

NDTS

ISO 9001:2008 Certified Company

Advance **Inspection Services** 24X7

- **Advanced Services**
- **Conventional Services**
- **NDT Level III Consulting Services**



Valued Customers



About Inspection Services

NDTS India provides 24X7 On-site Inspection Services and in order to understand better we have divided these services into two categories i.e. Advance Services & Conventional Services. We deploy world-class equipment's with trained manpower as per various affiliations (like ASNT, ISNT, BS-EN-ISO etc.) & customer requirements. Our team comprises of ASNT Level III's, Advanced NDT Inspection Engineers & NDT Technician's.

Our strength's lies in through knowledge and experience. Our collective experience of 70 years comes in handy when we are posed with unique challenges of providing our clients innovative solutions on NDT Inspection. By virtue or which our customers consider us the most reliable NDT Inspection Services provider.

The industries we have served range from Oil and Gas, Refineries, Petrochemicals, Engineering, Manufacturing and many more...

Advanced Services

- Ultrasonic Phased Array
- Time of Flight Diffraction (TOFD)
- Corrosion Mapping
- Remote Visual Inspection/Boroscopy
- Eddy Current Testing
- Remote Field Eddy Current Testing
- Eddy Current Array
- IRIS – Internal Rotary Inspection System
- Thickness Mapping of Boiler Tubes with EMAT
- Corrosion Detection in Pipelines & Tanks using MRUT
- High Temperature Thickness Gauging with EMAT
- Infrared Thermography
- Positive Material Identification
- Wire Rope Testing

Conventional Services

- Ultrasonic Flaw Detection
- Ultrasonic Thickness Gauging
- Magnetic Particle Inspection
- Liquid Penetrant Testing
- On-Site Hardness Testing
- Coating Thickness Measurement

NDT Level III Consulting Services



Ultrasonic Phased Array

Ultrasonic Phased Array (PA)

PA is an advanced method of ultrasonic testing. Instead of a single transducer and beam, phased array use multiple ultrasonic elements and electronic time delays to create beams by constructive and destructive interference.



As such, PA offers significant technical advantages for weld testing & plant monitoring over conventional ultrasonic as the phased array beams can be steered, scanned, swept & focused electronically from a fixed probe position. Beam steering permits the selected beam angles to be optimized ultrasonically by orienting or focusing them perpendicular to the predicted discontinuities, for example lack of fusion in automated weld inspections.

PA is now used for inspecting fabricated piping and pressure vessel welds. For piping inspection, it is used in lieu of radiography or manual ultrasonic inspection. The flaw image obtained with multiple angles and beams gives a more accurate flaw characterization than conventional ultrasonic inspection. This in turn facilitates fitness for service modelling and predictions.

PA can be done manually, in semi automated or fully automated mode. For corrosion mapping application, a linear array probe mounted on a wheel is used.

Results are immediate, can be viewed as well as emailed for further analysis.

Advantages of Ultrasonic Phased Arrays:

- High-speed inspection using single-axis scans instead of conventional raster scan
- Near-optimal focal length and focal spot for various areas of complex parts or thick components
- Small, simple probe assembly with multiple beams from a single probe
- Easy-to-install, one-axis scanning systems
- Better detection in austenitic materials and dissimilar metal (DM) welds
- Alternative to Radiographic imaging.

Corrosion Mapping

Corrosion Mapping provides reliable information about the remaining wall and ID geometries of equipment and piping to engineers and inspectors, who use the information to establish corrosion rates, equipment longevity and maintenance and repair cycles. It also provides information on the material integrity, such as laminar defects and blistering, which may occur due to the migration of hydrogen through the material due to process.

All vessels and piping systems in the refining and petrochemical industry are subject to material degradation and corrosion scanning can help detect where problem areas exist or where they may possibly exist in the future. Corrosion mapping provides digital images, which can be regenerated or archived for future examination. Corrosion mapping scans can be remapped to establish flaw extension over time, allowing Fitness for Service assessments.



