



# Inspection Solutions Across the Energy Value Chain



## Overview

Since 1994, Sigma Specialized Inspection (SSI) has been setting high standard inspection solutions in providing Quality Control, Non-Destructive Testing, Heat Treatment Services to the Offshore and Onshore Oilfield Industries and to Petrochemical, Power Generation, Nuclear NDE Services and Shipbuilding Industries throughout the Middle East region.

Over the past twenty-five years, our activities have increased from the original involvement in Oilfield Equipment Inspection to a wide variety of other sectors – Petroleum and Petrochemical Industries (Onshore & Offshore), Fabrication Industry, Foundry Industry, Power Generation, Maritime Industry and Aerospace Industry.

We are a trusted partner for key national and international Energy sector operators, EPCs and stakeholders.

Sigma Specialized Inspections has a long history of delivering technical excellence, and has earned a solid reputation for:






-  High Quality
-  Cost-effective Solutions
-  Customer Service Excellence
-  Speed-to-market
-  Customer Orientation
-  Operational Excellence
-  In-Country Value
-  100% Emirati Owned



## Our Supply Chain Network

As a result of its strategic location in the United Arab Emirates, Sigma Specialized Inspection has a vast service reach throughout the Middle East.

Our technical competence include but not limited to

-  Oil, Gas & Petrochemical
-  Marine
-  Nuclear
-  Renewable Energy
-  Power Plants (Oil and Gas, Solar, Water & Nuclear Energy)







## Our Value Proposition

At SSI, we place **QUALITY, HEALTH, SAFETY & ENVIRONMENT** at the forefront of our business.

We established a QHSE operational management system that sits at the core of our energy sector business practices as part of its objective to grow sustainability.

We adhere to international best practices and are diligent when it comes to quality, health, safety, and the environment regulations and procedures.



## Commitment to Innovation

SSI is committed to having a continuous development, training, and education programs to maintain the latest technological advances to provide the highest standard of services to clients.

SSI can provide additional services by partnering with top global companies to accommodate projects that require sophisticated equipment. The company can provide qualified manpower through the support of our Human Resources Department for specific project requirements.



## Membership & Certifications

A vital part of our establishment is the certification of our inspection personnel; SSI technicians are qualified in accordance with American Society of Non-Destructive Testing ASNT / PCN certification or equivalent society, to a minimum of Level II for various test methods.





## Our Services



ASME Level-3 Services for Pressure Vessels Manufacturer



Asset Integrity & Nuclear Inspection



Corrosion Mapping (B & C Scan) & Time of Flight UT Inspection



Drill Tool Inspection Services



Hardness Testing & Coating Thickness



Liquid Penetrant & Magnetic Particle Inspection



MFD (Magnetic Flux Density)



Marine Inspection Services



OMNI SCAN (PHASED ARRAY AND TOFD (Time Of Flight Diffraction))



Plant & Refinery Inspection, Shutdown, Turnaround Inspection



PMI (Positive Material Identification)



PWHT-Heat Treatment, Preheating & Post Heating



QC Inspection Services



Radiography Inspection (X-Ray & Gamma – SE75 & IR192) on Plant, Structures & Pipelines



Rope Assess NDT Services



Thermographic Inspection



Tube Inspection – IRIS, Eddy Current & Remote Field Eddy Current



Training, Qualification and Certification of NDT Technicians Level I & II as per ASNT Document SNT-TC-1A



Ultrasonic Weld Inspection, Lamination & Thickness Measurement



Welder/Welding Procedure Qualifications Services



# Our Technical Capabilities

Sigma Specialized Inspection (SSI) has the capability to provide complete inspection solutions for fabrication in different areas:



## ONSHORE

- Jack-up overhauls
- Platform Construction
- LNG & LPG tank
- Ship repair & overhaul
- Offshore Drilling Rigs
- Drilling Tools condition monitoring
- Drilling Tools Inspections



## OFFSHORE

- Bridge – Civil
- Bulk Storage Tanks
- Tank frame pipe work
- LPG Bullets & Tanks
- Ship Loader Cranes
- Onshore Drilling Rigs
- Refinery shutdowns
- Drilling equipment
- Pipeline projects



## PLANTS

- Pressure Vessels & Drums
- Piping & Headers
- Towers & Reactors
- Internal Trays
- Heat Exchangers
- Fired Heaters, Furnace Boilers
- Valves & Pumps
- Separators & Regenerators
- Rotating Equipment
- Crane Hooks & Lifting Equipment
- Storage Tanks







# Our Inspection Methods

SSI offers all conventional and advanced NDT methods employing state-of-the-art equipment. All equipment is easily portable for all field applications.



