



Sigma

Industrial services (Pty)Ltd
— In Pursuit of Quality —



Specialising in
Non-Destructive &
Mechanical Testing,
Physical and Welding
Metallurgy Consultancy


Company Profile

Reg No.2015/364418/O7





BACKGROUND



Sigma Industrial Services (Pty) Ltd was established in January 2015. The company's head offices are currently located at 4A Dr. Beyers Naude Street Middelburg. The company provides various industrial services to power plants, paper, smelters, refinery, foundry, refinery, mining, and petro-chemical industries. Our aim is to expand our services to a wide range of Mechanical, Metallurgical, Welding and Non Destructive Testing (NDT) by the end of 2020.



OUR VISION

We are driven by a philosophy of "In pursuit of quality", thus, whatever we do should be in par with our slogan. The company seeks to be amongst the leader and model in the field of Non Destructive Testing, Physical and Welding Metallurgy.

OUR MISSION

To provide our client with unsurpassed metallurgical and NDT services within a stipulated time frame and at a reasonable price. We exist to attract, maintain and support our client's core business.

OUR VALUE AND BELIEVE

- We are of a view that 'A satisfied client is the best referral', when we adhere to this maxim, everything else will fall into place.
- We believe that our 'business model' of being more than just a testing company to our clients will add value to our clients and our reputation within the field.
- We believe that by building a long term working relationship with our client can be beneficial both to us and our valued clients.
- We believe that highly ethical and technically competent personnel are the most valuable assets of the company.



OUR MANAGEMENT SYSTEMS

Sigma Industrial Services (Pty) Ltd fosters a safe working environment to enhance the wellbeing of its personnel and the communities within its areas of operation. The following are our objectives and commitment with every project that we undertake:

SAFETY, HEALTH AND ENVIRONMENT

- To perform the task **RIGHT**,
- To complete the task on **SCHEDULE**,
- To complete the task without **INCIDENTS**,
- To increase the awareness of the impact of our services on the environment,
- To strive to have a minimum adverse effect on the environment with which we operate.

Our primary focus is to foster a culture of **"SAFETY COMES BEFORE PRODUCTION"**. Therefore safety cannot be comprised in order to increase the production.

We have implemented ISO 45001 and ISO 14001 management systems for safety and environment respectively. Our intention is to acquire certification for both these management systems by January 2020.

QUALITY

As our motto says "IN PURSUIT OF QUALITY", we have imbedded in ourselves and our personnel that quality cannot be compromised. We are currently certified to ISO 9001: 2015 and accredited to ISO 17025:2005. We intend to migrate to ISO 17025:2017 before the end of September 2019. The robustness and effectiveness of these Quality Management Systems is assessed through periodic rigorous internal and external audits.



OUR AFFILIATES

Sigma Industrial Services (Pty) Ltd believe in unity, as such, we are elated and proud to be affiliated with the following brands.



WHO ARE WE?

The Non Destructive Testing Department is led by seasoned Technicians. The "hands-on" experience acquired by our team makes the department capable and competent to perform array of inspection within its scope.

Our Technicians are experienced and qualified to ISO 9712 and SNT-TC-1A.

The Metallurgical Department offers a wide range of services. The department comprises of young experienced and dynamic Metallurgists who are eager to learn. The experience of our Metallurgists covers a wide spectrum of Physical metallurgy field.

WHAT WE OFFER

NON DESTRUCTIVE TESTING

1. ULTRASONIC TEST (UT)
2. MAGNETIC PARTICLE INSPECTION (MPI)
3. LIQUID PENETRANT INSPECTION (LPI)
4. WALL THICKNESS(WT)
5. PHASED ARRAY (PA)
6. CRACK DEPTH (CD)
7. VIDEO SCOPE

"PREVENTION IS BETTER THAN CURE"

METALLURGY & WELDING

1. REPLICA METALLOGRAPHY (ESKOM APPROVED)
2. MICRO & MACRO EXAMINATION
3. FAILURE ANALYSIS/ INVESTIGATION
4. HARDNESS, BEND, IMPACT & TENSILE TEST
5. WELD FRACTURE TEST
6. POSITIVE MATERIAL IDENTIFICATION
7. WELDING PROCEDURE QUALIFICATIONS
8. ISO 3834, 9001 AND 17025 CONSULTANCY

"AT THE HEART OF METALLOGRAPHY"



IN-SITU METALLURGICAL SERVICES

REPLICA METALLOGRAPHY & MACRO-ETCHING

In situ metallography is a non-destructive examination (NDE) of metallic materials whereby an acetate film wetted with acetone is placed on a metallographic prepared surface to imprint (negative relief) the materials' microstructure. The microstructure imprinted on the film is therefore examined with an optical/ scanning electron microscope (SEM) for important metallographic features.

