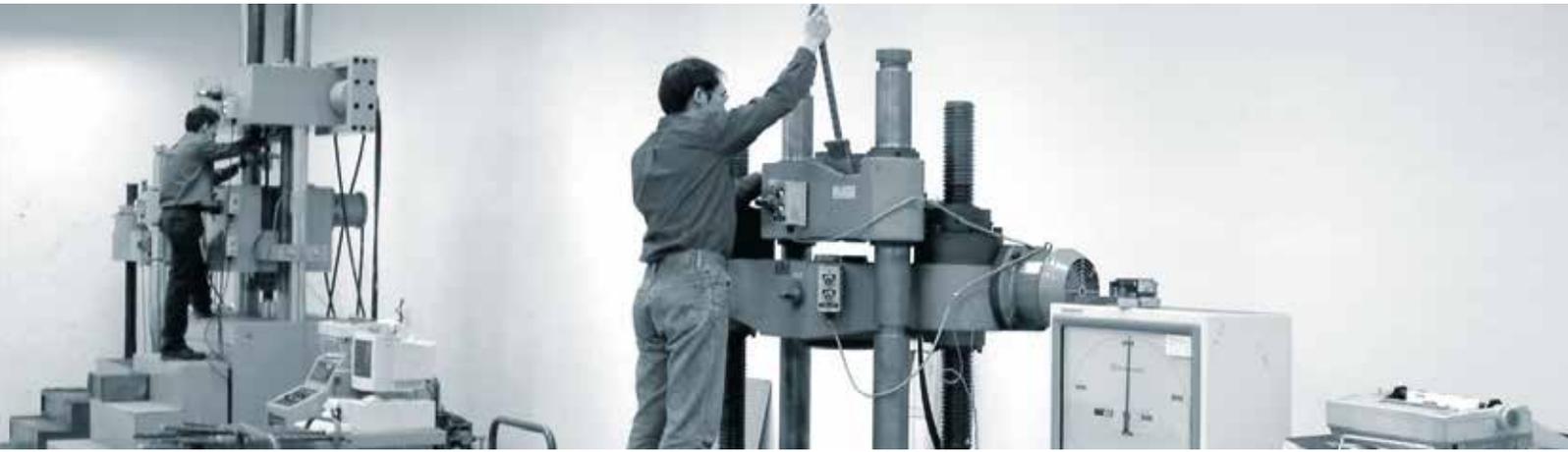




LABORATORY MATERIAL TESTING

SGS



YOUR **COMPETENT BUSINESS PARTNER** FOR INSPECTION, CERTIFICATION, VERIFICATION AND TESTING

Material testing is used for application trials and improvement of new materials, for defect detection and evaluation in the metal industry, for failure analysis and for basic research of the theoretical strength of materials.

SGS Materials Laboratories focus on the testing of Metal Products, Building Materials, Polymer Materials, Materials related to Automobiles and their products.

Our laboratories offer a range of mechanical, physical and chemical testing methods. Our services cover the mechanical properties, thermal properties, flammability properties, chemical composition analysis, microstructure analysis, weathering resistance testing, size measurements, safety testing and environmental impact testing.

Generally, the tests are performed in order to verify material characteristics, such as tensile strength, compressive strength, bending strength, aging characters or chemical composition.

Headquartered in Geneva, Switzerland, the SGS Group is the global leader and innovator in inspection, verification, testing and certification services. Founded in 1878, SGS is recognised as the global benchmark in quality and integrity.

Industrial Services as one of the largest business lines within the SGS Group is a global provider of technical inspection, verification, testing and conformity assessment services for all industrial markets.

The core values of complete independence, transparency and integrity guide us in our mission to deliver first-class services on a constant high quality level to customers around the world.

Partnering with SGS guarantees access to unparalleled know-how and facilities.

We eliminate uncertainty, enhance mutual confidence, and offer you the freedom to concentrate on the things that really matter: The growth of your core operations and the profitability of your enterprise.

SGS carries out independent and impartial examination, verification, validation and assessment on behalf of clients in order to ensure that systems and products are designed and constructed according to the specification requirements of the client.

With our advanced testing technologies and our experienced and qualified staff we offer total quality services and high level expertise for commercial clients, governments and international institutions.

Our Material Testing Laboratories are accredited according to DIN EN ISO/IEC 17025 and as inspection body TYPE A according to ISO 17020. Please check with each laboratory concerning the scope of their work.



CONSTRUCTION MATERIAL AND MECHANICAL TESTING

CONSTRUCTION MATERIAL TESTING

SGS has several construction materials laboratories, providing professional testing services and operating under the relevant required accreditations.

SGS' construction materials testing laboratories are the first choice when you require testing by an independent testing and inspection organisation, advice on quality of the materials and information on requirements for import and export of construction materials.