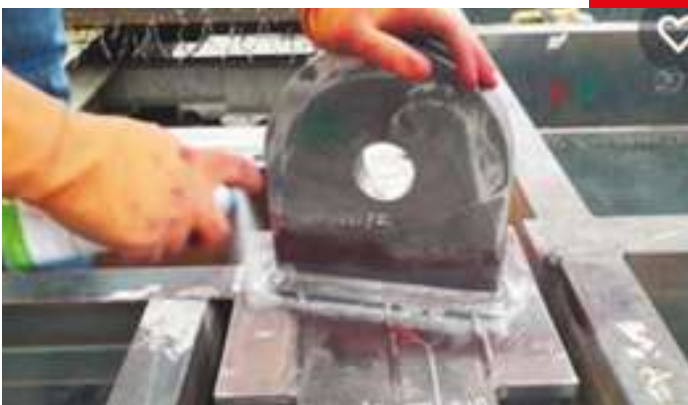
## Ultrasonic Testing (UT)

Ultrasonic Testing (UT) is an efficient and accurate way to detect surface and internal flaws in critical components. SSI skilled technicians perform a variety of contact UT techniques, including longitudinal wave for thickness measurements, shearwave for weld inspection and surface wave methods.



## Radiography Testing (RT)

SSI provides gamma-ray, utilizing Iridium 192 isotope. Our fleet of mobile darkrooms allows us to develop gamma-ray film on-site. We provide profile radiography to determine pipe wall thickness through insulation.



## Magnetic Particle (MPT)

Magnetic Particle Testing is a low-cost method to perform a nondestructive testing (NDT) process for detecting surface and shallow subsurface discontinuities in ferromagnetic materials.

MT can find extremely small defects such as cracks, seams and laminations that could cause component failure. This method is ideal for rapid maintenance or critical equipment testing such as cranes, crane hooks, forklifts, and other lifting devices.



## Liquid Penetrant (PT)

SSI provides Liquid Penetrant (PT) testing to locate surface-breaking defects on any ferrous and non-ferrous materials, including metals, plastics, and ceramics utilizing fluorescent and visible methods. PT is sensitive to tiny defects such as cracks, seams, pits, and other defects open to the surface.



## Positive Material; Identification (PMI)

Thermo Scientific Niton XL2 Series x-ray fluorescence (XRF) analyzers are engineered for your most demanding needs. When speed, accuracy, and reliability count, our combination of hardware, software, and direct industry experience helps meet your specific analytical requirements. Choose the value-leading Niton® XL2 analyzer or performance-leading Niton XL2 analyzer – either way you get a lightweight, rugged, handheld XRF instrument perfectly suited for your particular testing applications.

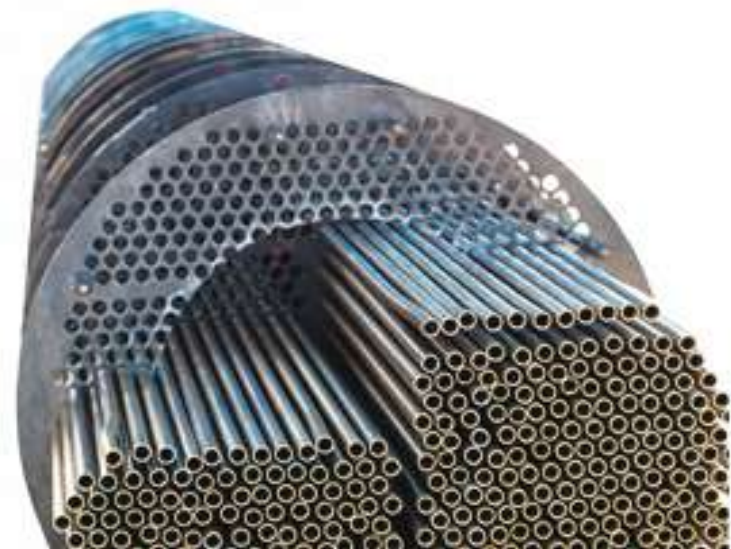
## Tube Inspection

Tube inspection can be carried out using different inspection techniques (IRIS, ECT, RFEC, MFD, MFL) for the following industrials and associated equipment.