HARDNESS

Positive Material Identification (PMI) is one of the more specialised NDE methods. PMI serves critical roles in instances where material certificate is missing or it is not clear what the composition of a material is. This method can be used on ferrous and non-ferrous alloys in order to identify, detect and quantitatively measure elements such as Ti, V, Cr, Mn, Iron, Co, Ni, Zr, Se, Nb, Sn, Cu, Pb, Ta, etc.

HARDNESS

In this method, the velocity of a propelled impact body is measured directly prior and after the impact onto the test material' s surface. The ratio between both measured velocities specifies the hardness of the material. The harder the material, the less the rebound velocity and the smaller the impression will be on the material.

IN-SITU METALLURGICAL SERVICES



**PORTABLE HARDNESS
TESTER**



**METALLOGRAPHICALLY
PREPARED SURFACE**



**POSITIVE MATERIALS
IDENTIFICATION**

MECHANICAL & METALLURGICAL SERVICES

Our laboratory is fully accredited to ISO 17025 by SANAS. We are capable of performing Tensile, Bend, hardness, Charpy impact and Fracture test.

Additionally, our metallurgists are experienced to undertake various metallurgical tests that includes microstructural analysis, Macro Examination, Grain Size, Inclusion count, Depth of decarburization, and various corrosion analysis.

FAILURE INVESTIGATION

At a certain point in time during in-service, even the best material fails. There are many factors that may contribute to component failure. Our Metallurgists are capable of performing failure analysis and investigations in order to report the cause of failure. A

number of failures can be attributed to failure mechanisms that include but not limited to fatigue, creep, stress cracking corrosion, etc.



VARIOUS METALLURGICAL AND MECHANICAL TESTS ARE UTILISED AS PART OF FAILURE INVESTIGATIONS.

WELDING CONSULTANCY

WELDING PROCEDURE QUALIFICATION

Welding is a critical joining process that requires stringent regulation and monitoring. As such, welders and procedures that are to be used for specific project should be qualified prior to the commencement of the project.

Our qualified International Welding Technologist and Metallurgists have the know-how on how to develop the Welding Procedure Specification (WPS)

WELDING PROCEDURE QUALIFICATION

The skill of the welder is assessed prior to the actual fabrication project. Depending on specific code and standard, welders are qualified using X-Ray, Ultrasonic, Bend Test, Macro-exam or Weld Fracture Test.



NON DESTRUCTIVE TESTING SERVICES

LIQUID PENETRANT INSPECTION

Liquid Penetrant Inspection (LPI) is a widely applied and low-cost inspection method used to locate surfacebreaking defects in all non-porous materials (i.e., metals, plastics, or ceramics). LPI is based upon capillary action, where a low surface tension fluid penetrates into clean and dry surfacebreaking discontinuities. A Penetrant may be applied to the test component by dipping, spraying, or brushing.

After adequate dwell time has been allowed, the excess penetrant is removed and a developer is applied. The developer helps to draw penetrant out of the discontinuity so that an invisible indication becomes visible to the inspector. Inspection is performed under ultraviolet or white light, depending on the type of dye used - fluorescent or non/fluorescent (visible).

MAGNETIC PARTICLE INSPECTION

Magnetic Particle Inspection (MPI) can be regarded as a combination of two NDE methods namely magnetic flux leakage and visual testing. Magnetic flux leakage is a phenomenon wherein the magnetic field is expanded from its normal path due to the presence of the air gap normally induced by the presence of the discontinuity (i.e., crack) on metallic material.

ULTRASONIC INSPECTION

Ultrasonic testing (UT) is a family of non-destructive testing techniques based on the propagation of ultrasonic waves in material tested through various probes. In most common UT applications, very short ultrasonic pulse-waves with centre frequencies ranging from 0.1-15 MHz, and occasionally up to 50 MHz, are transmitted into materials to detect internal flaws or to characterize materials.





