AIR HYGIENE, INC.

STATEMENT OF QUALIFICATIONS - 2022

Corporate Headquarters:
1600 West Tacoma Street
Broken Arrow, OK 74012

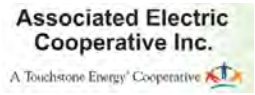
(918) 307-8865
(888) 461-8778

Certificate No. 3796.01

WWW.AIRHYGIENE.COM

Remote Office Locations:
Chicago, IL
Shreveport, LA
Las Vegas, NV
Austin, TX
Fort Worth, TX
Pittsburgh, PA

CLIENT REFERENCES



AIR HYGIENE E'MISSION Statement:

AIR HYGIENE's core philosophy of "**Second-to-None (2-2-0)**", demands extra mile customer service anchored on dignified character and family-oriented principles to deliver unmatched quality stack testing, worth paying for every time. We utilize revolutionary technology and **AIR HYGIENE UNIVERSITY** to create the best educated work force to define the future of stack testing.

STATEMENT OF QUALIFICATIONS

AIR HYGIENE

AIR EMISSION TESTING SERVICES

January, 2022

Celebrating 25 Years!

INTRODUCTION

AIR HYGIENE INTERNATIONAL, INC. (**AIR HYGIENE**) is a professional air emission testing services firm operating from corporate headquarters in Broken Arrow, Oklahoma for 25 years. Additional field offices with ready for field use testing labs are strategically located in Chicago, IL; Shreveport, LA; Las Vegas, Nevada; Austin and Ft. Worth, Texas; and Pittsburgh, Pennsylvania to serve all fifty (50) United States, Mexico, and Canada. **AIR HYGIENE** specializes in air emission testing services for combustion sources burning multiple fuels with multiple control devices and supporting equipment.

AIR HYGIENE testing laboratories are equipped with the following capabilities:

1. State-of-the-Art air emission analyzers, computers, and data-logging software!
2. Dual racks for multiple source testing simultaneously or multiple points on a single source (in/out SCR, etc.)!
3. NIST traceable gases for the most accurate calibration. Ranges as low as five (5) ppm!
4. PM_{10}, NH_3, mercury (Hg), sulfuric acid mist (H_2SO_4), SO_3, and formaldehyde sampling equipment!
5. VOC testing with on-board gas chromatograph to remove methane and ethane!
6. On-board printers to provide hard copies of testing information on-site!
7. Networking capabilities to provide real-time emission data directly into the control room!

AIR HYGIENE is known for providing professional services which include the following:

- Superior cost effective services to our clients!
- Educated work force trained to utilize the latest in revolutionary technology!
- Meeting our client's needs whether it is 24 hour a day testing or short notice mobilization!
- Using great equipment that is maintained and dependable!
- Understanding the unique start-up and operational needs associated with combustion sources!
- Experience working with state and federal regulations and agencies in all 50 states!

OUR WHY!

AIR HYGIENE strives to provide innovative, practical, top-quality services allowing our clients to increase operating efficiency, save money, and comply with federal and state requirements. We believe our first responsibility is to the client. In providing our unique services, the owners of **AIR HYGIENE** demand ethical conduct from each employee of the company. The character and integrity of **AIR HYGIENE** employees allows our clients to feel confident in the air testing services of **AIR HYGIENE**. Through a long-term commitment to these goals, **AIR HYGIENE** is known as a company committed to improving our clients' operations.

TESTING EXPERIENCE

AIR HYGIENE has **twenty-five (25) QSTI certified** personnel on staff and more than two hundred fifty (250) years of combined testing experience. We have completed over 25,000 emission tests and our testing services history includes interaction with all 50 state agencies and EPA regional offices. **AIR HYGIENE** testing personnel are rigorously trained through our very own **AIR HYGIENE UNIVERSITY** on EPA reference test methods from 40 CFR Part 51, 60, 63, and 75 along with ASTM methods. All testing personnel are instructed and tested on test responsibilities and must complete a "Demonstration of Capability" test per the **AIR HYGIENE** Quality Assurance Manual and the **AIR HYGIENE** Emission Testing Standard Operating Procedures Handbook.

AIR HYGIENE has completed testing on over 500 power plants including in excess of 2,000 combustion turbines and 50 coal fired boilers 250,000 megawatts (MW). ***Let us add your project to our list of satisfied customers!***

TESTING SUCCESS STORIES

AIR HYGIENE personnel have performed thousands of testing projects which have yielded significant benefits for our clients. The following project descriptions briefly discuss some of these emission testing projects.

- Conducted Mercury (Hg), PM, selected metals, HCl, Chlorine, and gas testing to verify status with the industrial boiler MACT on six coal fired units at three (3) locations.
- Conducted inlet/outlet baghouse emission testing for Mercury (Hg) to determine control efficiency using Ontario-Hyrdo testing methodology.
- Conducted numerous projects optimizing SCR performance by conducting inlet & outlet SCR analysis for NH_3, NO_x, flow, and Oxygen. Used information to assist with flow optimization and AIG tuning.
- Conducted federal and state required compliance testing for NO_x, CO, PM-10 (front & back-half), SO_2, VOC, Ammonia, Formaldehyde, Opacity, RATA testing (NO_x and CO) for new and updated power plants with both simple and combined cycle turbines firing natural gas and fuel oil.
- Conducted dry low NO_x burner tuning and performance testing for various models of GE, Siemens Westinghouse, Mitsubishi, Pratt & Whitney, and ABB combustion turbines to verify manufacturer's emission guarantees for clients in preparation for compliance testing.
- Performed power plant emission testing for natural gas & fuel oil fired combustion turbines. Tests included federal required testing per 40 CFR Part 75, state air permit requirements, RATA testing, and emission testing to verify manufacturer's guarantees during electric/heat output performance testing.

TESTING LOCATIONS

AIR HYGIENE bases mobilization charges on the distance from your site to the closest of seven (7) regional starting points covering all 50 United States. These include Broken Arrow, Las Vegas, Austin, Ft. Worth, Shreveport, Chicago and Pittsburgh.

Each start point is located such that the **AIR HYGIENE** test teams can mobilize to your site within 24 hours at affordable costs to ensure we are price competitive to any U.S. location.

QUALITY ASSURANCE PROGRAM SUMMARY

AIR HYGIENE has received interim accreditation from the Source Testing Accreditation Council (STAC) per ASTM D7036 as an Air Emission Testing Body (AETB). Air Hygiene also maintains current accreditation from LDEQ, CARB, SCAQMD, and PADEP.

AIR HYGIENE has **twenty-five (25) Qualified Stack Testing Individuals (QSTI)** on staff providing testing leadership for every testing project; including a PhD Chemical Engineer who is ACS Certified managing in house laboratory operations and specialty remote wet chemistry projects.

AIR HYGIENE ensures the quality and validity of its emission measurement and reporting procedures through a rigorous quality assurance (QA) program. The program is developed and administered by an internal QA team and includes five major areas:

1. QA reviews of reports, laboratory work, and field testing;
2. Equipment calibration and maintenance;
3. Chain-of-custody;
4. Training; and
5. Knowledge of current test methods.

QA Reviews

AIR HYGIENE'S review procedure includes review of each source test report, along with laboratory and fieldwork, by the QA Team. The most important review is the one that takes place before a test program begins. The QA Team works closely with technical division personnel to prepare and review test protocols. Test protocol review includes selection of appropriate test procedures, evaluation of interferences or other restrictions that might preclude use of standard test procedures, and evaluation and/or development of alternate procedures.

Equipment Calibration and Maintenance

The equipment used to conduct the emission measurements is maintained according to the manufacturer's instructions to ensure proper operation. In addition to the maintenance program, calibrations are carried out on each measurement device according to the schedule outlined by the Environmental Protection Agency. Quality control checks are also conducted in the field for each test program. Finally, **AIR HYGIENE** participates in a PT gas program by analyzing blind gases semi-annually to ensure continued quality.

Chain-of-Custody

AIR HYGIENE maintains full chain-of-custody documentation on all samples and data sheets. In addition to normal documentation of changes between field sample custodians, laboratory personnel, and field test personnel, **AIR HYGIENE** documents every individual who handles any test component in the field (e.g., probe wash, impinger loading and recovery, filter loading and recovery, etc.). Samples are stored in a locked area to which only **AIR HYGIENE** personnel have access. Field data sheets are secured at **AIR HYGIENE'S** offices upon return from the field.

Training

Training available to both employees and customers through our very own **AIR HYGIENE UNIVERSITY** is essential to ensure quality testing. Constantly striving to be recognized globally as the worldwide leader in Stack Testing Training, **AIR HYGIENE UNIVERSITY** has developed a baseline foundation and curriculum using a unique indoor training facility, practice stack, and over 16 years of real-world field testing experience. **AIR HYGIENE UNIVERSITY'S** classwork combines customized training modules focusing on presentation, testing, resource utilization, and hands-on experience and the knowledge from each module can be combined to provide a final capstone, a Demonstration of Competency in the subject matter of interest. Participants are prepared to pass the Qualified Individual examinations and obtain Federal certifications and have the ability to apply new and refreshed knowledge about each test method to everyday work practices.

