

Automotive Testing and Certification Services

SOLUTIONS TO ENSURE SAFETY, QUALITY AND SUSTAINABILITY FOR THE AUTOMOTIVE INDUSTRY.

**A CLEAR ROAD AHEAD FOR YOUR
AUTOMOTIVE SERVICES.**



WE ARE SGS – THE WORLD'S LEADING TESTING, INSPECTION AND CERTIFICATION COMPANY.

TESTING SERVICES

Quality, safety and performance of end products and components depends on the quality of materials used to manufacture them.

With the surge in demand for use of latest materials and their combinations, it becomes necessary to monitor the value chain right from raw material to the end product.

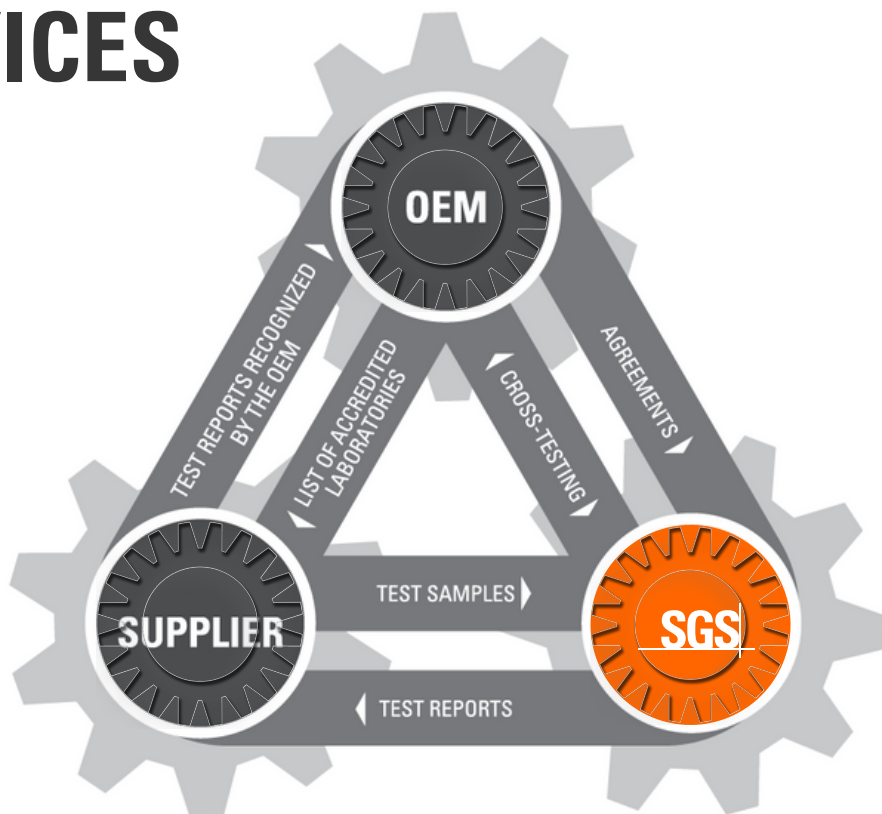
At SGS, our technical experts use state-of-the-art facilities and technology to deliver tailor-made services that benefits businesses. We undertake various testing services for materials as well as parts.

We strive to deliver value at every step in your project by providing:

- Rapid turnaround
- Value based pricing
- Technical assistance
- Key account management

SGS services span total content analysis, aging simulation and tests for determination of mechanical and chemical properties to the evaluation of test results. For requirements of sample tests, SGS can be your preferred partner as an interface between OEM and the supplier.

SGS is recognised worldwide for its network of 17025 accredited labs by major OEMs of the automotive Industry such as BMW, Changan, Daimler, FAW, FCA, Ford, Geely, GM, Honda, Hyundai, Isuzu, JLR, Kia, Mazda, Mitsubishi, PSA-Opel, Renault Nissan, Suzuki, Toyota, Volvo, VW.



MATERIAL TESTING

SGS tests all types of materials including plastics, rubbers, composites, metals, paints, coatings and varnishes.

AGINGS



UV PHOTO AGING

Test on exterior and interior parts; wetaher-o-meter; fade-o-meter, sunshine weather-o-meter, sun simulation.

