SGS METLAB – MATERIAL TESTING LABORATORY
YOUR COMPETENT BUSINESS PARTNER FOR INSPECTION, CERTIFICATION, VERIFICATION AND TESTING

Material testing is performed for a variety of reasons: application trials, impact of raw/input material quality on final product quality, product development, process control, defect detection and root cause identification, quality control and certification of final product, cause for corrosion, quality of surface coatings and verification of welding processes and welder qualification.

At SGS Metlab destructive and non-destructive testing are carried out on various materials including almost all metal products, HDPE pipe, polymers, rubbers and composite products. Component testing within the laboratory equipment scope of capabilities is available. The testing laboratory is a SANAS 17025 accredited facility and provides dimensional assessment, metallurgical assessment, mechanical, physical, chemical, metallographic and corrosion testing of materials. Non-destructive testing and simulated heat treatment of samples prior to preparation and laboratory testing are also offered.

A team of six metallurgical engineers and technicians with extensive knowledge of material testing, production, post production treatment, material and testing standards and conformance provide metallurgical support in terms of advising which tests or assessments are required, interpretation of the results, preventive measures and quality assurance.

Comprehensive metallurgical investigations into in-service failures or product non-conformances are available. The witnessing of sampling, sample preparation and testing by a third party inspection body on behalf of the client is arranged by SGS Metlab. Client appointed inspection body representatives may also attend and witness the testing by prior arrangement.

NON-DESTRUCTIVE TESTING AND SIMULATED HEAT TREATMENT ON TEST COUPONS

Various non-destructive tests can be performed on samples prior to preparation and testing and include magnetic particle testing, dye penetrant testing, XRay/ Radiographic and ultrasonic testing.

Heat treatment processes i.e. pre- and post-weld heat treatment, can be simulated and carried out on test coupons prior to testing.

MECHANICAL TESTING

A dedicated workshop and machine shop, equipped with CNC machines ensure that samples are prepared strictly in accordance with the requirements of material and testing standards and with precise control over dimensions and surface finish.

The testing laboratory boasts a range of testing equipment, guaranteeing equipment availability and presentation of test results without delay. Equipment are maintained and calibrated strictly in accordance with the requirements of ISO 17025 and testing standards. Tests are performed according to national (SANS) and internationally recognised standards such as ISO, American (ASTM, ASME, AWS, API), Japanese (JIS) or European (EN, DIN, BS, etc).

Services which can be provided include the following:

- Tensile strength (yield, UTS, elongation and reduction in area)
- Elevated temperature testing (20 - 950°C)
- Through thickness tensile testing (Z test)
- Impact toughness testing (V notch, U notch and Izod) from -196°C to 300°C
- Load testing (tensile and compression)
- Hardness tests (Vickers, Brinell, Rockwell) including 3 point hardness testing for fasteners and hardness traverse as per welding codes
- Bend testing
- Bend and re-bend testing of rebar product (ageing)
- Flattening and flaring tests
- Welding procedure qualification testing
- Welder certification testing
- Tube push out tests
- Jominy test
- Fillet fracture
- Nick breaks

MANY SGS LABORATORIES OPERATE WITH ISO/IEC 17025 SCOPES OF ACCREDITATION.
CHEMICAL ANALYSIS
The complete chemical composition of iron and steel products are determined using optical emission spectroscopy (OES) and the analysis at a minimum include the weight percentage C, Si, S, P, Mn, Ni, Cr, Mo, Cu, Al, V, Nb, Ti, Sn, Sb and B.
The nitrogen content is determined and reported when requested.
Aluminium, nickel and copper based metals are also analysed. Specialised analysis including wet chemical analysis (ICP), LECO Carbon and Sulphur are also offered.
The chemical composition of corrosion products, surface coatings or deposits are determined using EDS/EDX analysis and scanning electron microscopy.
Sophisticated techniques like XRF, XRD, etc are available upon special request.

MATERIAL AND METALLURGICAL TESTING
Testing of various ferrous metals, non-ferrous metals and non-metallic products are performed and include the following:
- Macro structure (weld) etching and assessment
- Metallographic examination of micro samples
- Microstructure and phase assessment
- Grain size determination
- Inclusion assessment and counts
- Coating thickness and quality determination including galvanizing coating according to SABS 934/935 and ASTM A90
- Decarburization or carburization depth determination
- Sulphur printing
- Delta ferrite count (manual point method) and ferritescope method
- Replication and verification of microstructures
- Pressure testing
- Accelerated weathering tests
- Scanning electron microscopy and EDS/EDZ analysis of fracture faces, corrosion products or entrapped matter

CORROSION TESTING
Corrosion properties of materials are verified by performing intergranular corrosion tests to various ASTM and ISO standards.
Salt spray tests are performed by the use of an automated chamber and are carried out in accordance with ASTM or ISO standards.

ON-SITE TESTING
Services available for on-site testing include:
- Determining of chemical composition by means of portable OES
- Hardness testing (rebound and UCI)
- Ferrite count
- NDT testing including wall thickness testing
- Metallurgical replication
- Macro etching
- Surface roughness

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SGS IS THE GLOBAL LEADER AND INNOVATOR IN INSPECTION, VERIFICATION, TESTING AND CERTIFICATION SERVICES. FOUNDED IN 1878, SGS IS RECOGNIZED AS THE GLOBAL BENCHMARK IN QUALITY AND INTEGRITY. WITH OVER 90,000 EMPLOYEES, SGS OPERATES A NETWORK OF OVER 2,000 OFFICES AND LABORATORIES AROUND THE WORLD.