Knowledge of Current Test Methods

With the constant updating of standard test methods and the wide variety of emerging test procedures, it is essential that any qualified source tester keep abreast of new developments. **AIR HYGIENE** subscribes to services, which provide updates on EPA reference methods, rules, and regulations. Additionally, source test personnel regularly attend and present papers at testing and emission-related seminars and conferences.

AIR HYGIENE, INC.

Testing Solutions for a Better World

AIR HYGIENE Testing Services Summary

AIR HYGIENE is a privately-held professional services firm headquartered in Tulsa, Oklahoma with additional field offices in Chicago, IL; Shreveport, LA; Las Vegas, Nevada; Austin and Ft. Worth, Texas; and Pittsburgh, Pennsylvania.

AIR HYGIENE specializes in emission testing services for a variety of industries including solid, liquid, & gas fired utility plants, turbines, engines, refineries, printers, glass plants, chemical plants, various manufacturers and related industries.

AIR HYGIENE provides turn-key emission testing services with fast-turnaround which include:

1. Pre-test site visit;
2. Consulting on port locations and setup;
3. Preparation of test plan for state agency;
4. Coordination with state agency for testing;
5. On-site emission testing services; and
6. Preparation of draft and final reports.

AIR HYGIENE has mobile laboratories that serve all 50 United States and North America. **AIR HYGIENE** has performed over 25,000 emission tests on a variety of sources for 750+ clients.

AIR HYGIENE performs air emission certification compliance testing on combustion sources (natural gas, biomass, coal, fuel oil, jet fuel, etc), NSPS sources, ICR MACT testing, and Title V compliance sites. Our experience ranges from emission testing for new PSD facilities, ICR, MACT, and RACT required performance certification testing to Relative Accuracy Test Audits (RATA Tests) for Continuous Emission Monitoring Systems (CEMS) and Parametric Emission Monitoring Systems (PEMS).

Air Hygiene corporate headquarters, testing warehouse, and training center are located in Broken Arrow, OK. A newly constructed, 32,000 square foot facility has provided expanded capabilities for our world class Air Hygiene University. AHU has provided training to companies, agencies, and individual engineers interested in emission testing from all over the world. This facility has expanded our testing services capabilities with an upgraded and larger laboratory space. It has a one-of-a-kind indoor stack in a temperature controlled environment with dedicated testing equipment for a full service training center available to both employees and customers to further develop testing knowledge and skills. Finally, the expanded warehouse to better meet our operational needs, expand our test lab production capabilities, and expand on our reputation of having the very best stack testing labs in the world!

AIR HYGIENE performs FTIR testing by EPA Method 320 321, & ASTM D-6348 for Hazardous Air Pollutants (HAPS) including formaldehyde, benzene, xylene, toluene, hexane, ammonia, hydrogen chloride, etc. This methodology provides real-time analysis of these critical pollutants.

AIR HYGIENE specializes in the following types of pollutants and EPA Reference Methods (RM):

- Exhaust Flow – RM 2 &/or 19
- Carbon Dioxide (CO_2) – RM 3a
- Oxygen (O_2) – RM 3a &/or 20
- Moisture – RM 4
- Particulates (PM) – RM 5(filterable) & 202/OTM-028
- PM < 10 microns (PM_{10}) – RM 201a
- PM < 2.5 microns ($PM_{2.5}$) – RM 201b
- PM sizing (elzone analysis)
- Sulfur Dioxide (SO_2) – RM 6c
- Nitrogen Oxides (NOx) – RM 7e &/or 20
- Sulfuric Acid Mist (SO3) – RM 8a (control condensate)
- Opacity – RM 9
- Carbon Monoxide (CO) – RM 10
- Hydrogen Sulfide (H_2S) – RM 11
- Lead – RM 12
- Dioxin & Furans – RM 23
- Total Hydrocarbons (THC) – RM 25a
- Volatile Organic Compounds (VOC) RM 25a & RM 18
- Metals – RM 29
- Chrome – RM 306
- Formaldehyde – RM 320 & ASTM D-6348 (FTIR)
- HAPS – FTIR – RM 320, 321, & ASTM D-6348 (FTIR)
- Ammonia – RM 320, CTM-027, or BAAQMD ST-1B
- **Mercury – RM 30b-Sorbent Tubes (both with on-site analysis, Ontario-Hydro, and RM**

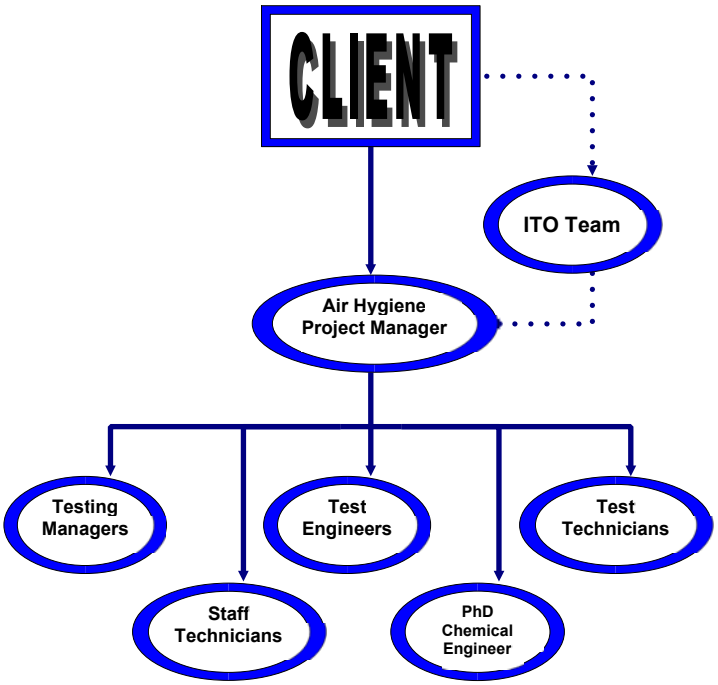
AIR HYGIENE, INC.

Testing Solutions for a Better World

EMISSION TESTING TEAM

Air Hygiene International, Inc. (**AIR HYGIENE**) intends to exceed your expectations on every project. From project management to field-testing teams, we're committed to working hard on your behalf. The job descriptions and flow chart below outline **AIR HYGIENE**'s client management strategy for your testing services.

From the initial request through receipt of the purchase order, the Inquisition to Order (ITO) team strives to inform every client of the benefits gained by using **AIR HYGIENE** for their emission testing project. The ITO team includes representatives from the sales, marketing, operations, and contracts divisions. In addition, several support staff assist to ensure the ITO team provides the support for client needs as requested by a client or project manager.



Project Managers are the primary contact for clients and ultimately responsible for every emission testing project.

AIR HYGIENE's Project Managers include **sixteen (16) QSTI certified** testing experts with experience ranging from those with a masters level, to professional engineers to industry experts with over 25,000 testing projects completed. Each project is assigned a Project Manager based primarily upon geographic location, industry experience, contact history, and availability. The Project Manager prepares the testing strategy and organization for the project. This includes preparation of testing protocol; coordination with state agencies, client representatives, and any interested third parties. The site testing and report preparation are executed under the direction of the Project Manager from start to finish.

Testing Managers have completed Air Hygiene's rigorous demonstration of capability training program and are capable of operating all testing equipment and performing all test methods required for your testing project. Testing Managers assist Project Managers by leading the field testing when required, preparing draft reports, calibrating equipment, and overseeing the testing team on-site. **AIR HYGIENE**'s staff includes **three (3) QSTI certified** testing managers.

Test Engineers have significant background and understanding of emission testing or related services. Test Engineers prepare pre-test drawings for port location, ensure on-site logistics for electrical and mechanical/structural needs, and conduct on-site testing as directed by the Project Manager and/or Testing Manager. Test Engineers often have special understanding of process and/or regulations applicable to specific testing jobs, which provide great value to both the client and Project Manager in testing strategies. **AIR HYGIENE**'s staff currently includes **two (2) QSTI certified** test engineers.

Test Technicians experience ranges from new hire with technical degree and experience to technicians who have performed 500 emission tests. All test technicians have a basic understanding of emission training and are involved in daily training and under supervision to continue to develop testing skills. Each has testing experience with **AIR HYGIENE** equipment along with a variety of industries and source equipment. Test Technicians may operate isokinetic sampling trains or gas analyzers on-site under the direction of the Project Manager and assist with preparation of field reports and quality assurance procedures.

Staff Technicians are entry-level personnel who have performed fewer than 500 emission tests. Staff Technicians perform pre-test equipment preparation, on-site test preparation, and testing assistance under the direction of Project Manager and/or Testing Manager. Staff Technicians connect sampling probes to ports, raise and lower equipment to and from sampling platform, and other support activities under the direction of the Project Manager and/or Testing Manager.