XENON ARC DEVICES

Hot temperature, aspersion and freeze; Ci5000, Ci4000. Q-SUN, Xe-2 and Xe-3.

FLOURESCENT LAMP DEVICES

UV-A, UV-B with temperature and humidity conditions. Q-UV, UV-CON.

SOLAR SIMULATION DEVICES

Sun Simulation (SoSi) chambers from 1cubic metre to 25 cubic metre.



CORROSION

CONSTANT HUMID CORROSION

- Neutral Salt Spray (NSS)
- Copper Accelerated Acetic Acid Salt Spray test (CASS)
- Acetic Acid Salt Spray test (ASS)
- Condensation/Immersion

CYCLED CORROSION TESTING (CTT)

3C Corrosion, SWAAT Test, Renault ECC1, JASO M610, VW CCT, Ford CETPL467, Nissan CCT, Hyundai & Honda sub-zero temperature CCT, GMW 14872, SAEJ 2334, PV 1210

CORROSION ANALYSIS

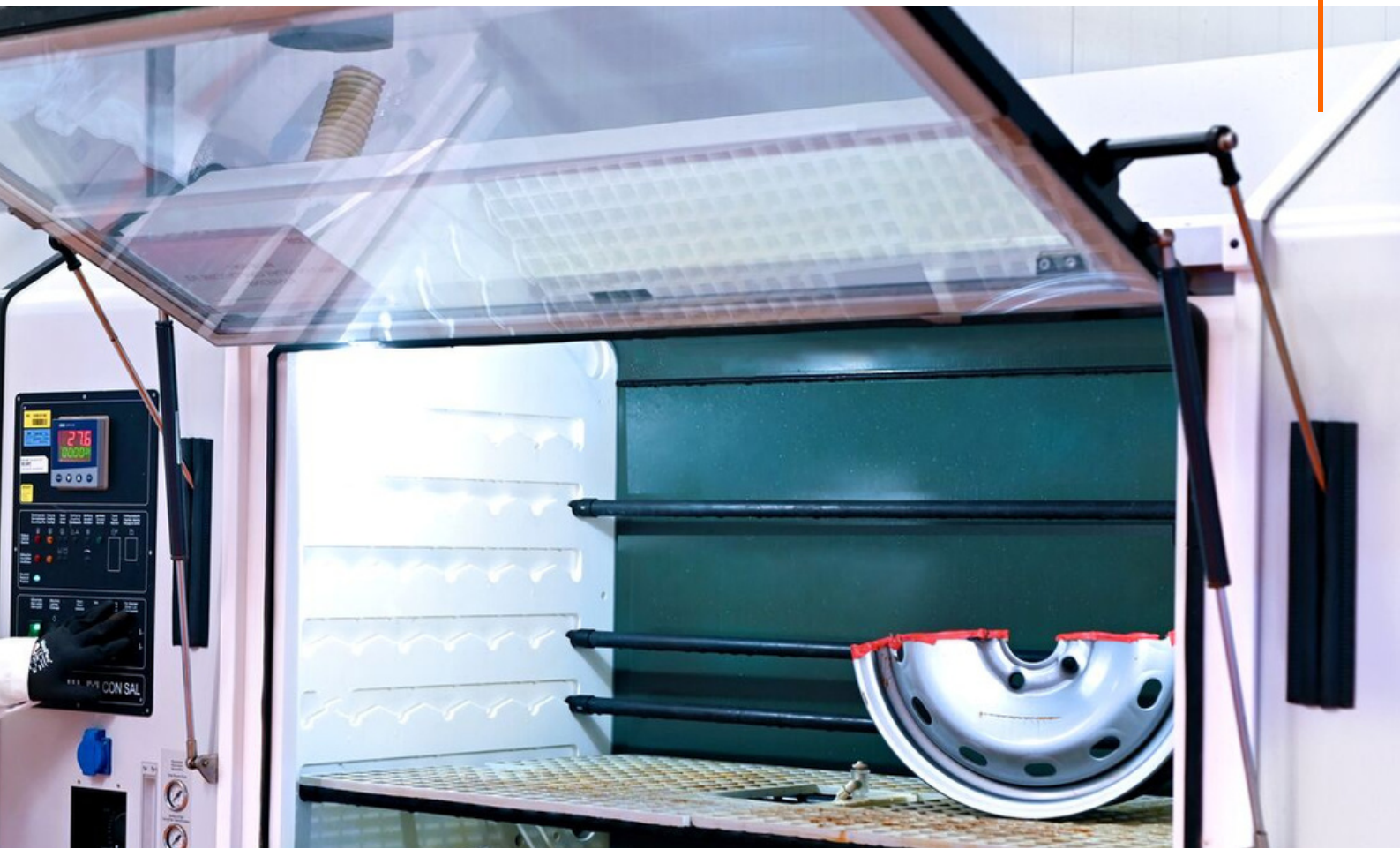
- Pitting analysis
- Brazing quality analysis
- Filiform corrosion
- Weld bead analysis
- Coating thickness measurements



