



INSPECTION & TEST SERVICES

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TAI's Inspection & Test Services division is equipped with certified inspectors who perform various types of inspections for the industrial and manufacturing industries.

TAI's Inspection & Test division is staffed with experienced and certified inspectors with the latest equipment to perform various types of non-destructive testing and inspection services for the industrial and manufacturing industries.

TAI specializes in assisting clients manage their OSHA PSM covered equipment and piping inspection needs as part of a mechanical integrity program. Whether the inspections involve above ground storage tanks, pressure vessels, heat exchangers, or process piping, we can help. We are committed to seeing clients through this process from start to finish which may include in-process inspection of new equipment & piping, baseline data collection, development of inspection and test plans, all forms of non-destructive testing, supervise repairs that may be required to fix deficiencies, or perform Fitness for Services (FFS) engineering evaluations to allow equipment and piping to stay in service.

CERTIFIED PROFESSIONALS

TAI supplies highly experienced **American Petroleum Institute (API)** certified inspectors to industrial and manufacturing clients to help meet federal and state regulations regarding the inspection of process equipment and piping. Our staff is certified in API 510, 570, 580, 653, as well as CWI for weld inspections. Our staff has extensive experience in process equipment fabrication, so we can provide repair expertise if it is needed. With thousands of inspections under our belt, we ensure that equipment is safe and meets its expected useful life.

INSPECTION CAPABILITIES

- Piping Inspections (API 570)
- Storage Inspections (API 653)
- Vessel Inspections (API 510)
- Weld Inspections (CWI)
- Third Party Vendor Surveillance
- Inspector Replacement Services
- NACE Inspectors for Coating / Lining Systems
- Welding Program Development
- Mechanical Integrity Program Development
- P&ID Updates
- CAD Services









INSPECTION EQUIPMENT

- Remote Visual Inspection Equipment (RVI)
- Positive Material Identification (PMI)
- Spark Tester/Holiday Tester
- Thermography Cameras
- Barcol Hardness Tester
- Ultrasonic Shearwave
- Ultrasonic Thickness Meter with Glass Testing and Data Logging
- HD PRO 30S Holiday Detector
- Hi-Def Inspection System RVI+ FOSAR remote visual inspection and foreign object search and retrieval

EQUIPMENT SERVICED

- Above Ground Storage Tanks
- Pressure Vessels
- Piping & Process Systems
- Structures & Structural Systems
- Bridges & Civil Systems
- Fiberglass Tanks (FRP)



HD PRO' 30S HOLIDAY DETECTOR



The PHD Pro' 30 Holiday Detector has been specifically created to enable inspectors to quickly and effectively check for pinholes and porosity in a wide range of non-conductive coatings and linings from 16 microns to 14.4mm (0.56"). Batteries can be charged out of the unit by mains or from a car lighter socket. High quality D cell batteries can also be used.

(GE) XL FLEX+ VIDEO PROBES



The GE XL Flex+ Video Probe is a video borescope with all-way probe articulation for full-VGA resolution image and video capture and stereo measurement. They are lightweight and portable with powerful light output to produce clear, sharp videos and still images. The stereo measurement technology built into the video probes uses a patented prism to obtain left and right stereo images from slightly different perspectives. The matching of surface points in the left and right images provides accurate measurement results.

HI-DEF INSPECTION SYSTEMS – RVI+FOSAR REMOTE VISUAL INSPECTION | FOREIGN OBJECT SEARCH AND RETRIEVAL



The Hi-Def inspection system - RVI+ROSAR - provides visual inspection tools to see inside and inspect process and pressure components for cleanliness and mechanical damage. This system helps assess conditions and

retrieve loose parts, if found. This versatile system is designed with a one-hand carry solution to provide a user interface with full control for Pan-Tilt-Zoom-Lighting. It has a UL-rated low-voltage power supply and swivel mount for monitor or recorder and only one power cord so no additional outlets are needed which makes this tool highly portable and efficient.

VANTA ELEMENT™ HANDHELD XRF ANALYZER SERIES



The XRF provides elemental analysis for fast alloy grade identification and sorting, including light element detection for magnesium (Mg), aluminum (AI), silicon (Si), sulfur (S), and phosphorus (P). It features fast grade ID and clear on-screen grade compar-

ison to speed up metal testing for scrap sorting, metal manufacturing, and precious metals analysis. The Vanta Element series includes an alloy database with the most commonly used alloys in scrap recycling and manufacturing. Easily customize the database for proprietary or additional grades.

SITE SAFETY - CONFINED SPACE RESCUE STANDBY



Inspecting tanks and vessels is a risky endeavor, as there are various environmental and physical challenges to accessing the equipment. Confined space entry (CSE) work safety issues, including hazardous atmospheres, difficult space configurations, and potential chemical exposure are frequent components of the entry hazard analysis and planning process. TAI's Inspection & Test Services division deploys confined space professionals to perform hazard recognition and risk mitigation, planning and managing the personnel entry process and if needed, perform emergency extractions should an entrant become compromised. TAI combines client CSE best practices with ours' and by gap analysis, ensures safe entries exceed regulatory and clients' expectations while completing the safe entry task. Our on-site safety officer monitors and ensures the CSE compliance is as planned and documented before and during the entry period.