PhD Chemical Engineer/Lab Manager our in house, ACS Certified Lab Manager manages in house laboratory operations and is available for specialty remote wet chemistry projects on site to provide added expertise and accuracy. **AIR HYGIENE**'s lab team is led by a **QSTI certified (All 4 groups) PhD Chemist.**

INSTRUMENT CONFIGURATION AND OPERATIONS FOR GAS ANALYSIS

The sampling and analysis procedures used by **AIR HYGIENE** during tests conform in principle with the methods outlined in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 3a, 6c, 7e, 10, 18, 19, 20, and 25a.

The flowchart on the next page depicts the sample system used by **AIR HYGIENE** for analysis of oxygen (O_2), carbon dioxide (CO_2), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), and volatile organic compounds (VOC) tests. A heated stainless steel probe is inserted into the sample ports of the stack to extract gas measurements from the emission stream. The gas sample is continuously pulled through the probe and transported via 3/8 inch heat-traced Teflon® tubing to a stainless steel minimum-contact condenser designed to dry the sample through Teflon® tubing via a stainless steel/Teflon® diaphragm pump and into the sample manifold within the mobile laboratory. From the manifold, the sample is partitioned to the O_2, CO_2, SO_2, CO, and NO_x analyzers through glass and stainless steel rotameters that control the flow rate of the sample. The VOC sample is measured as a wet gas.

The flowchart shows that the sample system is also equipped with a separate path through which a calibration gas can be delivered to the probe and back through the entire sampling system. This allows for convenient performance of system bias checks as required by the testing methods.

All instruments are housed in an air-conditioned trailer which serves as a mobile laboratory. Gaseous calibration standards are provided in aluminum cylinders with the concentrations certified by the vendor. EPA Protocol No.1 is used to determine the cylinder concentrations where applicable (i.e. NO_x calibration gases).

All data from the continuous monitoring instruments are recorded on a Logic Beach HyperLogger™ or Intellilogger™ which retrieves calibrated electronic data from each instrument every second and reports an average of the collected data every 30 seconds and 10 seconds. The averaging time can be selected to meet the client's needs. **This data is available instantaneously for printout, analysis, viewable by actual values, or examined by a trending graphs!**

The number of test runs, test loads, and length of runs is based upon federal and state requirements for the facility. Typical run times associated with emission testing are as follows:

Type of Test	# of runs	Length of runs
O_2 Traverse (GG)	1 run @ low load (8 – 48 points)	2 minutes per point
NO_x Stratification Test	1 run @ base load (12 points)	2 – 4 minutes per point
Subpart GG or KKKK	3 runs @ 4 loads (30%, 50%, 75%, & 100%)	15 – 60 minutes per run
RATA	9 – 12 runs @ normal load	21 minutes per run
State Permit Test (gases)	3 runs @ base load	1 hour per run
State Permit Test (particulates)	3 runs @ base load	2 – 4 hours per run

The stack gas analysis for O_2 and CO_2 concentrations are performed in accordance with procedures set forth in EPA Method 3a (EPA Method 20 for O_2 on combustion turbines). The O_2 analyzer uses a paramagnetic cell detector. The CO_2 analyzer uses an infrared detector.

CO emission concentrations are quantified in accordance with procedures set forth in EPA Method 10. A continuous non-dispersive infrared (NDIR) analyzer is used for this purpose.

NO_x emission concentrations are measured in accordance with procedures set fort in EPA Method 7e and/or 20. A chemiluminescence analyzer is used to determine the nitrogen oxides concentration in the gas stream.

Total hydrocarbons (THC), non-methane, non-ethane hydrocarbons also known as volatile organic compounds (VOC) are analyzed in accordance with procedures set forth in EPA Methods 18 & 25a. A flame ionization detector calibrated with ethane is used to determine the THC concentration in the gas stream and VOCs analyzed by GC to determine methane, ethane, and remaining VOCs per EPA Method 18 determination with gas chromatograph using FID detector.

TESTING QUALITY ASSURANCE ACTIVITIES

A number of quality assurance activities are undertaken before, during, and after turbine testing projects. This section describes each of those activities.

Each instrument's response is checked and adjusted in the field prior to the collection of data via multi-point calibration. The instrument's linearity is checked by first adjusting its zero and span responses to zero nitrogen and an upscale calibration gas in the range of the expected concentrations. The instrument response is then challenged with other calibration gases of known concentration and accepted as being linear if the response of the other calibration gases agreed within ± two percent of range of the predicted values.

NO_2 to NO conversion is checked via direct connect with an EPA Protocol certified concentration of NO_2 in a balance of nitrogen. Conversion is verified to be above 90 percent.

Instruments are both factory- tested and periodically field challenged with interference gases to verify the instruments have less than a two percent interference from CO_2, SO_2, CO, NO, and O_2.

After each test run, the analyzers are checked for zero and span drift. This allows each test run to be bracketed by calibrations and documents the precision of the data collected. The criterion for acceptable data is that the instrument drift is no more than three percent of the full-scale response. Quality assurance worksheets summarize all multipoint calibration linearity checks and the zero to span checks performed during the tests are included in the test report.

The sampling systems is leak checked by demonstrating that a vacuum greater than 10 in. Hg can be held for at least one minute with a decline of less than 1 in. Hg. A leak test is conducted after the sample system is set up and before the system is dismantled. This test is conducted to ensure that ambient air does not dilute the sample. Any leakage detected prior to the tests is repaired and another leak check conducted before testing will commence.

The absence of leaks in the sampling system is also verified by a sampling system bias check. The sampling system's integrity is tested by comparing the responses of the analyzers to the responses of the calibration gases introduced via two paths. The first path is directly into the analyzers and the second path includes the complete sample system with injection at the sample probe. Any difference in the instrument responses by these two methods is attributed to sampling system bias or leakage. The criterion for acceptance is agreement within five percent of the span of the analyzer.

The control gases used to calibrate the instruments are analyzed and certified by the compressed gas vendors to ± one percent accuracy for all gases. EPA Protocol No.1 is used, where applicable, to assign the concentration values traceable to the National Institute of Standards and Technology (NIST), Standard Reference Materials (SRM). The gas calibration sheets as prepared by the vendor are included in the test report.

AIR HYGIENE, INC.

Testing Solutions for a Better World

COMBUSTION TESTING SERVICES SUMMARY

Thank you for your consideration of the combustion emission testing services of Air Hygiene International, Inc. (**AIR HYGIENE**). The following list details some of the testing services and extras **AIR HYGIENE** includes with each testing job.

Types of Air Testing Services for Combustion Sources:

- Boiler or Turbine tuning/mapping for NOx, CO, O2, CO2, flow, temperature, &/or NH_3 emissions
- Pollutant testing to verify EPC contractual emission guarantees
- Research and Development (R&D) emission data research and emissions optimization
- **Mercury (Hg) testing with on-site data**
- 40 CFR Part 60 Subpart GG or KKKK – Turbine Compliance Testing
- 40 CFR Part 75 – Acid Rain Classified Equipment Testing
- 40 CFR Part 75 Appendix E – Peaking Plant CEMS alternative NOx emissions versus Heat Input mapping
- RATA Testing on CEMS systems for NOx, CO, SO_2, CO_2 or O_2, Flow (3-D & Wall effects)
- QA/QC Plans, Monitoring Plans, Linearity Checks, Testing Protocols, etc. are provided with our high quality, service-oriented emission testing services
- Initial permit compliance testing for PM, PM-10, PM-2.5, SO_2, NOx, CO, H2SO4, HCl, Hg, exhaust flow, moisture, O_2, CO_2, Ammonia, Formaldehyde, other HAPs

AIR HYGIENE will provide the following testing services:

- On-site, real-time test data
- Fuel F-Factor calculation data sheet
- Experienced emission testing personnel
- Flexible testing schedules to meet your needs
- Live Streaming and electronic reports provided
- Extensive experience with all 50 state agencies in the U.S., Mexico, & Canada
- EPA Protocol 1 Certified Gases (one percent accuracy) for precise calibration
- Low range (0-10 ppm) equipment calibration and measurement available
- Test protocol preparation, coordination with state agency, EPA Region, and site personnel
- Numerous mobile testing labs, which may be used for your projects across the U.S.
- State-of-the-art data logging technology to allow real-time examination of meaningful emission data
- Monitor your emissions data measured in our test lab from your control room via our datalogging network system

AIR HYGIENE is committed to providing testing teams that will take the time to meet your needs. We ensure the job is completed on time with the least amount of interruption to your job and site operation as possible. Thank you for considering our services.

AIR HYGIENE, INC.

Testing Solutions for a Better World

SYNERGISTIC APPROACH TO POWER PLANT CONSTRUCTION PROJECT TESTING

Power plants continue to be built, modified, and improved across the United States. These new or modified facilities are at the forefront of clean energy. Emission rates and limits continue to decrease. These units are very efficient, environmentally friendly, and meet the stringent requirements set forth by the Environmental Protection Agency (EPA) and associated state agencies. **AIR HYGIENE** has developed a unique strategy to help owners demonstrate compliance with testing solutions for difficult sampling locations to meet complicated requirements.