NON DESTRUCTIVE TESTING SERVICES

PHASED ARRAY ULTRASONIC TESTING

Phased array ultrasonic Testing (PAUT) is an advanced method of UT that has wide applications in industrial non-destructive-testing. The term phased refers to the timing, and the term array refers to the multiple elements. PAUT is based on principles of wave physics. In contrast to a conventional UT manually scanned probes that emit fixed direction beam, the beam from a phased array probe can be moved electronically, without moving the probe, and can be swept through a wide volume of material at high speed. The beam is controllable because a phased array probe is made up of multiple small elements, each of which can be pulsed individually at a computer calculated timing.

WALL THICKNESS

Ultrasonic thickness measurement (WT) is a method of performing non-destructive measurement of a thickness of a solid element (typically made of metal), based on the time taken by the ultrasound wave to return to the surface. We perform this this type of measurement with an ultrasonic thickness gauge.

TIME OF FLIGHT DIFFRACTION

Measuring the amplitude of reflected signal is a relatively unreliable method of sizing defects because the amplitude strongly depends on the orientation of the crack. Instead of amplitude, Time of flight diffraction (TOFD) uses the time of flight of an ultrasonic pulse to determine the position of a reflector. In a TOFD system, a pair of ultrasonic probes sits on opposite sides of a weld. One of the probes, the transmitter, emits an ultrasonic pulse that is picked up by the probe on the other side, the receiver.



NON DESTRUCTIVE TESTING SERVICES

BORE/ VIDEO SCOPE

A borescope is an optical device consisting of a rigid or flexible tube with an eyepiece on one end, an objective lens on the other linked together by a relay optical system in between. The optical system in some instances is surrounded by optical fibres used for illumination of the remote object. An internal image of the illuminated object is formed by the objective lens and magnified by the eyepiece in order to present it to the viewer's eye.

RADIOGRAPHIC TESTING

Radiographic Testing (RT) It is one of the methods that reveals imperfections that are often imperceptible in components (i.e., structural or weld). A source is set at one side of the component and film on the other side. The radiation passes through the object and throws the image onto the film. Once it is developed, the image appears on the film, it is then viewed and evaluated under the viewer.

CRACK DEPTH METER

Crack depth determination with the potential probe method is based on the measurement of the electrical resistance between two points on the surface of a metallic workpiece. A probe with four spring-loaded and guided contact pins is positioned across the crack to be measured on the workpiece.

EQUIPMENT CAPABILITIES-NDT

CURRENT EQUIPMENT AND INSTRUMENTS

- 6x Magnetic Particle Test Yokes,
- 2x Epoch Ultrasonic flaw detector with 12 various Probes
- 4x Digital Ultrasonic Thickness Tester ,
- 2x Light Meter, 2X Pie Gauge; 2x Gaussmeter and 2x Castrol Strips
- 1x Videoscope
- Calibration Blocks (V1, V2, A5, Step Wedge, 4.5 kg Lifting Block)
- 1 Set of RT equipment



EPOCH 650 UT FLAW DETECTOR



MX2 OMNISCAN TESTER



220V GAMMATEC MY-2 YOKE



CRACK DEPTH METER



27MG THICKNESS GAUGE



CYHT 201 GAUSS METER



VIDEO SCOPE

OUTSOURCED EQUIPMENT



TOFD PROBE



RT SOURCE PROJECTOR

EQUIPMENT CAPABILITIES-METALLURGY

Our Metallurgical laboratory is an independent ISO 17025 accredited facility (SANAS T837) with the capability of performing Tensile, Impact, Bend, Fracture, Hardness, Replica Metallography, Grain Size, Inclusion Count, Depth of Decaburization and Failure Investigation.



METALLURGICAL MICROSCOPE



STEREO MICROSCOPE



IMPACT TESTER



METALLURGICAL POLISHER



VICKERS HARDNESS TESTER



600KN UNIVERSAL TENSILE TESTER

NORMATIVE REFERENCES

ASTM E1351: Standard practice for Production and Evaluation of Field Metallographic Replicas

ASTM E165: Standard Test Method for Liquid Penetration Examination.

ASTM E709: Standard Guide for Magnetic Particle Testing

ASTM E1444: Standard Practice for Magnetic Particle Testing

ASTM E1417: Standard Practice for Liquid Penetrant Testing

ASTM E164: Standard Practice for Contact Ultrasonic Testing of Weldments

ASTM E2375: Standard Practice for Ultrasonic Testing of Wrought Products

ASTM E1476: Standard Guide for Metals Identification, Grade Verification, and Sorting

ASTM E1038: Standard Test Method for Portable Hardness Testing by the Ultrasonic Contact Impedance Method

ASTM E2700: Standard Practice for Contact Ultrasonic Testing of Welds Using Phased Arrays

AWS D1.1 : Structural Welding Code Steel ASME V, Art 6 (2007): Liquid penetrant examination.