Time of Flight Diffraction

Time of Flight Diffraction (TOFD)

TOFD method of ultrasonic testing is a sensitive and accurate method for the non-destructive testing of welds. The use of TOFD enabled crack sizes to be measured more accurately, so that expensive components could be kept in operation as long as possible with minimal risk of failure.

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,



TOFD uses the time of flight of an ultrasonic pulse to determine the position of a reflector.

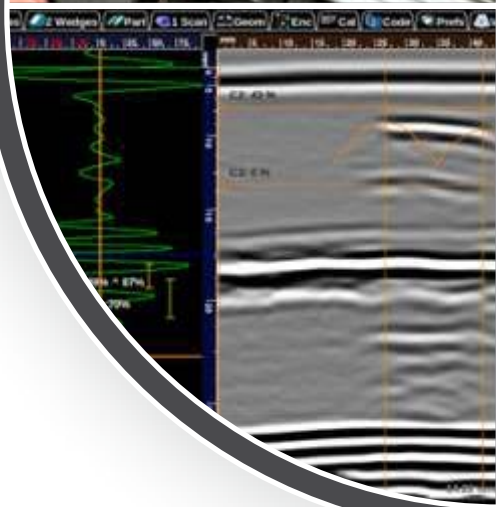
In a TOFD system, a pair of ultrasonic probes sit on opposite sides of a weld. One of the probes, the transmitter, emits an ultrasonic pulse that is picked up by the probe on the other side, the receiver. The signals picked up by the receiver probe are from two waves: one that travels along the surface and one that reflects off the far wall. When a crack is present, there is a diffraction of the ultrasonic wave from the tip(s) of the crack. Using the measured time of flight of the pulse, the depth of a crack tip can be calculated automatically by simple trigonometry. Due to its sensitivity and sizing accuracy, TOFD is also an excellent tool for in-service material & flaw monitoring.

We have experience in planning, managing & carrying out TOFD on pre-service & in-service projects. We advise and develop TOFD procedures & have specialized scanning equipments for carrying out inspection.

We also provide phased array & TOFD Inspection simultaneously which increases the probability of defect detection and measurement of length and height of the defect to a high precision. This helps in detecting and discriminating the fatigue cracks which leads to catastrophic failures.

Advantages of TOFD:

- Full record of examined weld sections in A-Scan, B-Scan, C-Scan, D-Scan and TOFD Scan presentation. Storage of full examination results.
- Real Time vision on quality of welds by the operator during examination.
- Accuracy in sizing the through thickness dimensions.
- High sensitivity in detecting planar, vertical or oriented defects like cracks or lack of fusion not visible by radiography and hardly to detect by standard ultrasonic pulse echo technique. For these reasons ASME Code with the Code Case 2235 has permitted to perform on pressure vessel welds TOFD examination in lieu of radiography.
- Full control on contact effectiveness and coverage by examining the TOFD map in any time after the examination.
- Supervision of the examination in the dynamic way as during the scanning on your PC in the office or far away the job.



Remote Visual Inspection

Remote Visual Inspection (RVI) / Boroscopy

RVI is used to visually inspect plant components for surface defects, general condition, degradation, blockages and foreign materials. It can be used as standalone inspection or as a complement to other NDE techniques such as Eddy Current, Ultrasonic or X-ray, in order to qualify unclear signals or pinpoint where a more thorough inspection is needed.

We offer a turnkey inspection solutions, whether it is inspecting high energy piping, performing a loose part retrieval or diagnosing an operational problem, we bring the right equipment to visually inspect (or retrieve) it, record it and report it back to you.

Applications Include :

- Electrical generators & transformers
- Gas, steam & wind turbines
- Sanitary piping & tubing
- Boiler water piping & components
- Nuclear reactor heads, reactor coolant pumps, demineralizers, containment structure & other components
- Piping systems such as service water, fire protection, oil, coal handling, steam, boiler, feed water & other piping
- Condenser, feed water heaters, steam generators & other heat exchangers
- Foreign material search & retrieval
- Surveillance, covert operations, search & rescue tasks etc.

