

METLAB SA COMPANY SERVICES

Metlab SA is a metallurgical testing facility that performs a wide range of destructive and non-destructive testing of various metals and metal components used in industrial and engineering environments.

The testing laboratory acquired its SANAS 17025 accreditation at the end of January 2023 and provides dimensional assessment, metallurgical assessment, mechanical, physical, chemical, metallographic and corrosion testing of materials. Non-destructive testing and simulated post weld heat treatment of welded samples prior to preparation and laboratory testing are also offered.

The team that includes a qualified IWE, consist of metallurgical engineers, metallurgists and technicians with extensive competence on material testing, production, post production treatment, material and testing standards as well as conformance, are available to provide metallurgical support. The team determines which test or assessments are required for analysis, for interpretation of the results, remedial measures and quality assurance.

CHEMICAL ANALYSIS

The specified chemical composition of steel, stainless steel and iron alloy products according to their relevant specifications 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, and Sb. The nitrogen (N) and Boron (B) content is determined and reported when requested.

Non-ferrous alloys such as Aluminium (Al), Nickel (Ni), Copper (Cu), Cobalt (Co), Zinc (Zn) and Titanium (Ti) based alloys are also analysed.

Specialised analysis is provided through co-operation agreements and include the following:

- Wet chemical analysis (ICP),
- LECO Carbon and Sulphur
- Scanning electron microscopy combined with EDS/EDX analysis is used to determine the chemical composition of corrosion products, surface coatings or other deposits
- Specialist polymer analysis
- Sophisticated techniques like XRF, XRD, etc are available upon special request

ON-SITE TESTING

Services available for on-site testing include:

- Determining of chemical composition by means of portable OES
- Hardness testing (Brinell, rebound and UCI)
- Ferrite count (Feritscope)
- Specialized Metallurgical replication
- Macro etching
- Surface roughness

SPECIALIZED SERVICES, FAILURE INVESTIGATIONS AND CONSULTING

Comprehensive Metallurgical investigations into in-service failures or product non-conformances are available as well as assistance with metallurgical quality control.

- Third party witnessing can be arranged
- Failure Root cause analysis
- Litigation
- Basic failure investigation
- Scanning electron microscopy and EDS/EDZ analysis of fracture faces, corrosion products or entrapped matter

NON-DESTRUCTIVE TESTING AND SIMULATED HEAT TREATMENT ON TEST COUPONS

Various non-destructive tests are provided through co-operation agreements on samples prior to preparation and testing and include:

- Wall thickness testing
- Magnetic Particle Inspection (MPI)
- Dye penetrant testing
- X-Ray/ Radiographic
- Ultrasonic testing (UT)

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

MATERIAL AND METALLURGICAL TESTING

Assessment of various ferrous and non-ferrous metals, as well as 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
- Non-metallic Inclusion assessment and counts
- Coating thickness and quality determination including galvanizing coating according to SABS 934/935 and ASTM A90
- Decarburization and carburization depth determination
- Sulphur printing
- Determine volume fraction of phases (manual point method)
- Ferritscope measurements
- Replication and verification of microstructures
- Pressure testing of small components
- Accelerated weathering tests
- Geometry evaluation on rebar
- Hardness tests (Vickers, Brinell, Rockwell) including 3 point hardness testing for fasteners and hardness traverse as per welding codes
- Jominy test

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 wide range of testing equipment, guaranteeing equipment availability and presentation of test results without delay. Equipment is 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)
- Bend testing
- Bend and re-bend testing of rebar product (ageing)
- Flattening and flaring tests
- Welding procedure qualification and welder certification testing according to ASME, AWS, ISO and other international specifications when required
- Evaluation of tubesheet welds, including push out testing
- Fillet fracture
- Nick breaks

CORROSION TESTING

Corrosion properties of materials are verified by performing intergranular corrosion, weight loss and pitting 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 B117 or ISO 9227 standards.

