cold/humid/constant and cyclic conditions; also simulated shock and altitude, solar radiation and splash water combined with functional testing to IEC/ISO standards.

### CORROSION TESTING

Corrosion for gas (four gases: H<sub>2</sub>S/SO<sub>2</sub>/NO<sub>2</sub>/Cl<sub>2</sub>, Kesternich), acid vapors and salt spray (constant or cycled) is also available.

### VIBRATION AND SHOCKS, FREE FALL TESTING

Vibration and shock standard testing against IEC 60068-2-6, IEC 60068-2-64, JIS D1601, IEC 60068-2-27. In addition to these tests, we can simulate handling-related falls during transport phases as required for IEC 60068-2-31.

### PROTECTION INDEX (INGRESS OF PROTECTION (IP) AND IK) AND TIGHTNESS

Electrical and electronic equipment are defined by protection indices:

- The protection index IP: IEC 60529, EN60068-2-18
- The protection index IK: IEC 62262 and IEC 60068-2-75

SGS also offers services to check the tightness of electric and electronic parts:

- Immersion test according to IEC 60068-2-45
- Fluid contamination according to IEC 60068-2-74



## MECHANICAL RESISTANCE

Static and dynamic testing services including:

- Tests on electrical wires (abrasion, tensile test, fatigue in bending, wending resistance)
- Tests on connectors (effort measurements, endurance)

## HALT/HASS TESTING

### FUNCTIONAL SAFETY AND CYBERSECURITY

Our functional safety experts offer full services relating to ISO 26262, as well as services such as court-proof safety certificates and ISO/SAE 2134 cybersecurity training and certification.

Automotive cybersecurity services include:

- Training and personal qualifications
- Consulting
- Gap analysis of processes
- Penetration testing, fuzz testing, etc.
- Cybersecurity analyses/workshops
- Assessments of products
- Audits of processes
- Certification of products and processes

## EMC

We are equipped to carry out EMC measurements on traditional and high-voltage e-mobility components and systems for:

- Electromagnetic interference (EMI)
- Electromagnetic susceptibility (EMS)
- Electrostatic Discharge (ESD)
- Transients
- Burst and surge at DC high voltage interfaces up to 1000 V/100 A DC

### REGULATORY TESTING

We offer testing services for:

- Registration, evaluation and authorization of chemicals (REACH)
- Persistent organic pollutants (POP)
- End-of life vehicles (ELV)
- Glow wire flammability (standards such as IEC 60695, VW 80000 & 80101, BMW GS95003-3&-4&-5, Daimler MBN LV124-2)



## WHY CHOOSE SGS?

We are a recognized testing authority for numerous global procedures, with services available in external laboratories which are ISO/IEC 17025 accredited, or in our own accredited test centers.

Working with industry leaders worldwide, we have helped to create and implement new standards. Choosing us as your testing partner guarantees trusted, independent third-party services to help you achieve quality, safety and compliance for your automotive products.

### ELECTRICAL MEASUREMENTS

Our electrical measurement tests comply with major original equipment manufacturer (OEM) specifications including BMW, VW, Daimler, Renault, Nissan, PSA, Toyota and many more. Performance of electrical and electronic components under environmental simulations such as vibration, climatic aging and corrosion is assessed for the following:

- Resistivity
- Contact resistance
- Electrostatic discharge (ESD)
- Dielectric strength
- Insulation resistance
- Electrical continuity
- Ground continuity
- Switch rebound time
- Heating temperature
- Micro-cut, performance tests, aging (combining environmental and power)
- Photometry
  - Test lamp intensity and distribution
  - Test retro-reflector performance
  - Luminous flux
  - Color
  - PF
  - Test luminance
  - Check of exterior plastic materials of automotive lamps
  - Diffusion
  - Transmission

### DAMAGE AND FAILURE ANALYSIS

Our damage and failure analysis services include:

- Preparation, metallography, materialography
- Topography and materials diagnostics
- Surface/chemical analysis
- Non-destructive testing (NDT)
- Polymer thermal analysis
- Electronics laboratory testing
- Mechanical – technological testing

#### CONTACT US

For further information, please contact:

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WHEN YOU NEED TO BE SURE

**SGS**