Inspection of Large Vessels

RVI of large surface areas requires an industrial Pan, Tilt and Zoom (PTZ) camera. The PTZ camera requires opening of 5 inches or more. It can also be submerged underwater up to 100 feet. The auxiliary lamp provides extra lighting for extremely dark inspection environments.

Applications Include :

- Large pipe inspection
- Coke drum lining inspection
- Refractory linings
- Storage tanks
- Fractionation towers
- Tower trays
- Nuclear fuel bundle serial number verification
- Tanks and vessels inspection
- Floating roof inspection
- Contamination detection
- Crude units, catalytic cracker
- Spheres
- Reactors
- Piping & valves

Inspection of Pipes

We use steerable crawler to inspect pipes of various diameters. These crawlers are well suited for carrying out inspections on pipe systems, especially those that have a lot of bends and pipe branches. The remote pendant easily steers the crawler around multiple elbows & solid obstructions and controls the crawler's focus, lighting, speed and pan & tilt functions. This is the most common inspection technique to inspect sewer, drain, water, electrical conduit and process lines in various industries.

Applications Include :

- Air ducts and electrical conduits
- Steam header
- Loose-parts retrieval
- Lube oil and steam lines
- Small pressure vessels and tanks



Eddy Current Testing

Tubular Inspection ECT/RFT/IRIS/ECA

Eddy Current Testing (ECT) works on the principle of electromagnetic induction. In ECT a probe is excited with sinusoidal alternating current to induce eddy current in an electrically conductive material such as stainless steel, aluminium etc. The change in coil impedance that arises due to distortion at regions of discontinuities and associated magnetic flux leakage is measured. This is a surface technique and can readily detect very shallow surface and sub-surface defects. ECT is a simple, high-speed, high sensitive, versatile and reliable NDT technique and is popularly used in many engineering industries.

Remote Field Testing (RFT) is one of the several electromagnetic testing methods commonly employed in the field of non-destructive testing. RFT may also referred to as RFEC (Remote Field Eddy Current) or RFET (Remote Field Electromagnetic Technique). RFT is primarily used to inspect ferromagnetic tubing since conventional ECT have difficulty in inspecting the full thickness of the tube wall due to the strong skin effect in ferromagnetic materials.

Internal Rotary Inspection System (IRIS) is an ultrasonic method for testing of pipes and tubes. The ultrasonic beam allows detection of metal loss from the inside and outside of the tube wall. It is a fairly sensitive technique. The sensitivity achieved will depend on tube dimensions and tube cleanliness. Both ferromagnetic and non-ferromagnetic tubes can be inspected. A three dimensional picture of the defect is obtained, thus the defect profile and its depth is provided. Interpretation of results is easier than in the other techniques.

The conventional ECT faces major limitations with respect to detection & sizing of circumferential cracking and extent of volumetric flaws in tubular. Rotating probes is a solution but it reduces the inspection speed. Therefore **Eddy Current Array** along with bobbin probe technology is the solution to perform high speed inspection in a single pass.

Material Sorting

Rapid growth in performance requirements of modern automobiles has brought about a more stringent demand for quality control of automotive materials and components. Eddy current inspection can be an effective way to ensure these requirements are met. Primary applications are non destructive verification of material properties resulting from heat treatment and alloy processes and detection of surface cracks and flaws resulting from rolling, forming, machining, finishing and heat-treat processes.

Crack Detection / Weld Inspection

The cracks in parent material are real threat for reliability of a structure, as they can rapidly grow to cause failures of structural integrity. On other hand, for welds, there is a need to detect surface breaking defects on weld beads as well as transition and heat affected zones.

For ferro-magnetic material e.g. carbon steel, generally magnetic particle inspection is used. However, eddy current inspection offers a number of advantages:

- No surface preparation required - e.g. paint doesn't need to be removed, saving time in preparation for the inspection & in any recoating of surfaces .
- Improved sensitivity - ability to detect smaller defects.



EMAT

Thickness Mapping of Boiler Tubes

We offer this service using temate TG-IS (B) which is a redesigned FST GAGE or Fast Scanning Thickness Gage, first introduced in 1994. FST GAGE was developed by Electric Power Research Institute (EPRI) and Babcock & Wilcox (B&W) specifically to scan boiler tubes & provide a continuous measurement of tube wall thickness.

