



# Materials Testing

## SGS AUTOMOTIVE SERVICES

Rise to the challenge to meet customer expectations on quality, performance and durability, as well as regulatory and safety standards with a comprehensive range of materials testing services from SGS.

Trusted means *Tested.*

**SGS**



Aging



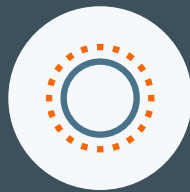
Interior emissions



Fire testing



Thermal Analysis



Appearance testing



Cleanliness of components and protection of systems by filtration



Mechanical testing



Non-destructive testing

To ensure safety and performance compliance, SGS's wide testing scope includes all types of materials including plastics and polymers, rubbers, composites, metals, paints, coatings and varnishes. Assessments can be made on aging, interior emissions, fogging and odor/smells. We conduct physical and filtration testing and also mechanical and non-destructive testing.

## AGING

### CORROSION TESTING

- Constant humid corrosion (up to 10 m<sup>3</sup>)
  - Neutral Salt Spray (NSS)
  - Acetic Acid Salt Spray (AASS)
  - Copper Accelerated Salt Spray (CASS)
  - Condensation and immersion
- Cycled corrosion testing (CCT, alternating salt spray cycle, temperature and humidity cycle and drying cycle): 3C corrosion, SWAAT test, Renault ECC1, PSA TCAC, Herel test, Dr Diehl, Volvo ACT, C4S, ECC2, CCT-1, NVDA

After corrosion testing, SGS can conduct pitting analysis, brazing quality analysis, filiform corrosion, weld bead analysis, coating thickness measurements.

*Applicable standards: ISO9227, ASTM B117, Daimler DBL7392, RNES-G-00005 (ECC1, CCT1), VW PV1210, Toyota TSH1552.*

### HOT LIGHT FASTNESS/HOT LIGHT AGING AND SUN SIMULATION

SGS provides several weathering testing equipment:

- Weatherometer, fadeometer, sunshine weatherometer, sunshine simulation with xenon arc lamps (hot temperature, aspersion and freeze)
- Fluorescent lamp (UV-A, UV-B with temperature and humidity conditions)

- Carbon arc lamp (more dedicated to Japanese OEMs)

Test chambers are programmable for temperature and humidity, as well as water spraying (simulating a cycle of morning dew and graining). Chambers for sun simulation testing of parts vary from 1 m<sup>3</sup> to 14 m<sup>3</sup>. Interior parts can be tested with or without snow-white coffin. We assess visual aspects like color change, the gloss, the sticky effect, orange peel effect and changes in dimension and clearance of the mechanical resistance as well before and after aging.

*Applicable standards: ISO 4892, ISO16474, ISO 105-B02, VW PV3929, BMW AA-0236, FCA 50451, Toyota TSH 1585.*

### CLIMATIC AGING TESTING

Climatic tests are used for simulating ageing under extreme conditions (humidity, temperature, sunlight exposure, thermal shocks) in order to check resistance and behavior. SGS provide test chambers from a few liters up to walk-in chambers, which are programmable in temperature and humidity, rapid temperature variation, vacuum option, ozone aging or thermal shocks (air/air or by immersion) for small samples as well as for complex and large vehicle parts. We assess visual aspects like color change, gloss, changes in dimension and clearance by using an optical laser 3D scanner (GOM) as well as mechanical resistance before and after aging.

*Applicable standards: ISO188, ISO1431, VW PV1200, Ford BI106-03, Nissan M0132, GMW14124, PSA D451139.*





## INTERIOR EMISSIONS

### VOLATILE ORGANIC COMPOUND (VOC)/SEMI-VOLATILE ORGANIC COMPOUND (SVOC) TESTING AND FORMALDEHYDE

Several regulations governing the search for these compounds and standards representing vehicle interior air quality (VIAQ) have been set to both qualify and quantify VOCs, SVOCs and formaldehyde within the materials, parts or the vehicle itself. Our resources include micro, 1 m<sup>3</sup> and walk-in chambers, as well as GC-MS or GC-FID and HPLC or photometric assessment methods. Other substances can be analyzed individually.