SGS LABORATORIES CAN PERFORM

- Yield and tensile strength, elongation and bending strength of steel
- Design and mixture proportions of ordinary concrete and masonry mortar
- Compressive, flexure and impervious strength of concrete
- Compressive strength of mortar
- Compressive and flexure strength, setting time, fineness and soundness of cement
- Compressive strength of bricks
- Aggregate testing including checking of fineness modulus, density, lumpiness of clay, crushed stone value, flat and elongated particles in coarse aggregate
- Density of soil
- Testing of polymer (plastics, paint and rubber) materials
- Environmental testing: soil, ground water, indoor environmental quality testing
- Asphalt concrete testing including characters of asphalt and bituminous mixture, smoothness of pavement, design and mixture proportions of bituminous mixture
- NDT and durability for concrete construction including impact echo, infrared camera, rebar detector, GPR, ambient vibration monitoring
- Rail component testing
- Failure analysis for metal material/product

MECHANICAL TESTING

The mechanical testing laboratories provide structural, physical and mechanical assessment of materials and products. Tests are carried out under environmentally controlled conditions to ensure that the materials and products meet specifications and fit their intended purpose.

With superb laboratories, workshops, purpose-built test equipment and a highly trained team of experts, the

mechanical testing laboratories can provide services including

- Tensile strength
- Flexural and compressive strength
- Impact strength
- Burst and tear strength
- Punch and interlaminar shear
- Bond strength
- Hardness
- Abrasive resistance
- Deflection temperature
- Softening and melting point
- Brittleness and cold crack temperature
- Thermal expansion
- Density
- Heat and humidity resistance
- Viscosity
- Surface tension

The tests are performed according to internationally recognised standards, such as ISO, American (ASTM), Japanese (JIS) or European (EN, DIN, BS, etc.).



METAL TESTING SERVICES

Metal Testing services focus on the testing of ferrous metal, non-ferrous metal, mechanical apparatuses and mechanical parts. Our services cover mechanical properties, chemical composition analysis, micro-structure analysis, dimensional measurements, non-destructive testing, corrosion resistance and weather resistance.

MAIN TESTING SCOPE

- Mechanical Property Testing
 - Tensile
 - Impact (under different temperatures between -196°C up to $1,000^{\circ}\text{C}$)
 - Rockwell Hardness
 - Brinell Hardness
 - Vickers Hardness
 - Bend Test
 - Impact (under different temperatures between -196°C up to $1,000^{\circ}\text{C}$)
 - Impact (under different temperatures between -196°C up to room temp)
- Metallography
 - Macro-/Microstructure inspection
 - Grain size
 - Coating thickness
 - Depth of hardening
 - Spheroid graphite and SEM
- Chemical Composition Analysis
 - Optical emission spectrometric
 - X-radial fluorescence spectrometric
- Carbon sulphur analyser
 - Nitrogen oxygen analyser
 - Fast and Reliable Mobile OES Metal Analysis – PMI-MASTER PRO
- Dimension Measurement
 - Symmetry
 - Coaxiality
 - Roundness
 - Perpendicularity
 - Flatness
 - Circular
 - Parallelism
 - Roughness
- Non-Destructive Testing (NDT)
 - Ultrasonic Testing
 - Radiographic Testing
 - Magnetic Particle Testing
 - Penetrant Testing
 - Infrared Testing
- Corrosion Testing
 - 10 % oxalic acid etch testing for stainless steel
 - Thermal-neutron fluence rate measurements
 - Ferric sulphate-sulphuric acid testing for stainless steel
 - Neutral salt spray
 - Acetic acid-salt spray
 - Acid-oxidising salt test
 - Copper accelerated salt spray (CASS)
 - Pitting Test

REPLICA METALLOGRAPHY

Additional to the destructive laboratory testing services for materials SGS also provides in-service analysis using Replica Metallography. The microstructure of material used in components exposed to both high temperature and high stresses will over time deteriorate due to creep.

By metallographical methods such as Replica the actual condition can be monitored and any acute need for repair or the rate of inspection frequency in the future can be safely judged.

The preparation for microstructure evaluation will include several grinding steps with subsequently higher finish in each step followed by either mechanically or electrolytically polishing.

One of the great advantages of the replica technique is that efficient preparation and collection of copies can be made on site by skilled personal and the evaluation can be done in the laboratory with the best microscopes by qualified metallurgists. Further the results can be documented by photos, and the replicas stored for comparison with later retesting.

SGS can utilise advanced portable equipment for polishing, grinding and etching as well as a portable microscope. Our teams of expert metallography technicians are capable to deliver quality and satisfactory services.



POLYMER TESTING SERVICES

Polymer Testing service is committed to professionalise its testing capability in plastics, rubber, coating, ink, adhesive, automotive related polymeric materials and various other relevant products.