Unique Testing Strategy

AIR HYGIENE has developed a synergistic approach to assisting the various groups involved in the completion of a commissioning/startup unit or modification project. **AIR HYGIENE** strives to combine the multiple testing aspects involved with bringing a combustion unit to commercial service. By conducting the various emission tests required for a new combustion unit using one test company, the following benefits are a given:

1. Save money by…
    a. Reduced mobilizations
    b. Combined tests yield reduced fuel usage and site time
    c. Bulk projects receive quantity discounts
2. Improve efficiency through familiarity with site needs
3. Site personnel and testing team are comfortable working together

These projects typically involve some or all of the following groups. There is not a defined set of responsibilities that will match every project. The table below simply suggests a typical list of testing responsibilities.

Responsible Party	**Testing Responsibilities**
Owner	Initial and on-going federal and state compliance testing (i.e. NSPS Sub GG, Part 75, Operating Air Permit, etc.)
Operator	Initial and on-going federal and state compliance testing (i.e. NSPS Sub GG, Part 75, Operating Air Permit, etc.)
Turbine/Boiler manufacturer	Contractual emission guarantees of unit (i.e. NOx, SO2, CO, VOC, PM-10, NH3, H2SO4)
EPC & Construction Company	Contractual emission guarantees including control devices (i.e. NOx, SO2, CO, VOC, PM-10, NH3, H2SO4)
CEMS Supplier	Initial RATA testing (i.e. NOx, CO, SO2, CO2, O2, flow)
Lending Party (i.e. bank)	No responsibility, but concerned with outcome of all tests
Environmental Consultant	Concerned with air permit and overall compliance; may select the test contractor and provide oversight for testing

Example Project:

A recent project provides a prime example of the synergistic benefits of using **AIR HYGIENE** to perform your commissioning/startup or remodification testing needs for performance and compliance. Eight GE Frame 7FA turbines were taken from performance testing through compliance testing in 20 days. The following tests were performed on each turbine:

- NOx tuning and mapping
- Contractual performance testing for NOx, CO, VOC, SO_2, NH_3, & PM_{10}
- 40 CFR Part 60 Subpart GG: testing for NOx and CO at max load
- 40 CFR Part 75: NOx & CO RATA certification on CEMS
- State required compliance testing for NOx, CO, VOC, NH_3(on-site analysis), formaldehyde (on-site analysis by FTIR), opacity and SO_2 burning natural gas

Test data was provided on-site for all tests, except PM-10. Electronic files were e-mailed for review to the turbine manufacturer, owner & operator, and environmental consultant within 24 hours following completion of site work. Complete reports including PM-10 were submitted to interested parties within 10 days following each blocks completion.

Power Plant Testing Experience

AIR HYGIENE personnel have over two hundred fifty (250) years of testing experience on combustion turbines, coal fired boilers, gas fired boilers, landfill gas, wood fired, & diesel fired engines across the United States. **AIR HYGIENE** has 50 combustion labs serving all 50 states from one corporate office in Tulsa, OK and six (6) additional field offices (Chicago, IL; Shreveport, Louisiana; Las Vegas, NV; Austin, TX; Fort Worth, TX; & Pittsburgh, PA). **AIR HYGIENE** has tested plants ranging from 50 to 2,000 megawatts in both simple and combined cycle operation with controls including:

- Selective Catalytic Reduction - Ammonia injection
- Steam/Water injection
- Sprint injection
- Dry Low NOx burners (DLN)

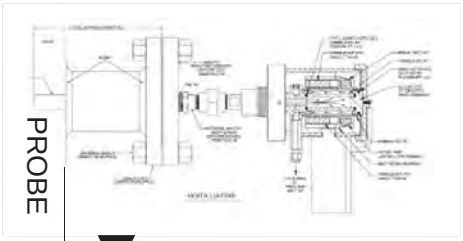
AIR HYGIENE has completed testing at over 500 plants on 2,000 combustion turbines, 50 coal fired boilers, 100 gas fired boilers, and other sources representing 250,000 plus megawatts (MW). **AIR HYGIENE** has proven through our numerous projects that we can be relied upon for uncompromised quality, service flexibility, and loyalty to our clients no matter where the job nor what the situation may be. ***Let us add your upcoming project to our list of satisfied customers!***

Air Hygiene Mercury Testing

Air Hygiene Mercury Testing Lab

Apex 30B Console & Probe

Ohio Lumex: RA915+ Analyzer with RP-91 Attachment for Ontario Hydro or 30b sorbent trap analysis on-site



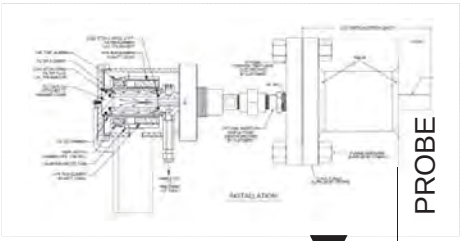
PROBE

HEATED PROBE FILTER

LEGEND

- Heated Teflon Tubing (pre-conditioned sample)
- Unheated Teflon Tubing (conditioned sample)
- Diluted Calibration Gas
- Calibration Gas
- Electronic Input/Output

HEATED PROBE FILTER



PROBE

PROCESS INLET OR 2ND STACK

dual line heated sample umbilical

STACK EXHAUST

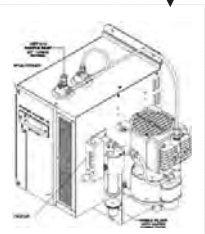
TEST TRAILER EXTERIOR

TEST TRAILER INTERIOR

DATA RECORDER

COMPUTER

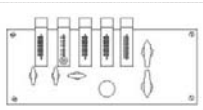
GAS CONDITIONER



dual line heated sample umbilical

MOBILE SECONDARY ANALYZERS

MANIFOLD



GAS DILUTER

THC, VOC

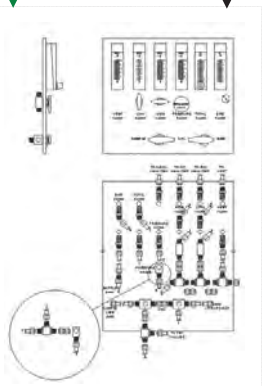
O_2, CO_2, NOx, CO, SO_2

HOT/WET ANALYZERS
COLD/DRY ANALYZERS

COLD/DRY ANALYZERS
HOT/WET

O_2, CO_2, NOx, CO, SO_2

FIXED PRIMARY ANALYZERS



FLOW CONTROL MANIFOLD

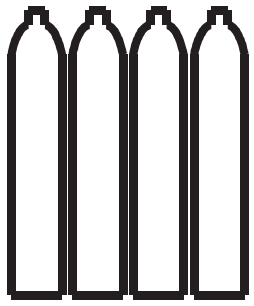
FTIR

THC, VOC

CONDITIONER

VENT

CALIBRATION/ BIAS GAS BOTTLES



VENT

Shown fully equipped. Some labs may not contain these features and others may contain additional features specific to certain scopes.

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Figure 4.1
EMISSIONS TESTING LAB

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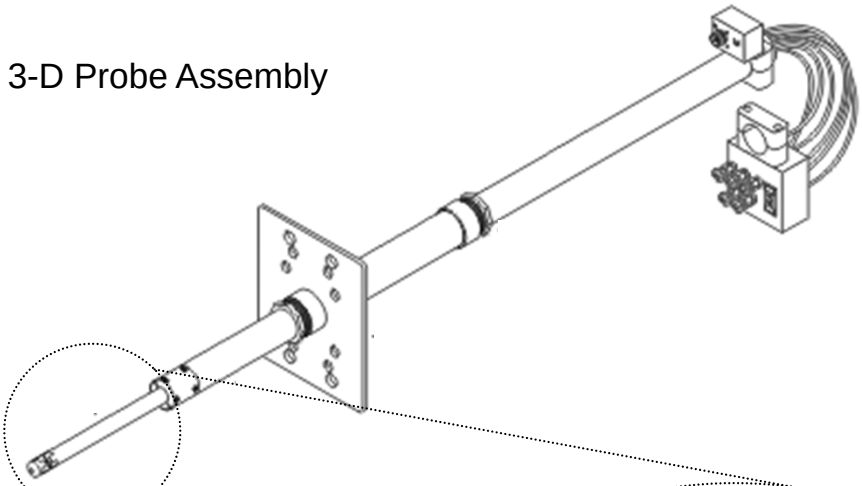
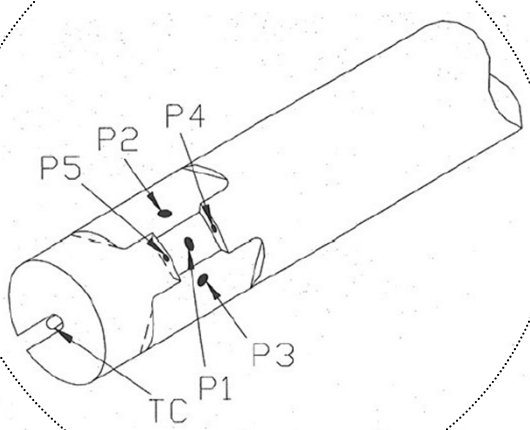
3-D Probe Assembly