CLIMATIC AGING

HOT/COLD/HUMID CHAMBERS

- Capacity ranges from a few litres up to 30 cubic metres.
- Temperature ranges from -70°C to 300°C.
- Humidity ranges from 10% to 100%.
- Thermal shock air/air
- Thermal shock by liquid/liquid immersion
- Chambers with rapid temperature variation (upto 15°C/min)
- Chambers equipped with IR lamps
- Ozone aging for rubber



INTERIOR EMISSIONS



VOC TESTING

Volatile organic compounds have a direct impact on health. Several standards for air quality have been set to qualify and quantify the presence of VOC's within the materials, parts or the vehicle itself.

- Tedlar upto 10l Bag (SES N 2403) article; NES M0402:2016 Method-2; TSM0508G:2009; 0094Z-TOA-0000:2012)
- Micro-chamber (G-00-1730 & G-00-1736: RNES-B-20116 V1.0)
- Tedlar upto 2000l Bag (Nissan M0402 Method-1)

The BTEX aromatic hydrocarbons, Benzene, Toulene, Ethylbenzene, Xylene, Styrene and n-Tetradecane all VOC's are monitored using gas chromatography (GC/MS or GC/FID). It is also important to monitor formaldehyde in order to limit its spread to the inside of the vehicle, within passenger compartments. This is detected by HPLC.



SENSORY ANALYSIS

OLFACTORY

Our sensory evaluations cover two aspects:

- Odour intensity assessment
- Identification of the nature of the odour

The assessments are carried out on materials or parts, in vials or in bags.



CHEMICAL ANALYSES

Testing for substances according to standards: Total Carbon TVOC SES N 2403 article; MS 300-55E:2014; RLTD42 3109



FOGGING TEST

The aim of this test is to determine, under the effect of high temperature, the quantity of volatile products released by various materials in the passenger compartment (through condensation on the inside of the windscreen).

The assessments are made by:

- Gloss measurement of the condensation
- Weighing the condensation (gravimetry)
- Transparency measurement (or haze) of the fogging

MECHANICAL AND PHYSICAL TESTS

MECHANICAL TESTING AND CHARACTERIZATION

- Static and dynamic properties of materials from -40°C to 400°C, tensile compression, bending, torsion, shear strength, creep, fatigue and flat and right angle peeling.
- Shore, Rockwell, Vickers, Brinell, Barcol Knoop and Persoz hardness
- Micro and ball indentation hardness
- Charpy and Izod impact
- Drop tower for instrumented impact (puncture impact)

PRESSURE TESTING

Endurance under combined pressure cycles (liquid to air) and thermal cycles (-40°C to 180°C) and fluid circulation coupled with vibration.

THERMAL ANALYSES AND PHYSICAL TESTING

- FTIR, DSC, TGA, HDT, Vicat, MFI
- IRTF
- Physico-chemical analysis: ash rate, density and fiber content

RESISTANCE AND APPEARANCE TESTING

- Scratching, rubbing
- Abrasion
- Staining
- Shot-blasting
- Taber
- Martindale
- Spraying with different types of fluids
- Car wash testing
- Impact testing

FLUID'S IMPACT ON MATERIALS

Immersion, wiping, dripping, soaking with all types of fluids including volatiles, fuels and oil.