ASME V, Art 24 (2007): Standard practice for liquid penetrant examination.

ASME VIII, Div. 1(2007): Liquid penetrant acceptance criteria. Appendix 8 ADD (2008)

BS 1113, Sect 5: Inspection during constructions.

BS 4489: Measurement of UV-A radiation (Blacklight) used in non-destructive testing.

BS 5500, Sect 5: Inspection and testing.

BS 6443: Penetrant flaw detection

ISO 15614: Specification of welding procedures or metallic material-Welding procedure test
ISO 9606: Qualification testing of welders- Fusion welding: Steels, Aluminium and its alloys

BS EN ISO 15607:2003: Specification and qualification of welding procedures for metallic materials- General rules

BS EN ISO 15613:2004: Specification and qualification of welding procedures for metallic materials. Qualification based on pre-production welding test

ISO 3057: Non Destructive Testing- Metallographic Replica Technique of Surface Examination.



WHERE ARE WE HEADING

METALLURGY & WELDING

Sigma Industrial Services (Pty) Ltd have personnel that 'lived in the future.' They aren't afraid of the growth because they've been there.

The intention of the department is to expand the scope of its services to include the following test:

- Fatigue Test;
- CTOD Test;
- Luders and Roping Test;
- Chemical Analysis;
- Corrosion Testing;
- Heat Treatment (Thermal and Vibration)

NON DESTRUCTIVE TESTING

Our department intends to integrate the following test methods within its current scope:

- Thermographic Camera;
- Radiographic Test;
- Digital Radiographic Test;
- Tomography Test;
- Laser Ultrasonic Test;
- Eddy Current;
- IRIS;
- Micro Phase Array;
- Rope Access Inspection.





MEET OUR TEAM

We pride ourselves on being the best in our field and this is delivered through our valued people, who are all highly trained to deliver exceptional client care. We are unique in our approach and work closely with all our clients and candidates, building excellent long term relationships.



Mr. J.S. Mokalane
Chief Executive Officer

Jack Setlhare Mokalane (ZA-IWT-00054)

Mr. J.S. Mokalane is an open minded and eager to learn Metallurgist with a BSc (Hons): Metallurgy from University of Pretoria. He is also a qualified International Welding Technologist (ZA-IIW-00054) and hold an Executive Development Program certificate from Wits Business School. He intends to acquire Master of Business Leadership with GIBS business School by the end of 2021. He has been in the industry for the past 10 years and has been exposed to diverse Non Destructive Testing, Metallurgical and Welding Techniques.
Contact Details: +27 (0)73 981 5023



Mr. J.E. Malefane
CHIEF OPERATIONS OFFICER
(UT/PA PCN 313005)

Mr. J.E. Malefane is a young and dynamic Technician with a Diploma: NDT from Vaal University of Technology; PCN Level II in both Ultrasonic Testing and Phased Arrayed, and ASNT Level II in Magnetic Particle Testing. He is currently busy with his Level III. He has been in the industry for the past 9 years through the ranks as a Learner Technician, Technician and Snr. Technician. His experience covers Ultrasonic Test, Phased Array, Magnetic Particle Inspection, Penetrant Test, Corrosion Mapping, TOFD, Replica, and Welding
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Mr. G.K. Kumah
OO: TECHNICAL
(RT/PT/MT SAQCC 2356)

Mr. G.K. Kumah is a seasoned and knowledgeable Non Destructive Testing Technician with Advanced Welding and Fabrication from City and Guilds, SAQCC Level II in Radiographic Testing, Magnetic Particle Testing and Dye Penetrant Testing. He has been in the industry for the past 20 years and has acquired a comprehensive experience in the field of Non Destructive Testing.
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CSD : MAAA0080631

CIDB : 10096175

B-BBEE status : Level 1

EXECUTIVE TEAM

Jack Setlhare Mokalane	: Chief Executive Officer
Josefa Enerst Malefane	: Chief Operations Officer
Gottlieb Konu Kumah	: Operations Officer: Technical

BRANCH OFFICES

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