PLASTIC MATERIALS AND PRODUCTS

Our Polymer Testing Labs perform tests for mechanical, thermal, electrical and optical properties as well as flammability for various plastic raw materials according to ASTM, ISO, EN, JIS and GB standards, and analyse polymer materials as well as evaluate the fatigue properties.

We also offer independent testing services for

- Various plastic structures used in electric and electronic products
- Many plastic sheets and films that are used as packing materials
- Plastic floor
- PC sun panels
- Weave bags
- Reflection materials /Resin raw material/Recycle materials

according to all relevant national and international standards as well as client specifications.

RUBBER MATERIALS AND PRODUCTS

Raw rubber materials are widely used throughout the industry. We can test and evaluate rubber materials according to GB, ASTM and ISO standards.

Moreover our labs offer independent testing services for

- Vulcanised rubber
- Rubber products
- Sealing materials
- Latex products
- Waterproof materials /Reclaimed rubber products

For food grade rubber we can do hygiene, environmental and toxicity tests according to GB, FDA and EN standards.

Further we test various soft and rigid foam materials including PU, PS, PE and POM.

As an important part of a vehicle the safety of tires is always crucial. We can test various tires including inner and outer tires for bicycles, motorcycles, cars and trucks according to different standards.

COATING, INK, ADHESIVE AND RAW MATERIALS

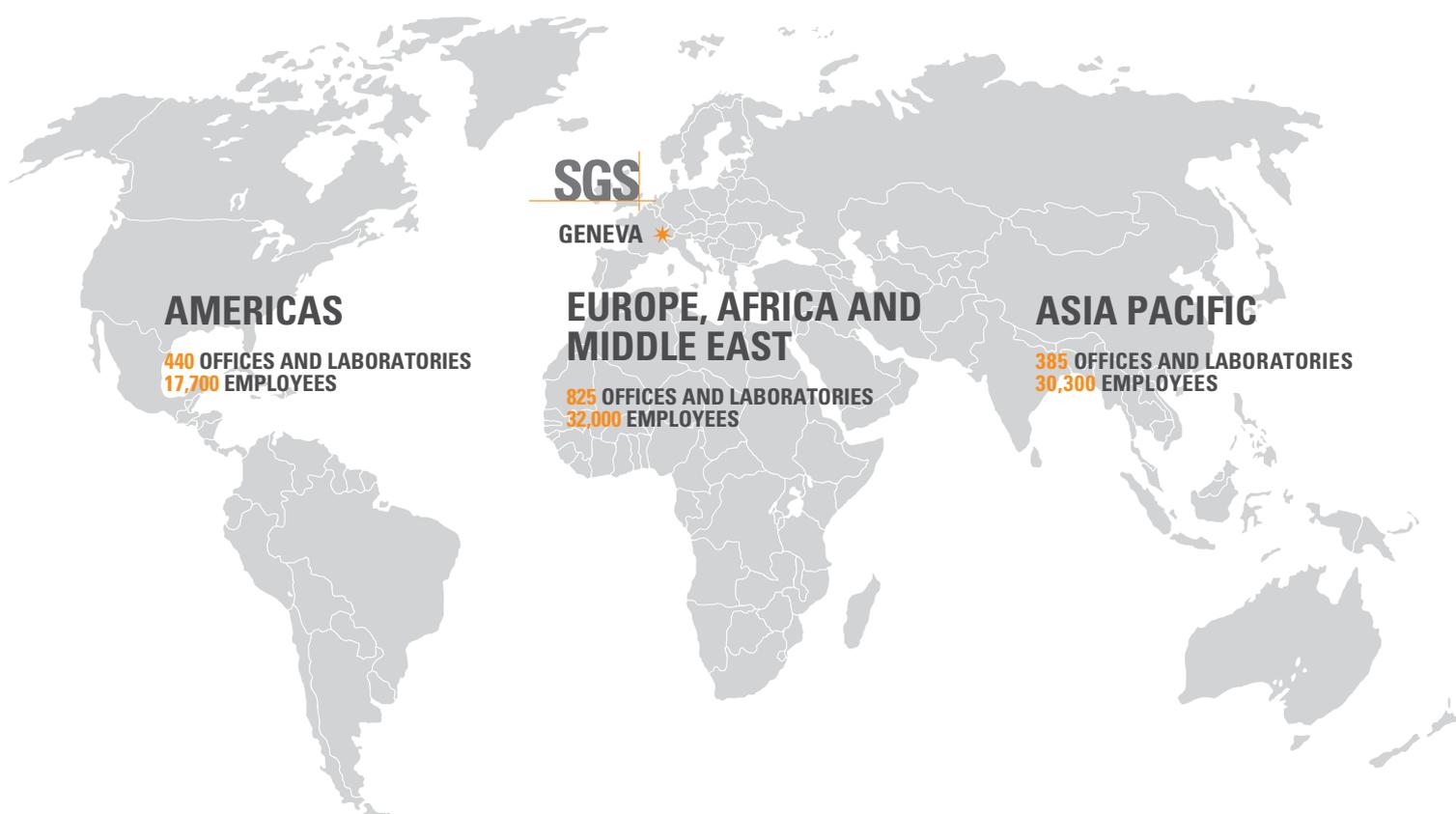
Prints are used as surface treatment for many materials, providing decoration, protection and other special functions.