FIRE TESTING

Horizontal and vertical combustibility (eg. FMVSS 302, UI94, IS 15061)

MICRO STRUCTURE

- Microstructure study
- Total case depth/ decarburization depth
- Failure analysis (simple/complex)
- Grain flow test
- Grain size
- Inclusion rating
- Macro etch test
- Effective case depth
- Hardness pattern (weld)
- Weld and porosity analysis
- Cast iron analysis

RESTRICTED/ HAZARDOUS SUBSTANCES ANALYSIS

- Testing for hazardous substances like Lead, Cadmium, Mercury, Hexavalent Chromium
- Flame Retardants, Phthalates & HBCDD analysis as under SOC according to standards: IEC62321: 2017: EN 14372:2004
- Asbestos analysis
- RoHS, RoHS-2
- GADSL



DYNAMIC SERVICES

SGS can test automotive parts to evaluate their strength, safety, durability and dynamic performances.

I&E VALIDATION



MECHANICAL ENDURANCE TEST

- Vibration test
- Vibration with climate condition
- Mechanical shock



LIFE AND FATIGUE TEST

- Performance & function test
- Chassis parts fatigue (hydraulic servo system)
- Internal/external parts fatigue
- Strain gauging
- Data acquisition



BODY TEST

- Climatic aging
- Angle vs. force management
- Electric rear mirror adjust test
- Window regulator test
- Armrest force test door handle/grip test
- Sunvisor durability
- Louver/vent durability
- HVAC
- Dashboard
- Steering wheel
- Washer tank
- Bumper
- Cowl top
- Headliner
- Brake pedal
- Floor console
- Door handle
- Bearings



4 DOORS, HOOD AND DECKLID

- Side door key life test
- Open / close, inside / outside
- Hood fatigue endurance test
- Electric / manual tail gate fatigue



FORCE AND STRENGTH TEST

- Height adjusted unlock strength
- Armrest strength
- Shoulder unlock strength
- Backrest adjuster effort
- Side guard plate strength
- Headrest moving effort
- Seat track unlock effort
- Seat track displacement
- Seat cover abrasion resistance
- Seat framework durability
- Parking lever



LIFECYCLE DURABILITY

- Ingress and egress test
- Jounce durability



XRAY AND SCANNING SERVICES



AIRBAG AND INFLATOR ENVIRONMENTAL SIMULATION TEST

Dust, thermal shock, thermal cycle, vibration temp cycle, mechanical shock, sunshine simulation, salt spray, ESD, bonfire, Xenon Arc



AIRBAG DEPLOYMENT TEST MODULE LEVEL / SYSTEM / COMPONENT LEVEL ON

- Driver airbag
- Passenger airbag
- Seat airbag
- Curtain airbag
- Knee airbag
- Vehicle level deployment inside environment chamber from 100°C to -40°C.

COOLING SYSTEMS VALIDATION



RADIATOR

Performance test, Thermal cycle test, Pressure cycle test, Vibration test, Internal corrosion test, Leak test, Burst test, Internal cleanliness test



CONDENSER

Performance test, Pressure cycle test, Vibration test, Leak test, Burst test, Internal cleanliness test



INTERCOOLER

Performance test, SWAAT test, Pressure cycle test, Internal cleanliness test, Salt spray test, Thermal cycle test, Thermal shock test



HOSES

Pressure cycle test, Burst test, Internal cleanliness test, Thermal cycle test, PVT (pressure vibration and temperature) test



ON-BOARD ELECTRONICS TESTING

We test the performance and reliability of electrical, electronic and electromechanical (EEE) components and their materials.

ENVIRONMENTAL SIMULATION



VIBRATION AND SHOCK TEST

- Shakers from 5 to 75kN with climatic chambers and table (rapid ramp in temperature from -40°C to 150°C): Sine, random, sine on noise
- Shock up to 200g
- Resonance dwell testing



ELECTRICAL MEASUREMENTS & FUNCTIONAL CHARACTERIZATION

ELECTRICAL MEASUREMENT

- Insulation resistance
- Dielectric strength
- Resistivity
- Contact resistance
- Electrostatic discharge (ESD)
- Voltage drop
- Overvoltage
- Reverse polarity
- Withstand voltage
- Transient immunity test as per ISO 7637-2 for pulses 1, 2a, 3a and 3b
- Wave form module test as per JASO D001 for pulses A2, B2, D2



IP TESTING AND TIGHTNESS

- Resistance to solid: IP1X to IP6X, dust (talc, Arizona Portland cement)
- Resistance and tightness to liquids- from IPX1 to IPX9K

FUNCTIONAL CHARACTERIZATION

Micro-cut, performance tests (power consumption, activation profile of parts), ageing combining environmental and power (power up to 1500V, 2500 A, monitoring current/ voltage/ temperature, Grommet/Bending durability, Voltage/Current cycling test.