3-D Console



Prism Shaped 3D Pitot Head

AIR HYGIENE

Figure 4.2
3D FLOW EQUIPMENT

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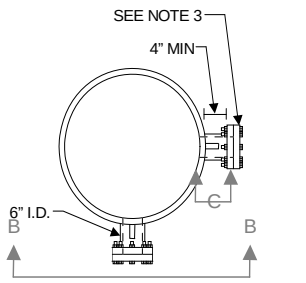
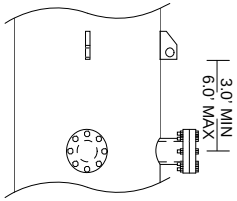


SECTION A
not to scale



SECTION B
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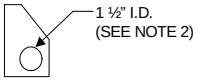

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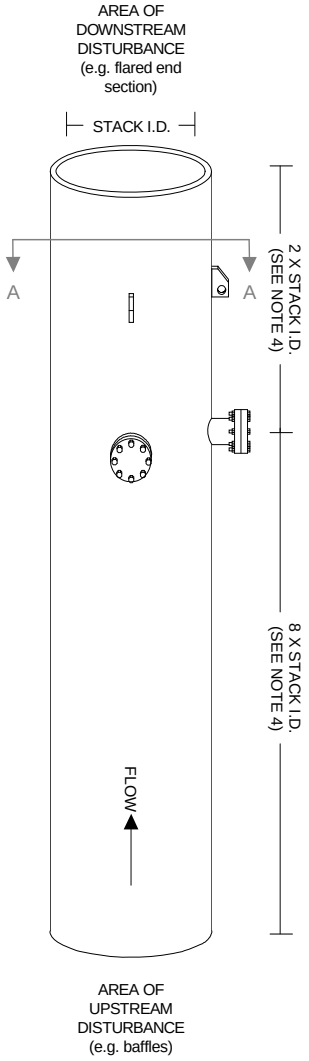

PARTIAL STACK
not to scale

NOTES

1. TWO PORTS WITH CENTERLINES AT 90° ANGLES
2. 3/8 INCH THICK STEEL, WELDED TO STACK EXTERIOR, PROVIDES PLACE TO HOOK CHAIN FOR RAIL ASSEMBLY
3. MINIMUM THREE INCH INNER DIAMETER STEEL PIPE, WELDED TO STACK EXTERIOR, HOLE CUT INTO STACK WALL, NO POTRUSIONS OR OBSTRUCTIONS INSIDE STACK WALL
4. IF TOTAL STACK LENGTH IS NOT AVAILABLE, EPA MINIMUM REQUIREMENTS ARE ½ X STACK I.D. FROM PORTS TO TOP AND 2 X STACK I.D. FROM PORTS TO BOTTOM

AIR HYGIENE

PORT INSTALLATION DIAGRAM
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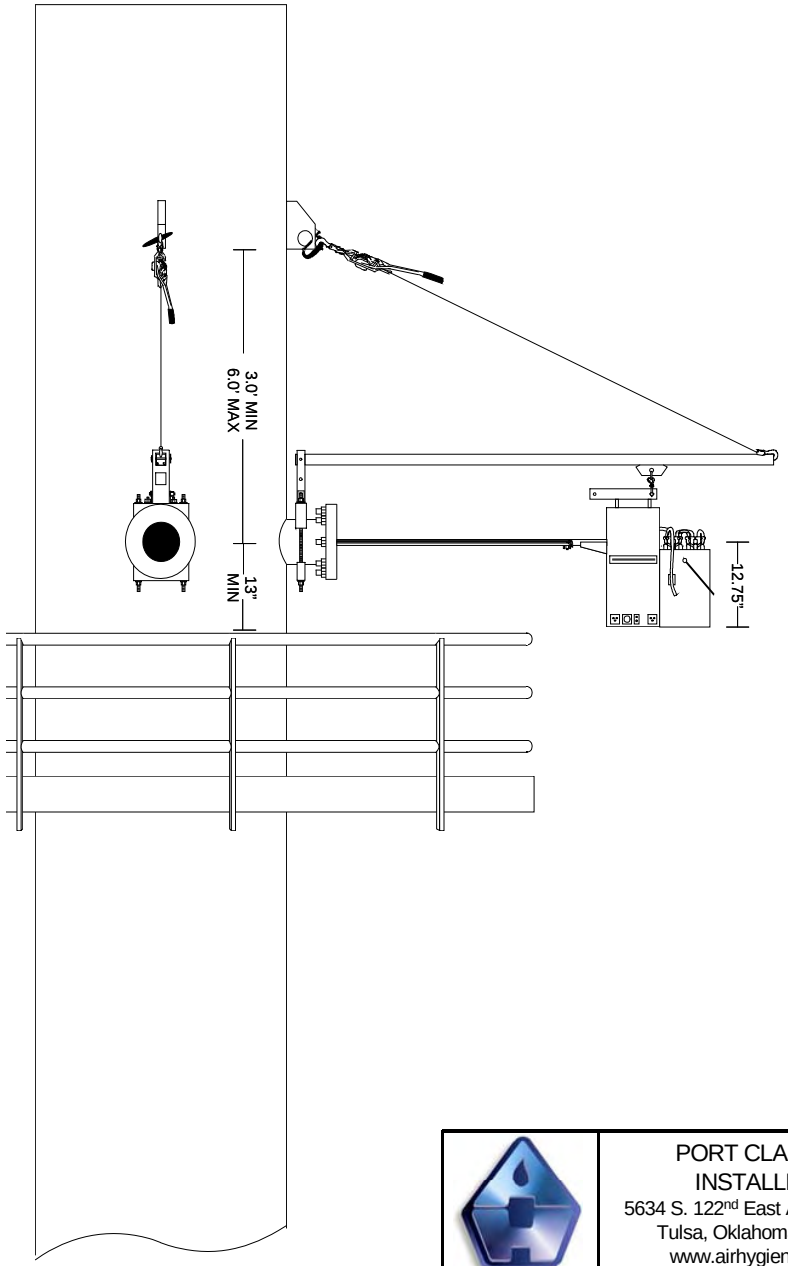
E:\SHARED\DRAWINGS\PORT INSTALLATION.PPT 02/08/02 TKG DRW NO: 02-001



not to scale

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AIR HYGIENE, INC.

Testing Solutions for a Better World

F-Factor Datasheet and Fuel Gas Analysis

Company: XYZ Power
Location: XYZ Power Plant
Date: April 9, 2001

Values to enter from fuel gas analysis by GPA 2166.

Font Scheme:
Blue Font = enter new data
Black Font = calculated data
Green Font = Labels for columns & rows
Red Font = Important results with notes

Gas Component		Mole (%)	Molecular Weight (lb/lb-mole)	lb Component per lb-Mole of Gas	Weight % of Component	Fuel Heat Value [HHV] (Btu/scf)[1]	Fuel Heat Value [LHV] (Btu/scf)[1]
Methane	CH4	96.491	16.04	15.477	92.97	974.27	877.20
Ethane	C2H6	2.115	30.07	0.636	3.82	37.41	34.22
Propane	C3H8	0.186	44.1	0.082	0.49	4.68	4.31
iso-Butane	iC4H10	0.019	58.12	0.011	0.07	0.62	0.57
n-Butane	nC4H10	0.023	58.12	0.013	0.08	0.75	0.69
Iso-Pentane	iC5H12	0.008	72.15	0.006	0.03	0.32	0.30
n-Pentane	nC5H12	0.005	72.15	0.004	0.02	0.20	0.19
Hexanes	C6H14	0.025	86.18	0.022	0.13	1.19	1.10
Heptanes	C7H16	0.000	100.21	0.000	0.00	0.00	0.00
Octanes	C8H18	0.000	114.23	0.000	0.00	0.00	0.00
Carbon Dioxide	CO2	0.510	44.01	0.224	1.35	0.00	0.00
Nitrogen	N2	0.618	28.01	0.173	1.04	0.00	0.00
Hydrogen Sulfide	H2S	0.000	34.08	0.000	0.00	0.00	0.00
Oxygen	O2	0.000	32	0.000	0.00	0.00	0.00
Helium	He	0.000	4	0.000	0.00	0.00	0.00
Hydrogen	H2	0.000	2	0.000	0.00	0.00	0.00
Totals (dry)		100.000		16.648	100.00	1019.44	918.57
Totals (wet)						1001.66	902.55

[1] Standardized to 60°F and 1 atm to match fuel flow data

If total is not 100.000 then the mol% data was either entered incorrectly or the gas analysis is incomplete. Sometimes small differences are due to rounding error.

High Heat Value of dry gas (HHV-dry) This is the primary fuel heat value used in emission testing calculations.

Low Heat Value of dry gas. LHV-dry

High Heat Value of wet Gas. HHV-wet

Low Heat Value of wet gas. LHV-wet

Characteristics of Fuel Gas		
Molecular Weight of gas =	16.648	lb/lb-mole
Btu per lb. of gas =	23239.7689	gross (HHV)
Btu per lb. of gas =	20940.2961	net (LHV)
wt % VOC in fuel gas =	0.83	%
Specific Gravity =	0.5749	

Value used to convert THC readings to VOC.