With the development of new technologies, client's requirements related to safety, environmental and aging properties as well as cleanser and stain resistance become more enhanced. Accordingly, coating testing is a growing demand.

We can provide testing of

- Wood Coating
- Construction Coating
- Automobile Coating
- Toy Coating
- Plastics Coating
- Coil Coating
- Powder Coating
- Fluorocarbon Coating
- Rubber Paint
- Inks
- Adhesion Resins
- Pigment
- Additive
- Solvent
- UV curing paints

GLOBAL & LOCAL



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

CONTACT US WWW.SGS.COM/INDUSTRIAL OR INDUSTRIAL.GLOBAL@SGS.COM

CONTACT US

COUNTRY, CITY	NAME	EMAIL	PHONE
Algeria, Algiers	Grib Hakim	grib.hakim@sgs.com	+213 7 70 27 87 74
Angola, Luanda	Jack Mokalane	jack.mokalane@sgs.com	+244 923 523 398
Australia, Sydney	Kyle Harpley	kyle.harpley@sgs.com	+61 0408 943 807
Brazil, Piracicaba	Fernando Neto	fernando.neto@sgs.com	+55 19 3917 1670
Canada, Calgary	Frank Langenecker	frank.langenecker@sgs.com	+1 403 262 7072
Canada, Montreal	Marina Banuta	marina.banuta@sgs.com	+1 514 255 1679
China, Shanghai	Bob Wang	bob.wang@sgs.com	+86 21 6818 3952
France, Orsay	Jean-Marc Ascione	jean-marc.ascione@sgs.com	+33 1 69 33 69 90
Germany, Dortmund	Olaf Guennewig	olaf.guennewig@sgs.com	+49 231 9742 7303
Germany, Hene	Dennis Rositzka	dennis.rositzka@sgs.com	+49 2323 9265 135
India, Mumbai	Yuvraj Galande	yuvraj.galande@sgs.com	+91 22 6187 0154
Korea, Pusan	Changsu Jeong	jeong.changsu@sgs.com	+82 51 630 7091
Malaysia, Shah Alam	Ali Asrol	ali.asrol@sgs.com	+603 5121 2320
Netherlands, Sittard	Louis Grannetia	louis.grannetia@sgs.com	+31 464 204 216
New Zealand, Auckland	Leonard Kong	leonard.kong@sgs.com	+64 9 634 3637
Singapore, Singapore	Paul Yeow	paul.yeow@sgs.com	+65 6379 0165
South Africa, Boksburg	Christo Brink	christo.brink@sgs.com	+27 11917 5173
South Africa, Boksburg	Jere Claase	jere.claase@sgs.com	+27 11 917 5173
Spain, Madrid	Jose Ciria	jose.ciria@sgs.com	+34 91 313 8053
Sri Lanka, Colombo	Ananda Devasinghe	ananda.devasinghe@sgs.com	+94 115 376 280
Taiwan, Taipei	Simon Tin	simon.tin@sgs.com	+886 2 2299 3279 , 3700
US, Chicago	Tamara Trout	tamara.trout@sgs.com	+1 832 339 3592
UK, Manchester	John Wallace	john.wallace@sgs.com	+44 161 873 7662
Vietnam, Ho Chi Minh City	Duc Nguyen	duc.nguyen@sgs.com	+84 8 3816 0999

CCTS TEAM	COUNTRY, CITY	NAME	EMAIL	PHONE
CCTS Manager	Taiwan, Taipei	Dennis Yang	dennis.yang@sgs.com	+886 2 22993260
Executive Head	Taiwan, Taipei	Jack Kuo	jack.kuo@sgs.com	+886 2 2299 3939
Calibration	Taiwan, Taichung	Phil Lu	phil.lu@sgs.com	+886 4 23591515 , 2400
Construction	Taiwan, Kaohsiung	Changting Tsai	changting.tsai@sgs.com	+886 7 3012121 , 1200
Geotechnical	Korea, Seoul	HyungHo Son	hyungho.son@sgs.com	+82 31 669 0610
Metal	Taiwan, Taipei	Simon Tin	simon.tin@sgs.com	+886 2 22993279 , 3700
Polymer	China, Shanghai	Bob Wang	bob.wang@sgs.com	+86 21 68183952

WWW.SGS.COM

WHEN YOU NEED TO BE SURE

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