ENVIRONMENTAL AGINGS



CLIMATIC TESTS

TEMPERATURE AND HUMIDITY

Constant and cyclic, thermal shock and altitude simulation combined with functional testing.

CORROSION

- Gas corrosion
- 4 gas corrosion (H2S/SO2/NO2/Cl2)
- Salt corrosion (neutral or cyclic)

SPLASH WATER

Test in accordance with ISO16750-4 (with or without Arizona dust and/or NaCl parts in operation during cycling).



FIRE HAZARD TESTS

- Glow wire flammability IEC 60695

REGULATORY TESTING

Testing of substances in accordance with directives:

- RoHS (1 or 2) 2002/53/EC
- ELV 2000/53/EC
- WEEE



FAILURE ANALYSIS

- Microscopic analysis of PCB, solders and braze joints, PCB cross-section analysis at magnification 6x to 1000x.
- Radiography and Computed Tomography (CT Scan)





ELECTROMAGNETIC COMPATIBILITY TESTS

EMC TESTS

SGS is equipped with shielded rooms, anechoic chambers, strip line/TEM cells, pulse generators with highly digitized and automated device under test monitoring using various transceivers, cameras and software. We undertake EMC measurements on traditional automotive electronics, high-voltage e-mobility/electric vehicle (EV) components/systems, two/three-wheeler vehicle testing as well as consumer electronics.

We undertake high-precision EMC measurements like:

- Radiated emission upto 40GHz
- Radiated immunity upto 600V/m
- Conducted emission & immunity
- Magnetic emission & immunity
- Harmonics, flicker, spikes and voltage interruptions
- Electrostatic discharge (ESD)
- Conducted transient emission
- Conducted transients immunity and abnormal voltage
- JASO and OEM specific tests

SGS's EMC testing services comply with all regulations and international standards including ISO, IEC, EN, CISPR and JASO. We also meet original equipment manufacturer (OEM) specifications for all the major manufacturers including Tata, Suzuki, Mahindra, TVS, FCA, PSA, Toyota, BMW, Volkswagen, Skoda, Jaguar Land Rover, Hyundai, Mitsubishi, Volvo, GM, Chrysler, Ford, Mercedes-Benz and many more.



Automotive categories:

- 12V, 24V & 48V electronics sub-assemblies
- EV electronics sub-assemblies eg: DC/DC converters, PDUs, inverters, Battery Management System etc.
- Two-wheeler and three-wheeler vehicle level testing
- UNECE R.10 and AIS 004 testing

HOMOLOGATION AND CERTIFICATION SERVICES

SGS can support automotive product homologation, certification and type approvals for various global markets. We are the designated technical service provider for various European authorities for issuing the UNECE certification (E Marking).

UNECE APPROVAL

- Designated by KBA (E1), RDW (E4), NSAI (E24) for E approval as per UNECE regulations
- Whole vehicle type approval for cars, buses and trucks
- Component level E approvals
- COP compliance
- Test execution and witness
- Whole vehicle type approval for South Africa (based on ECE reports)
- Joint witness for ECE approval with AIS approval

INMETRO CERTIFICATION

- Identification of the applicable standard
- Identification of the different classes for approval
- Support for testing in Brazil
- Identification of the legal representative in Brazil (required for INMETRO approval)
- Factory audits
- Legal representative audits

AIS CERTIFICATION FOR INDIA

- Support to overseas and Indian client for India type approval certification.
- Consultancy for Indian certification through India type approval authorities
- Coordination for all testing and documentation requirement for Indian approval

COLUMBIA CERTIFICATION

- Identification of the applicable standard
- Identification of the different classes for approval
- Support for testing in Colombia
- Factory audits
- Final certification

CE MARKING FOR BATTERY PACK AND EV CHARGERS

- Identification of the directive for the CE certification
- Testing for the CE marking
- Notified Body certificate for the CE under EMCD.