The system works on EMAT technique providing accurate thickness (with accuracy of +/- 0.127mm) readings with none or minimal tube surface preparation. The probe with integrated encoder and light indicators (for fast visual alert to the operator) is manually scanned along the boiler tube while the system records the thickness & alarms if the tube is below a pre-programmed threshold or other defect conditions are triggered. The system saves a complete record of each tube & the whole boiler for post analysis & trending.

Apart from detecting wall loss the system is capable of detecting hydrogen damage, pitting & caustic gouging (by measuring signal attenuation) which can't be detected with conventional means. It works on carbon steel and clad tubes. Tube thickness ranges from 1.25mm to 12.7mm & the minimum tube diameter requirement is 22.2mm, the tube surface can be oxidized, rough or pitted (scale-free).

The technique permits 100% inspection of the boiler instead of spot-checking at up to 15cm/s of scanning speed. The boiler-mapping tool permits easy visualization of boiler walls with results of inspection for fast analysis and interpretation.

Corrosion Detection in Pipelines & Tanks using MRUT

The temate MRUT (Medium Range Ultrasonic Testing) uses higher frequency guided waves to detect corrosion, cracks and discontinuities on exposed tubes, gas lines, oil pipelines and storage tanks.

The system is used in following modes and ideal for inspection of corrosion under supports and air-to-soil interfaces on exposed or thinly coated parts (<4mm):

- Non-contact EMAT technique using Medium Range Guided Waves permit coverage up to 5m (typical distance 0.1 - 5 m).
- Through-transmission technique (axial scanning) sends sound around a tube or across a plate to measure attenuation and/or velocity changes to detect defects between the sensors.
- Reflection technique (circumferential scanning) sends sound along a tube or plate & detects reflections from defects at up to 5m in front of the sensors (material and coating dependant).

High Temperature Thickness Gauging

Thickness measurement at elevated temperatures is a special category. Standard transducers are not designed to withstand elevated temperatures & will get damaged / destroyed due to varying thermal expansion coefficients of the materials used to construct them. Variation in material temperature affects sound velocity and accuracy of thickness measurements. We use EMAT equipment & probes with either air or water-cooling to accompany this task.



Other Advanced Services

Infrared Thermography

Infrared thermography is equipment or method, which detects infrared energy emitted from object, converts it to temperature, and displays image of temperature distribution. It is one of the most cost effective and proven predictive maintenance technology available to quickly, accurately and safely locate problems prior to failure.

We can conduct a comprehensive thermography survey and report the concern areas and vulnerable spots immediately so that corrective actions can be taken based on the severity of the problem.

Benefits of Thermography

- Reduction of production losses due to unplanned downtime
- Reduced maintenance and repair costs
- Increased equipment life
- Increased Mean-Time-Between-Failures (MTBF)
- Increased productivity and profitability

Wire Rope Testing

Large number of ferrous steel wire ropes are in use in different industries. Premature discard and replacement with the new rope involves in unreasonable costs, while operating the rope which already reached discard criteria is dangerous. Visual inspection is obvious, but only visual examination is not sufficient due to specific rope design. Nondestructive magnetic inspection of ropes enables to gather comprehensive data for making reasoned decision. Magnetic Flux Leakage (MFL) equipment with strong magnetization can inspect ropes reliably, and smart software facilitates data interpretation.

Our rope inspection services comprise inspection of the new ropes either during production run or delivered to the customer, and on-site inspection onshore, offshore, above ground and under ground. Inspection is carried in accordance with national / international standards and norms. This enables large cost savings as wire ropes can be used safely for a longer period of time.

Positive Material Identification (PMI)

As a result of a series of accidents resulting from material mix-ups, many companies have instituted stringent Positive Material Identification programs.

We offer comprehensive PMI services using latest X-Ray Fluorescence (XRF) analyzers, which are one of the quickest and most comprehensive method for PMI where low-level radiation is fired at the material and the energy levels, reflected back from each element is measured. All results are instant and computerized reports are produced at the time of testing.