Component	Weight %
carbon	73.71
oxygen	0.98
hydrogen	24.27
nitrogen	1.04
helium	0.00
sulfur	0.00
Total	100.00

F-Factor (scf dry exhaust per MMBtu [HHV] = 8641.17
(Based on EPA RM-19) at 68°F and 1 atm

Fuel Specific F-Factor. Note that EPA Method 19 lists natural gas's F-factor as 8710.

F-Factor Calculation:

F-Factor = 1,000,000*((3.64*%H)+(1.53*%C)+(0.57*%S)+(0.14*%N)-(0.46*%O))/GCV

%H, %C, %S, %N, & %O are percent weight values calculated from fuel analysis and have units of (scf/lb)/%

GCV = Gross Btu per lb. of gas (HHV)

EXAMPLE TESTING DATASHEET FOR GASES
XYZ Power Plant
GE GTG Frame 7FA Combustion Turbine
Fuel: Natural Gas

Fuel Data

Fuel F-Factor	8,671.5	SCF/MMBtu
Generator Output	172.0	MW
Fuel Flow	515,040.8	SCFH
Fuel Heating Value (HHV)	1,076.5	Btu/SCF
Combustor Inlet Pressure	6,166.5	mm Hg
Heat Input (LHV)	500.6	MMBtu/hr
Stack Moisture Content	8.4	%
Stack Exhaust Flow	13,600,266.4	SCFH

Weather Data

Barometric Pressure	29.11	in. Hg
Relative Humidity	82	%
Dry Bulb Temperature	72	F
Specific Humidity	0.0142443	lb H2O/lb air
Wet Bulb Temperature	68	F

yellow - supporting information
blue - raw testing data
red - final results

Run #1 - 100% High Load

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	SO_2 (ppmvd)	CO_2 (%)
06/27/01 11:47:32	16770	13.57	5.05	-0.38	0.59	0.59	5.09
06/27/01 11:48:02	16800	13.57	5.85	-0.26	0.63	0.63	4.83
06/27/01 11:48:32	16830	13.55	6.37	-0.44	0.71	0.71	4.71
06/27/01 11:49:02	16860	13.54	6.83	0.60	0.83	0.83	4.33
06/27/01 11:49:32	16890	13.55	7.26	0.25	0.99	0.99	4.49
06/27/01 11:50:02	16920	13.55	6.44	-0.24	1.14	1.14	4.64
06/27/01 11:50:32	16950	13.54	6.28	-0.75	1.29	1.29	4.79
06/27/01 11:51:02	16980	13.55	5.68	-0.68	1.46	1.46	4.96
06/27/01 11:51:32	17010	13.58	6.01	-1.14	1.60	1.60	5.10
06/27/01 11:52:02	17040	13.49	5.05	1.36	1.69	1.69	5.19
06/27/01 11:52:32	17070	13.60	5.14	-0.47	1.70	1.70	5.20
06/27/01 11:53:02	17100	13.61	4.58	0.69	1.69	1.69	5.19
06/27/01 11:53:32	17130	13.62	4.93	0.90	1.65	1.65	5.15
06/27/01 11:54:02	17160	13.62	4.69	0.54	1.64	1.64	5.14
06/27/01 11:54:32	17190	13.61	4.83	0.64	1.59	1.59	5.09
06/27/01 11:55:02	17220	13.61	4.76	-0.07	1.60	1.60	5.10
06/27/01 11:55:32	17250	13.64	4.86	-0.02	1.59	1.59	5.09
06/27/01 11:56:02	17280	13.63	4.38	0.92	1.51	1.51	5.01
06/27/01 11:56:32	17310	13.61	4.94	-0.01	1.47	1.47	4.97
06/27/01 11:57:02	17340	13.61	4.89	0.27	1.47	1.47	4.97
06/27/01 11:57:32	17370	13.61	4.82	1.28	1.46	1.46	4.96
06/27/01 11:58:02	17400	13.61	4.69	1.55	1.46	1.46	4.96
06/27/01 11:58:32	17430	13.60	4.23	1.16	1.46	1.46	4.96
06/27/01 11:59:02	17460	13.59	4.69	-0.26	1.46	1.46	4.96
06/27/01 11:59:32	17490	13.57	4.89	-1.46	1.49	1.49	4.99
06/27/01 12:00:02	17520	13.58	4.86	-1.49	1.53	1.53	5.03
06/27/01 12:00:32	17550	13.59	4.79	-0.79	1.53	1.53	5.03
06/27/01 12:01:02	17580	13.58	4.76	-1.57	1.54	1.54	5.04
06/27/01 12:01:32	17610	13.57	4.65	1.17	1.53	1.53	5.03
06/27/01 12:02:02	17640	14.24	4.69	0.01	1.52	1.52	5.02
06/27/01 12:02:32	17670	13.54	4.83	1.68	1.52	1.52	5.02
06/27/01 12:03:02	17700	13.55	5.70	1.31	1.53	1.53	5.03
06/27/01 12:03:32	17730	13.55	5.66	-0.73	1.53	1.53	5.03
06/27/01 12:03:32	17760	13.55	5.04	-0.48	1.53	1.53	5.03
RAW AVERAGE		**13.6**	**5.2**	**0.1**	**1.4**	**1.4**	**5.0**

QA/QC Data Control

		O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	SO_2 (ppmvd)	CO_2 (%)
Bias & Drift Checks	**Initial Zero**	0.2	0.3	-0.2	0.0	0.1	0.1
	Final Zero	0.2	0.5	-0.2	0.2	0.2	0.1
	Avg. Zero	0.2	0.4	-0.2	0.1	0.2	0.1
	Initial UpScale	12.1	5.8	4.0	3.4	28.3	9.0
	Final UpScale	12.1	5.7	4.0	3.3	28.2	8.8
	Avg. UpScale	12.1	5.8	4.0	3.4	28.3	8.9
Upscale Cal Gas		12.0	5.7	4.0	3.5	28.0	9.0

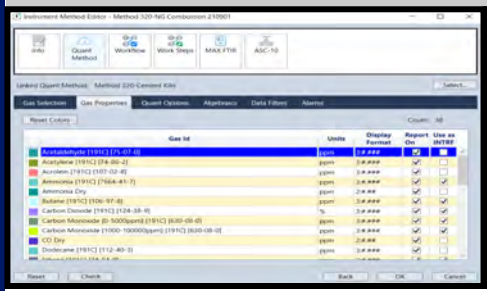
Emissions Data

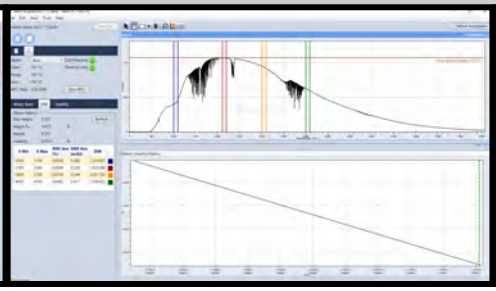
	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvd)*	SO_2 (ppmvd)	CO_2 (%)
Corrected Raw Averages	13.5	5.1	0.3	1.5	1.3	5.0
ppm @ 15% O_2	N/A	4.2	0.2	1.2	1.0	N/A
ppm @ 15% O_2 & ISO	N/A	4.7	0.2	1.4	1.1	N/A
Emission Rate (lb/MMBtu)	N/A	0.015	0.000	0.004	0.005	N/A
Emission Rate (lb/hr)	N/A	8.46	0.27	2.40	2.84	N/A
Emission Rate (ton/year) @ 8760 hr/yr	N/A	37.07	1.20	10.49	12.43	N/A
Emission Rate (g/MW*hr)	N/A	0.06	0.00	0.02	0.02	N/A

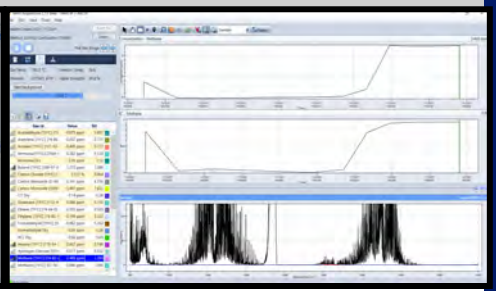
*VOC data in Emissions Data Table has been converted to dry values by the equation below.

*VOC uncorrected raw average * (100/100-stack moisture content)

FTIR TESTING







Why Air Hygiene FTIR Labs are the Solution for your Testing Needs!

- Nine (9) FTIR labs for formaldehyde, VOC's, & HAPS by EPA Method 320/321, ASTM D-6348, and Turbine MACT!
- Real-time data on-site for evaluation!
- On-site draft test reports & final report in 5 Days!
- Catalyst performance analysis (inlet & outlet testing) on-site with real-time data!
- Speciated VOC's on-site!
- STARBOOST - Low Level (ppb) formaldehyde.
- Greenhouse Gases measured real-time, on-site (N2O, CO2, CH4)!
- SCR tuning with point-by-point data, real-time for NH3, NO, & NO2!
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- Tests in all 50 states, Mexico, & Canada!
- Over 25 years of testing in gas industry!