Inspection CSE safety coverage is based on the type of project, work-space, environment, etc. If the project involves difficult access because of size or location of the CSE entry point TAI personnel will work with our client to develop a safety plan to mitigate the issues so the project is completed safely and accurately.

TAI also offers a Fire Watch & Brigade Team to provide stand-by while you conduct hot work, burning and welding, and maintain a con-stant presence for a prescribed time to report any hazardous devel-oping conditions. TAI also offers training to your employees from basic CPR to advanced rescue, as well as special hazard prevention services.







EXAMPLES OF INSPECTION FINDINGS AND RECOMMENDATIONS



50% Sodium Hydroxide Circuit

FINDINGS/FAILURE: Severe ID grooving along length of pipe at 3 and 9 o'clock which led to thru-wall leak.

CAUSE: Under normal conditions, pipe is insulated with electric heat tracing. Temperatures above 120F can cause accelerated corrosion of carbon steel piping. As temperatures and caustic concentration increase, iron reacts directly with caustic to form sodium salts and liberate hydrogen.

RECOMMENDATIONS: Replace section of pipe and avoid high temps during idle operation. Monitor pipe throughout utilizing ultrasonic thickness surveying every two years.





Small Solvent Surge Tank w/CUI Issue

FINDINGS: Extensive CUI (corrosion under insulation)

CAUSE: Breaches in insulation sheathing allowed moisture to collect at the bottom of the 1st shell course. Fiberglass insulation allowed the moisture to wick up causing the extensive CUI.

RECOMMENDATIONS: Leave insulation off the bottom 4-6 inches of the 1st shell course or annually remove sections of insulation to inspect.

96% Sulfuric Acid Carbon Steel Pipe

FINDINGS/FAILURE: Hydrogen grooving leading to thru-wall leak of carbon steel pipe long-sweep elbow

CAUSE: Internal grooving from hydrogen gas attack. Under normal flow the acid reacts with the steel to form a protective film which aides to reduce corrosion. At idle conditions, hydrogen gas bubbles build at upper half of pipe. When flow is continued, the bubble move and scrub away protective film at top of pipe, hence severe grooving can occur.

RECOMMENDATIONS: Use schedule 80 pipe, and keep flow velocity less then 3 ft/sec. Avoid short radius elbows. Monitor circuit every two years particularly at elbows and sections before and after elbows.

CHEMICAL | PETRO REFINING



HF Aklylation RAD Controls System Upgrade

CONSUMER GOODS



Mixer Installation Instrumentation & Controls Design Package

FOOD & BEVERAGE



Storage & Processing System Upgrade: In-line Blending

NATURAL GAS & LNG



Bridgeville & Delaware City Compressor Stations, Detailed Engineering Package



Electrical Power Study



Pressure Vessel Cooling Coil **Modifications Construction/** Fabrication



Flour Handling & Storage, **Efficiency and Safety Process** Improvements



New Process & Packaging Line Design with Field Fabricated **Refrigerated Hardening Tunnel** Package



Multi-discipline Engineering, **Design and Construction Services**



Davis Compressor Station Electrical Upgrade, Detailed Engineering Package & Bid Documents



LNG Terminal Upgrade, Detailed **Engineering Package**



Lube Esters Plant Capacity

Improvement Expansion

Construction Management Support for Chlor-Alkali Plants



Electrical and I&C Design Package

Bulk Storage Tank Project Engineering and Detailed Design Package



Process & Utility Relocation



Mechanical Integrity & Fitness for Service Evaluations

PHARMACEUTICAL, BIOTECH, LIFE SCIENCES



Plant Monitoring and Controls Upgrade Design Package



On-going Metrology Services, Initial Calibrations, Facilities Management Services



150K sf Lab and GMP Manufacturing Space, MEP Design Package, Process Engineering, Cx/QC



GMP Cleanroom, Mechanical, Process and Electrical Design Package

POWER GENERATION



Mercury Reduction via PAC Injection - Cx and Field Engineering Services



Retrofit New FGD Unit



CP Crane NOx Abatement Project Detailed Design and Engineering



Detailed Design and Engineering Package

COMMERCIAL & MISSION CRITICAL



Super Computer Data Center - Site Design and Industrial Automation



Build to Suit Campus - Over 700,000 sf of Space, MEP Design Package



1 Million Square Feet of Secure Space, Detailed Design Package



GLOBAL FINANCIAL FIRM - Over 500,000 sf of Commercial Interiors Design



TAI is a full-service professional Engineering, Management and Technical Services firm built on more than 35 years of dedication to the success of our clients. We pride ourselves on the ability to service our client's projects from scope development and conceptual design —all the way through to completed construction. We deliver consistency, efficiency and quality at every stage of the project life cycle.

CONTACT

William Sminkey | Principal & Director | Inspection & Test Division 610-299-3010 | bsminkey@taiengineering.com

BALTIMORE, MD

DALLAS, TX

PHOENIX, AZ

WILMINGTON, DE

HEADQUARTERS 600 Red Brook Blvd Suite 300 Owings Mills, MD 2111 100 North Central Expy Suite 600 Richardson, TX 75090 2390 East Camelback Rd Suite 130 Phoenix, AZ 85016

4060 N. Dupont Hwy Suite 8 New Castle, DE 19720

TAI ENGINEERS · MANAGERS · TECHNICAL SERVICES taiengineering.com | contact@taiengineering.com