*Applicable standards: VW PV3942, Renault-Nissan RNES-B-00114, Toyota TSM0508G, Suzuki SESN2403, Hyundai MS 300-57.*

### FOGGING TEST

The aim of the fogging test is to determine the quantity of volatile products released by various materials contained in the passenger compartment of a vehicle.

*Applicable standards: DIN75201, SAEJ1351, Honda HESD6508, Ford BO116-03, Volvo VCS 1027,2719, GMW3235.*

### ODOR/SMELL TESTING

The sensory assessment studies cover two areas:

- Odor intensity assessment
- Identification of the nature of the odor

*Applicable standards: VDA270, SAEJ1351, VW PV3900, Suzuki SESN2405, BMW GS-97014-4, PSA D105517, RNES-B-00096.*

## APPEARANCE TESTING

- Abrasion (Taber, Martindale) and rubbing (XB, friction by crockmeter)
- Washing brushes
- Impact (Dupont impact), shot-blasting, chipping, gritting and falling sand abrasion
- Staining and fluids impact on materials (immersion including soaking or spraying with all types of fluids such as volatiles (cleaning agent), fuels and oils)

*Applicable standards: ISO 1817, ISO 5470, ISO 6272, ISO 12947, ISO 17076, ISO 20566, ISO 20567.*

## THERMAL ANALYSES

- FTIR (Fourier Transform InfraRed spectroscopy)
- DSC (Differential Scanning Calorimetry)
- TGA (Thermogravimetric Analysis)
- MFI (Melt Fluidity Index)
- DMA (Dynamic Mechanical Analysis)
- TMA (Thermo Mechanical Analysis)
- Density (pycnometry or hydrostatic scales)
- Ash content
- Vicat Softening Temperature Point and deflection under load (HDT)
- Air permeability

*Applicable standards: ISO 75, ISO306, ISO1133, ISO1172, ISO1183, ISO3451, ISO10119, ISO11357, ISO11358, ISO11359.*

## WHY CHOOSE SGS?

Our staff are experienced and highly qualified and undergo continuous training to stay up to date with the latest technology and advancements. Testing can be performed in external laboratories which are ISO/IEC 17025 accredited or in our own accredited centers. We aim to help automotive suppliers and manufacturers of complete systems navigate complex processes of compliance, giving them a greater understanding of materials and components and allowing for swifter access to markets.

### FIRE TESTING

Assessment according to FMVSS302 and customer specifications. We are able to perform both horizontal and vertical combustibility testing.

*Applicable standards: DIN 75200, ISO 3795, VW TL1010, RNES-B-00071, PSA D451333, Ford BN024-02, Toyota TSM0504.*

### CLEANLINESS OF COMPONENTS AND PROTECTION OF SYSTEMS BY FILTRATION

Following the completion of the main methods of extraction, impurities are analyzed for compliance with ISO 16232. Filtration tests determine efficiency, capacity and resistance to fluids, pressures, and temperature.

### MECHANICAL TESTING

- Static and dynamic properties of materials from -40 to 400°C: Tensile, compression, bending, torsion, tear strength, shearing, 90° and 180° peeling, creep, fatigue and endurance
- Pendulum shocks for non-instrumented impact (Charpy, Izod, Dynstat)
- Drop tower for instrumented impact (puncture impact)
- Hardness (IRHD, Shore, Rockwell, Vickers, Brinell, Barcol, Knoop, Persoz)
- Micro and ball indentation
- Pressure testing (endurance under combined pressure cycles (liquid or air) and thermal cycles (-40 to 180°C) and fluid circulation coupled with vibration)

*Applicable standards: ISO 34, ISO 37, ISO 178, ISO 179, ISO 180, ISO 527-2 & -3, ISO 604, ISO 868, ISO 6603-2, ISO 7765.*

### NON-DESTRUCTIVE TESTING

#### SGS ADVANCED METROLOGY SOLUTIONS (AMS)

Our Advanced Metrology Solutions specialize in 3D metrology precision services and technical measurement processes.

#### SGS NON-DESTRUCTIVE TESTING SERVICES

We offer the following non-destructive tests, testing services and training for manufacturers and industry professionals:

- Industrial measurements
- Digitization and reverse engineering
- Tooling maintenance
- Quality engineering
- Training
- Distribution

#### CONTACT US

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WHEN YOU NEED TO BE SURE

SGS