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Remote Office Locations:
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Shreveport, LA
Las Vegas, NV
Austin, TX
Fort Worth, TX
Pittsburgh, PA

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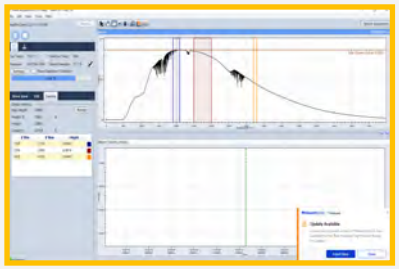
FTIR Compounds

Any gas or liquid compound that absorbs infrared light can potentially be identified and quantified using the FTIR. The gas phase infrared spectral standards are available for the compounds listed below. Reference spectra not included in this list may be already available or can be prepared.

acetaldehyde
acetic acid
acetone
acetonitrile
acetophenone
acrylic acid
acrylonitrile
allyl chloride
2-amino-2-methyl-1-propanol
ammonia
aniline (phenylamine)
arsine
benzene
benzotrichloride
benzyl chloride
beta-propiolactone
bis (chloromethyl) ether
boron trichloride
boron trifluoride
bromoform
1,3-butadiene
1-butanol
butyl acetate
carbon dioxide
carbon disulfide
carbon monoxide
carbon tetrachloride
carbonyl fluoride
carbonyl sulfide
chloroacetic acid
2-chloroacetophenone
chlorobenzene
chloroform
chloromethyl methyl ether
chloroprene (2-chloro-1,3-butadiene)
m-cresol
o-cresol
p-cresol
cumene
cyclohexanone
1,2-dibromo-3-chloropropane
1,4-dichlorobenzene
dichloroethyl ether
1,3-dichloropropene
dichlorvos
difluoroethane
difluoromethane
dimethyl carbamyl chloride
dimethyl formamide
1,1-dimethyl hydrazine
dimethyl phthalate
1,4-dioxane - (1,4-diethylene oxide)
epichlorohydrin
1,2-epoxybutane
ethane
ethanol
ethyl acrylate
ethyl benzene
ethyl chloride (chloroethane)
ethylbenzene
ethylene
ethylene dibromide - (dibromoethane)
ethylene dichloride
ethylene oxide
ethylidene dichloride
fluoroethane
fluoromethane
formaldehyde
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
hexamethylphosphoramide
hexane
hexyl acetate
hydrazine
hydrogen bromide
hydrogen chloride
hydrogen fluoride
isophorone
isopropanol
maleic anhydride
methane
methanol
methyl bromide - (bromomethane)
methyl chloride - (chloromethane)
methyl chloroform - (1,1,1-trichloroethane)
methyl ethyl ketone - (2-butanone)
methyl hydrazine
methyl iodide - (iodomethane)
methyl isoamyl ketone
methyl isobutyl ketone - (hexone)
methyl methacrylate
methyl tert butyl ether
methylene chloride-(dichloromethane)
n,n-diethyl aniline
nitric oxide
nitrogen dioxide
n-nitrosodimethylamine
n-nitrosomorpholine
naphthalene
nicotine
nitrobenzene
2-nitropropane
o-toluidine
oxygen difluoride
ozone
pentafluoroethane
perfluorobutane
perfluoroethane
perfluorohexane
perfluoromethane
perfluoropropane
perfluoropropene
phenol
phosphine
propane
1,2,3-propanetriol w/methyl oxirane
propionaldehyde
propylene dichloride
propylene glycol
propylene glycol methyl ether acetate
propylene oxide
1,2-propylenimine-(2-methyl aziridine)
qinoline
silane
silicon tetrafluoride
styrene
styrene oxide
sulfur dioxide
sulfur hexafluoride
sulfuryl fluoride
1,1,2,2-tetrachloroethane
tetrachloroethylene (perchloroethylene)
tetraethoxy silane (TEOS)
1,1,1,2-tetrafluoroethane
1,1,2,2-tetrafluoroethane
thionyl fluoride
toluene
2,4-toluene diisocyanate
1,2,4-trichlorobenzene
1,1,2-trichloroethane
trichloroethylene
2,4,5-trichlorophenol
triethylamine
1,1,1-trifluoroethane
1,1,2-trifluoroethane
trifluoromethane
tungsten hexafluoride
2,2,4-trimethylpentane
vinyl acetate
vinyl bromide
vinyl chloride
vinylidene chloride
m-xylene
o-xylene
p-xylene

HOW IT WORKS



Fourier Transform Infrared (FTIR) Spectroscopy is used to examine and characterize organic and inorganic materials. Data is produced in the form of a spectrum, with many bands that represent chemical bonding between two particular atoms or a group of atoms in a molecule. The spectrum is subsequently compared to a set of known reference materials for identification and interpretation. As an analytic technique, FTIR has several advantages. It requires only a minute sample. It takes only minutes to conduct and it will work with most liquids or gases. Air Hygiene's sample system incorporates a heated sample pump and conditioning system to ensure data accuracy.

COMPOUND IDENTIFICATION AND DETECTION

The FTIR measures the absorption of various infrared light wavelengths by the material of interest. These infrared absorption bands identify specific molecular components and structures. Air Hygiene uses two different FTIR systems, the MKS2030 and the Max-iR both which are designed to be rugged, precise and mobile. The minimum detection limits (MDL) vary with the compound and the effluent matrix being measured. Typically, MDL's range from 40 ppb to 10 ppm depending on the compound of interest.

Recently, EPA has classified formaldehyde as a probable human carcinogen as formaldehyde exposure has been associated with reproductive effects such as menstrual disorders and pregnancy problems. As a result EPA has proposed to reduce the concentration of formaldehyde in the exhaust from new or reconstructed stationary combustion turbines to 91 parts per billion by volume or less, dry basis (ppbvd), at 15 percent oxygen (if you use means other than an oxidation catalyst emission control device). Air Hygiene uses an intensifying filter in the StarBoost FTIR for high sensitivity measurements of formaldehyde. The MDL for formaldehyde is 40 ppb.

DATA ANALYSIS

The FTIR spectrometer system consists of an interferometer (MKS2030 or Max-iR), a heated sample pump (ASC10), and a computer. With an infrared data station, the computer acquires, processes, stores and retrieves spectral data. Max Acquisition, a powerful new automated, multi-component, quantitative analysis program, is used for analyzing gas phase mixtures in real time. This software also allows for custom methods and individualized interferent recognition to be completed on site to help improve the accuracy of the results proved. Quantitative results, concentration vs. time plots, and spectra can be displayed and updated in real-time for continuous monitoring applications.

The spectra or the interferogram is a permanent record and can be analyzed at a future time to identify and quantify additional compounds not known during the initial testing program. For example, if the sample was tested for only ammonia and formaldehyde, following the test, the tester is able to identify and quantify toluene, benzene, and acetaldehyde without repeating the test. This ability to perform post-test analysis for additional compounds will save you both time and money.

FTIR TRUCK

The FTIR Truck is a mobile FTIR Testing solution that is rugged and compact with the ability to test in some of the most remote locations. This system is fully integrated with stand alone power generation and has the full capabilities of HAPs testing all inside the shell of a Chevy 2500.

QUALITY ASSURANCE

Air Hygiene's goal is to achieve total customer satisfaction by delivering accurate, on-time analyses that meet each client's needs. It is our responsibility to provide each client with quality results. This is accomplished by documenting all facets of the analysis, communicating any questionable or out-of-specification results to the client, following procedures and complying with standards, and auditing data internally.

Testing Solutions for a Better World

Air Hygiene International, Inc. is a privately held professional service firm incorporated on March 1st, 1997. Its mission is to reduce its client's exposures to regulatory, civil, and criminal liabilities related to air emissions through superior testing services, risk identification, and management services. **Air Hygiene** accomplishes this mission by looking beyond mere compliance, toward strategies that encompass potential future liabilities as well as community responsibility.

Headquartered in Broken Arrow, Oklahoma, Air Hygiene serves clients throughout the continental United States as well as internationally. Its client base includes companies from various industries including oil and gas companies, utilities, manufacturers, and others.

Air Hygiene has experienced engine testing teams led by project managers with significant testing experience and a broad understanding of the federal and state regulations. **Air Hygiene** has over fifity (50) combustion emission testing systems. **Air Hygiene** test labs have on-board printers to allow on-site reporting of critical data for the client to review immediately following the testing.

Our pricing and flexibility are second to none (2-2-0). **Air Hygiene** prides itself on testing efficiency and has experience with complex testing. Including formaldehyde by FTIR (EPA Method 320 or ASTM D-6348) to meet RICE MACT, non-methane/ethane VOCs on-site with field GC or FTIR for JJJJ (40 CFR Part 60 Subpart JJJJ), PM, PM-10, & PM-2.5 tests (EPA Methods 1-5, 201a, 202).

Air Hygiene can complete numerous engines in a single day and has experience with testing large engine fleets within short duration or on a repeated schedule to meet periodic monitoring requirements. **Air Hygiene** has eight (8) FTIR labs!