Oxide Scale Thickness Measurement

We offer on-site oxide scale thickness measurement services to measure the thickness of oxide scale build-ups inside boiler tubes.

The gauge simultaneously displays the metal thickness of the boiler tube and the thickness of the oxide layer. Knowing the thickness of the oxide scale helps predict tube life.



Conventional Services

Ultrasonic Flaw Detection

In ultrasonic testing (UT), very short ultrasonic pulse-waves with center frequency ranging from 0.1-15 MHz are transmitted into materials to detect internal flaws or to characterize materials. UT is often performed on steel and other metals & alloys, though it can also be used on concrete, wood & composites. We offer onsite flaw detection services for inspection of structures, components, welds etc. We are equipped with state of art digital flaw detectors certified for reliable & faster inspection also our technicians are well qualified.



Ultrasonic Thickness Gauging (UTG)

UTG is a method of performing non-destructive gauging (measurement) of the local thickness of a solid element (typically made of metal) based on the time taken by the ultrasound wave to return to the surface. This type of gauging is typically performed with an ultrasonic thickness gauge. We offer on-site UTG services for assessing corrosion in process plant, piping & equipment. We are equipped with state of art thickness gauges having the latest through coat technology where removal of paint from the surface is not required. These gauges have in-built data logger for storing thickness readings, A-Scans, B-Scans which can be later transferred to computer for generating reports.

Magnetic Particle Inspection (MPI)

MPI is a NDT technique for detecting surface & subsurface discontinuities in ferromagnetic materials such as iron, nickel, cobalt & their alloys. We offer on-site magnetic particle inspection services using yoke type, prod type and coil type magnetizing equipment; dry powder, wet magnetic particles & wet fluorescent magnetic particle technique.

Liquid Penetrant Testing (LPT)

LPT is a widely applied low cost inspection method used to locate surface breaking defects in all non-ferrous materials and ferrous materials, although for ferrous components magnetic-particle inspection is often used. LPT is used to detect casting, forging & welding surface defects such as hairline cracks, surface porosity, leaks in new products, and fatigue cracks on in-service components. We offer on-site liquid penetrant testing services using colour contrast or fluorescent penetrant for highly sensitive inspection.

Onsite Hardness Testing

Conventional hardness testers like Rockwell, Brinell or Vickers machines, require the test piece be brought to the testing device; but this is not always possible. Portable testing devices have been developed that permit in-situ hardness measurements thus offering quick and economical supplements to conventional, stationary testing machines. We offer on-site hardness testing services using Equotip range of portable hardness testers.

Coating Thickness Measurement

Coating thickness is an important variable that plays a role in product quality, process control, and cost control. We offer on-site paint coating thickness measurement services by using state of art coating thickness gauges.



NDT Level III Consulting Services

We provide you with our fullest support and necessary information to complete your assignment through our certified and well experienced Level III persons, within a specified time period.

- To help you in selecting the right non destructive testing method/s and techniques suitable for the application
- Selection of suitable equipment for specific purpose.
- Preparation of NDT inspection procedures for various inspection methods, clients and jobs.
- Preparation of Test report formats and NDE technique sheets.
- Preparation of written practices as per ASNT recommended practice SNT-TC-1A/CP 189.
- Preparation of advanced NDT technique procedures for Immersion Ultrasonic testing, Phased Array Ultrasonic Testing, Time of Light Diffraction, Magnetic flux leakage.
- Validation of Procedures.
- Review of all inspection procedures.



NDT Level III
Consulting

About Us

We are a focused company dealing into Non Destructive Testing. Our activities include:

- Sales & Distribution of NDT Products
- Providing On-site Inspection Services
- Manufacturing of NDT Accessories
- Training & Certification
- Asset Integrity Management Services
- Level III Consulting Services

At NDTs India, we constantly endeavour to fulfil our customers varied testing needs and are deeply committed towards surpassing their expectations. We value & cherish their valuable suggestions & assistance in identifying important trends from time to time.

By virtue of our focus, core competencies, a committed team of professionals and our unrelenting quest for excellence, we are fully geared to meet future challenges.



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