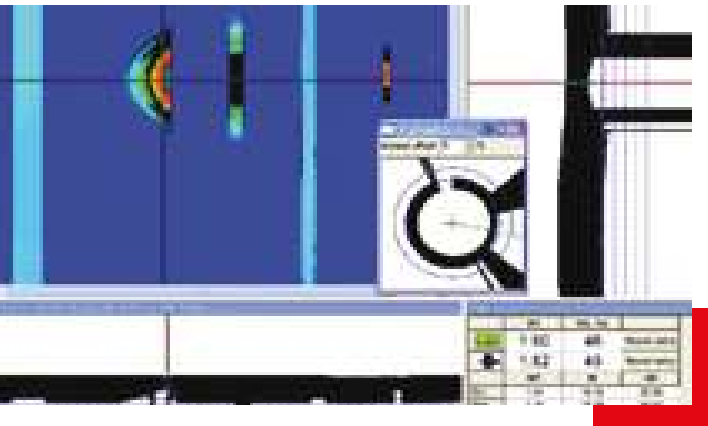
- Power generation plants
- Petroleum and Chemical plants
- LPG & Gas plants
- Pulp and paper mills
- Offshore platforms – Oil & Gas
- Fertilizer plants
- Mining industry
- Maritime industry
- Air conditioning systems
- Heat exchangers
- Boiler tubes
- Condenser tubes
- Air- finned coolers
- Air conditioning tubes
- Nuclear and Renewable Energy

### Elements Range: NITON XI2 800:

Titanium (Ti), Vanadium (V), Chromium (Cr), Manganese (Mn), Iron (Fe), Cobalt (Co), Nickel (Ni), Copper (Cu), Zinc (Zn), Zirconium (Zr), Niobium (Nb), Selenium (Se), Rhenium (Re), Molybdenum (Mo), Hafnium (Hf), Tantalum (Ta), Palladium (Pd), Antimony (Sb), Lead (Pb), Bismuth (Bi), Silver (Ag), Tin (Sn) and Tungsten (W), Cadmium(Cd) and Gold (Au).







## IRIS

Eddy Current Testing is one of several Non-Destructive Internal Rotary Inspection System (IRIS) is used to accurately measure internal and/or external corrosion pitting.

Remaining wall thickness is measure showing a cross-section and circumferential display of the tube material and metal loss, if any. Tube diameter 9.5 mm to 75 mm can be tested 100% at approximately 2.5m per min. depending on the condition of the tube.

## Eddy Current & RPEC

Eddy Current Testing is one of several Non-Destructive Testing (NDT) methods that use the electromagnetism principle. Conventional Eddy Current Testing utilizes electromagnetic induction to detect discontinuities in conductive materials. A specially designed coil energized with alternating current is placed in proximity to the test surface generating changing magnetic-field which interacts with the test-part producing eddy current in the vicinity.



## Magnetic Flux Density (MFD)

DINSEARCH 1-00 is an electromagnetic system for rapid, high-resolution inspection of carbon steel tubes in heat exchangers, coolers, boilers, and similar equipment. Ferrous tubes from 15mm to 70mm OD in the usual range of wall thicknesses can be inspected.

The wall of the tube is partially magnetized. Any loss of metal due to pitting, corrosion, erosion, or other factors, results in local variations in the level of magnetization within the tube wall. Sensors on the probe respond to these changes in the level of magnetization within the tube wall.

The traces from each tube are displayed on a computer screen, initially showing the whole length of the tube but with the facility to expand and view any section in great detail. The data is stored on a hard disc, there is space for several thousand tubes, and can be downloaded for archival storage.





## Advanced Inspection (Phased Array & TOFD)

The OmniScan MX2 is an important part of your inspection solution and can be combined with other critical components to form a complete inspection system. Coupled with the COBRA manual scanner, the OmniScan flaw detector is capable of inspecting pipes ranging from 0.84 in. OD to 4.5 in. OD. With its very slim design, this manual scanner is able to inspect pipes in areas with limited access. Adjacent obstructions such as piping, supports, and structures can be as close as 12 mm (0.5 in.).



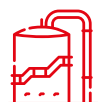
### Weld Inspection of Small-Diameter Pipes

When coupled with the COBRA manual scanner, the OmniScan flaw detector is capable of inspecting pipes ranging from 0.84 in. OD to 4.5 in. OD. With its very slim design, this manual scanner is able to inspect pipes in areas with limited access. Adjacent obstructions such as piping, supports, and structures can be as close as 12 mm (0.5 in.).

## Manual & Semi Automated Corrosion Mapping

The Omni Scan PA system with the Hydro FORM scanner is designed to offer the best inspection solution for detecting wall-thickness reductions resulting from corrosion, abrasion, and erosion. In addition, this system detects mid-wall damage, such as hydrogen induced blistering and manufacturing induced delamination, and clearly differentiates such anomalies from loss-of-wall-thickness.