MATERIAL COMPLIANCE FOR ELECTRICAL/ELECTRONIC PRODUCTS

- WEEE, REACH testing
- RoHS testing
- California Proposition 65

CERTIFICATION FOR RF, WIRELESS, WIFI, BLUETOOTH, FM/AM, CELLULAR AUTOMOTIVE PRODUCTS

- Support for the CE, FCC testing (RF, safety, health, EMC, cybersecurity testing).
- NB certificate for CE and UKCA
- FCC & ISED certification
- BT-SIG testing & certifications
- WIFI alliance testing and certifications
- RCM (Australia), MIC (Japan), NCC (Taiwan)
- WPC certification for India

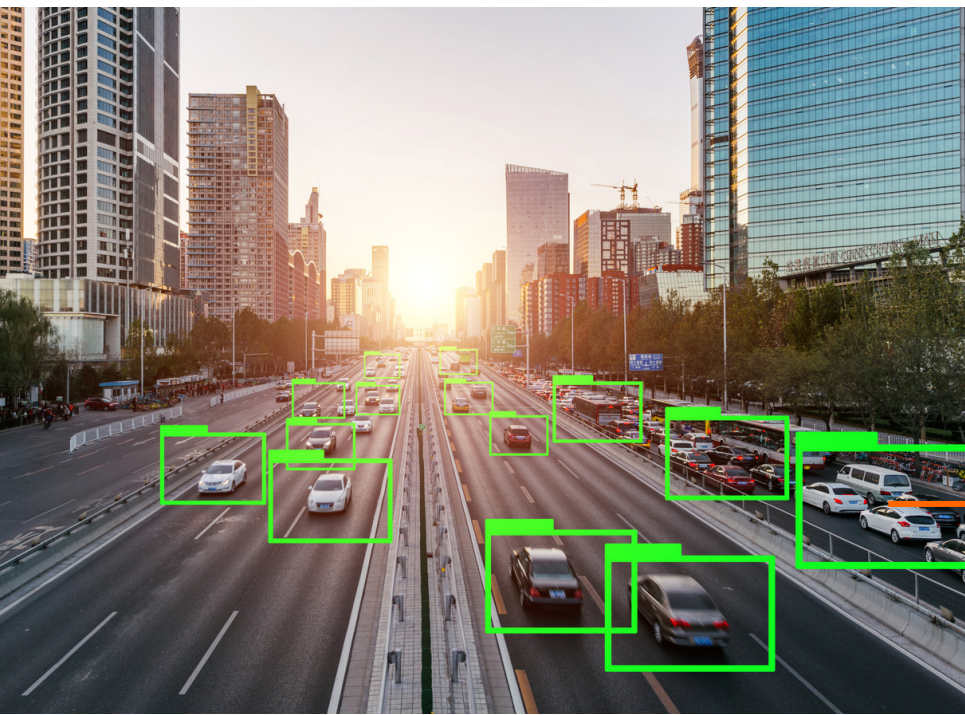
INTERNATIONAL TYPE APPROVAL (ITA) FOR RF RELATED PRODUCTS

- Support for type approval of RF products globally in all countries.
- Identification of requirement for each country.
- Documentation preparation and application filling for certificate with all countries.

CE CERTIFICATION FOR E-BIKE

- Testing as per the EN 15194 for E-bike
- Notified body certificate under machine directive

GLOBAL MARKET ACCESS PROGRAMS FOR ELECTRICAL & ELECTRONIC PRODUCTS



WHY SGS IS TRUSTED?

SGS is a world leader in testing, certification and verification with over a hundred years' worth of experience. Its global network and unparalleled resources give you the security of a dynamic and secure choice for your automotive manufacture and performance requirements.

Independent and innovative, our technical experts use state-of-the-art testing facilities and technology to deliver accurate results and tailor-made added value services that help to improve your business.

The services we offer cover everything from essential original equipment manufacturer (OEM) component manufacture to emission and mechanical testing. Our accreditations enable us to help you constantly to improve your business and demonstrate your excellence. We can support you with material and performance testing, chemical compliance testing, durability testing, engine endurance, functional safety training and cybersecurity, certification and homologation services.

GLOBAL REACH, LOCAL TOUCH

With a presence in nearly every single region around the globe, our experts speak the local language, understand the culture of the local market and at the same time, operate globally in a consistent, reliable and cost effective manner.



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WHEN YOU NEED TO BE SURE