For this application, phased array ultrasound technology offers superior inspection speed, data point density, and detection.



### Bulk Storage Tank Inspection

Bulk Storage Tank inspection can be carried out in accordance with the requirements of API 653, utilizing the latest magnetic flux floor scanner and some of the most experienced personnel from outside of the Middle East. By these means, Sigma can now test and inspect all sections of a tank and provide a report with recommendations for repair.



### Pressure Vessel Weld Inspection

A complete inspection of pressure vessel welds can be performed in a single scan using an OmniScan PA and manual scanner such as the HSMT series or a motorized scanner like the Weld ROVER. By combining TOFD and PA in a single inspection pass, a significant reduction in inspection time can be achieved as compared with conventional raster scanning or radiography. Furthermore, inspection results are available immediately, enabling you to detect problems with welding equipment and fix them right away.



### Weld Scan

Also using Eddy Current Testing, Ferrous (butt & fillet) welds can be inspected for surface breaking and slightly sub surface defects, especially stress fatigue cracking. Inspection can be carried out on topside and underwater on structure without removing coating, which reduces cleaning costs immensely. Furthermore, Weld Scan is a rapid inspection technique.



## Thermography Inspection

Thermography Inspection refers to the Non-destructive testing of parts, materials or systems through the imaging of the thermal patterns at the object's surface. Strictly speaking, the term thermograph alone refers to all thermographic inspection techniques regardless of the physical phenomena used to monitor the thermal changes. For instance, the application of a temperature sensitive coating to a surface in order to measure its temperature is a thermographic inspection contact technique based on heat conduction where there is no infrared sensor involved. Infrared thermograph on the other hand, is a nondestructive, nonintrusive, noncontact mapping of thermal patterns or "thermograms", on the surface of objects using some kind of infrared detector. It is applicable for:

- Refractory & insulated components.
- Heat exchanger leakage.
- Power station.



## Heat Treatment Services

Annealing, Normalizing, Tempering, Stress Relieving and Pre-Heating can be carried out at our MUSSAFAH workshop or on site.

Within our workshop facility we operate a manging furnace oven, high which is automatically controlled, the range of temperature from 0° C to 1200° C with 65 KVA transformer units.



## Welding And Third-Party Inspection Services

SIGMA, a member of the American Welding Society (AWS), is able to provide all aspects of weld inspection and welder qualifications. Services include the development of welding procedures. Witnessing during welder qualifications and the co-ordination of any mechanical testing.

Both AWS & CSWIP welding inspectors, who are also fully qualified NDT technicians, are available for long term projects and welder qualifications. Full procedures can be run at our Mussafah facility with the addition of third party witnessing through TPI agencies

SIGMA can provide expat personnel for major contracts, British PCN level II & III inspectors for ultrasonic cross-checking or radiographic film reviewer and QA/QC documentation control throughout all aspects of fabrication and construction.



## Engineering Project Services

The project team consists of engineers, supervisors, welders, fabricators and fitters to carry out the following:

- Offshore Rig repair
- Plant upgrades including refineries
- Pumping station
- Storage tanks
- Marine vessel repairs
- Electric and Power Generation Plant







## Drilling Tools Inspection Services

We inspect a wide range of Drilling Tools such as Completion Tools, Running Tools, Logging while Drilling (LWD) and Measurement While Drilling (MWD) Tools...etc

### We inspect:

- BHA Tools
- Casing Tools
- Completion Tools
- API Thread Inspection
- DS-1 Inspection
- Rig Tools
- Fishing Tool Inspection
- LWD/MWD Inspection



## Our Specialized Inspection Methods

- In-service inspection of Storage tank
- Furnace and Heater Tube Inspection
- Pipeline intelligent pigging (UT inspection)
- Remote Visual inspection using Drones
- Digital Radiography



## Rope Access NDT Services

Sigma Specialized Inspection services is well-versed in a wide range of NDT testing methods, including but not limited to the following that our trained and certified personnel perform from suspended access:

- Visual Inspections
- Magnetic Particle Testing 3321
- Liquid Penetrant
- Ultrasonic Thickness Testing

### Our NDT Services Include:

- Visual Inspection and acceptance of rotary connections
- Magnetic particle Inspection, using black light or dry powder of BHA and specialty tools
- Dye Penetrant inspection
- Ultrasonic shear wave inspection of tool joints
- Full length electromagnetic inspection of tubular tools
- Inspection of full length on Drifting of tubes as per API standard





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