Below are some of AHI's satisfied customers. Please contact us for more information or a quick quotation for your next project!

AIR HYGIENE, INC.

Corporate Headquarters:
1600 West Tacoma Street
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(918) 307-8865
(888) 461-8778

Remote Office Locations:
Chicago, IL
Shreveport, LA
Las Vegas, NV
Austin, TX
Fort Worth, TX
Pittsburgh, PA

RATA TESTING

Why Air Hygiene is the Clear Choice for your next RATA!

- Meets Part 75 AETB requirements!
- On-site draft RATA reports!
- Simultaneous test capabilities!
- Ammonia analysis on-site!
- Time shared CEMS RATA testing!
- RATAs on dilution systems!
- PM_{10}, HCL and Hg RATA testing!
- 3-D Flow RATA testing!
- Quarterly linearity/CGA testing!
- CEMS XML reporting by ECMPS!
- Rush mobilization 24/7!
- 25 QSTI certified managers!
- Over 5,000 RATA tests performed!
- Over 25 years of testing experience!

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Pittsburgh, PA

WWW.AIRHYGIENE.COM

CEMS TESTING EXPERIENCE

Air Hygiene has worked with the following CEMS manufacturers and instrument manufacturers to provide 3rd party certification per 40 CFR Part 60 and Part 75.

CEMS MANUFACTURERS

envea

CISCO

SIEMENS

CEMTEK Environmental

MSI MECHANICAL SYSTEMS, INC.

AMP CHEROKEE

KVB-Enertec

TELEDYNE MONITOR LABS
A Teledyne Technologies Com

Thermo ELECTRON CORPORATION

Monitoring | Solutions
Leaders in Environmental Monitoring Systems & Services

VIM Technologies, Inc.

CEMS ANALYZERS & SUPPORTING EQUIPMENT

Thermo SCIENTIFIC

UNIVERSAL Analyzers Inc.

AMETEK

TELEDYNE TECHNOLOGIES
Everywhereyoulook™

LOGIC BEACH, Inc.

California Analytical Instrumentss, Inc.

ROSEMOUNT® Analytical

Air Hygiene - Accreditation:

The United States Environmental Protection Agency requires that all 40 Code of Federal Regulation (CFR) Part 75 relative accuracy test audits (RATAs), and stack tests performed under 40 CFR Part 75 Appendix E or section 75.19 be performed by an Air Emission Testing Body (AETB) that meets certain competency standards, including experience and knowledge of test methods for individuals conducting the tests.
AIR HYGIENE has 25 QSTI certified personnel that have met this competency requirement!

AIR HYGIENE meets Part 75 AETB requirements and has been granted accreditation by the Stack Testing Accreditation Council (STAC) and is also in conformance with ASTM D7036-04 "Standard Practice for the Competency of Air Emission Testing Bodies." **AIR HYGIENE** has developed an ASTM specific QA/QC plan following ISO 17025; the international standard for quality systems in testing and calibration laboratories; which is used as the basis for accreditation of laboratories.

Training - AIR HYGIENE UNIVERSITY

Personnel's training, through our very own **AIR HYGIENE UNIVERSITY,** is essential to ensure quality testing. Featuring a one -of-a-kind indoor stack available to both employees and customers to help further develop testing knowledge and skills, **AIR HYGIENE UNIVERSITY'S** mission is to define the future of stack testing by creating the best educated work force, solidly grounded in the essential basics of the industry and trained to utilize the latest in revolutionary technology Participants are prepared to pass the Qualified Individual examinations and obtain Federal certifications and have the ability to apply new and refreshed knowledge about each test method to everyday work practices.

Constantly striving to be recognized globally as the worldwide leader in Stack Testing Training, **AIR HYGIENE UNIVERSITY** sets the standard for stack testing training. With a variety of topics that range from Stack Setup to Analyzer Specific Maintenance and Crew Management Techniques to Tips for Better Client Interaction, each graduate of the program is ready to face the ever growing challenges specific to our industry.

AIR HYGIENE UNIVERSITY prepares rookie and veteran stack testers for the QSTI exams by exploring each of the applicable test methods. Students who complete the battery of modules are capable of immediately applying their new found knowledge to practical field applications and also gain important insights that apply to gaining Federal certifications through Qualified Individual examinations.

Testing Solutions for a Better World

Air Hygiene's core philosophy of "Second-to-None (2-2-0)", demands extra mile customer service anchored on dignified character and family-oriented principles to deliver unmatched quality stack testing, worth paying for every time. We utilize revolutionary technology and Air Hygiene University to create the best educated work force to define the future of stack testing.

Providing air emission testing since 1997 and headquartered in Broken Arrow, Oklahoma, **Air Hygiene** provides testing services throughout the continental United States as well as internationally. Its client base includes various industries from oil and gas companies to utilities, manufacturers, and other similar industries.

Air Hygiene has experienced RATA testing teams led by project managers who are QSTI certified with professional engineering backgrounds and a broad understanding of federal and state regulations. **Air Hygiene** has 50 RATA testing laboratories capable of simultaneous testing upon request and can provide an on-site draft of the report immediately following the testing.

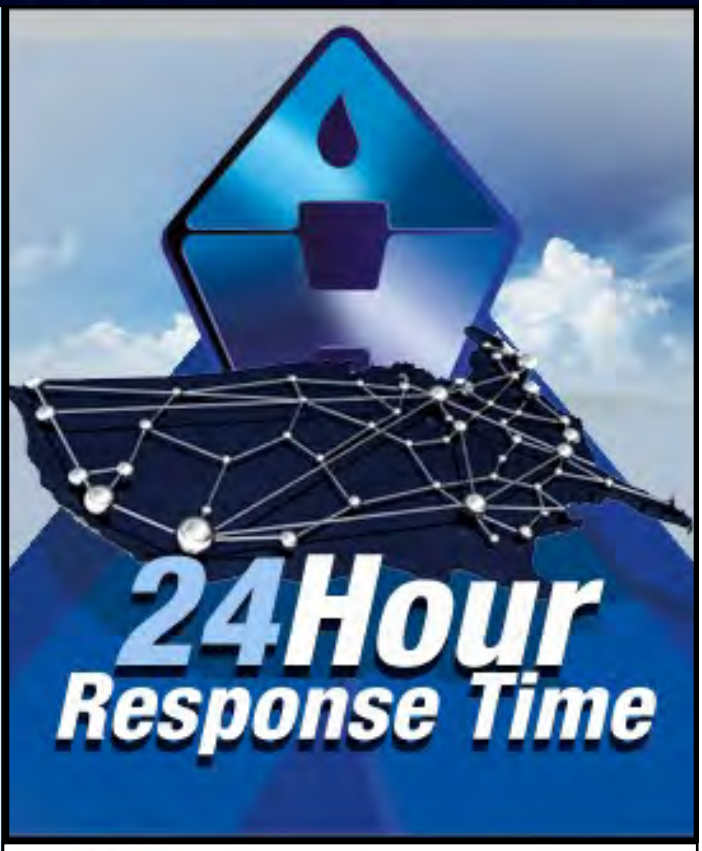
Air Hygiene can perform testing such as an ammonia RATA by CTM-027, Bay Area Method ST-1B and EPA Method 320. **Air Hygiene** will conduct the testing and provide the analysis on-site for immediate results for this important test.

Air Hygiene's pricing and flexibility are second to none. **Air Hygiene** prides itself on testing efficiency and is capable of conducting RATA testing in six (6) hours while efficiently moving to the next unit and performing a second RATA during the same test day.

Air Hygiene frequently performs multiple RATA tests simultaneously. **Air Hygiene** has successfully performed as many as four (4) RATA tests simultaneously meeting 40 CFR Part 60 and Part 75 requirements.

Air Hygiene is capable of short notice mobilization per client request 24 hours 7 days a week! Clients include:

Exxon · Mitsubishi Power · Siemens · Air Products · Black & Veatch · Halliburton · Buzzi Unicem · aps · OGE · Dominion Energy · NV Energy · ODEC · Baker Hughes · CEMEX · LafargeHolcim · Central Plains Cement Company · Oklahoma Natural Gas · DuPont · Gemma



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ENGINE TESTING

Why Air Hygiene is the Solution for your Engine Testing!

- Nine (9) FTIR Labs for formaldehyde, VOC's, & HAPS!
- Thirty (30) test labs providing testing anytime & anywhere!
- On-site draft test reports & final report in 10 Days!
- Catalyst performance analysis (in/out CO) measurement on-site!
- Portable power by on-board generator!
- LDEQ, CARB, & SCAQMD certified!
- Portable analyzer capabilities!
- VOC's by on-site Gas Chromatograph for methane/ethane!
- Part 60 - JJJJ Testing (NOx, CO, VOC)!
- Part 63 - ZZZZ Testing (CO and HCHO)!
- 25 QSTI Certified Personnel!
- Tests in all 50 states, Mexico, & Canada!
- 25 years of testing in gas industry!
- On-site man lift and fuel flow meter provided!

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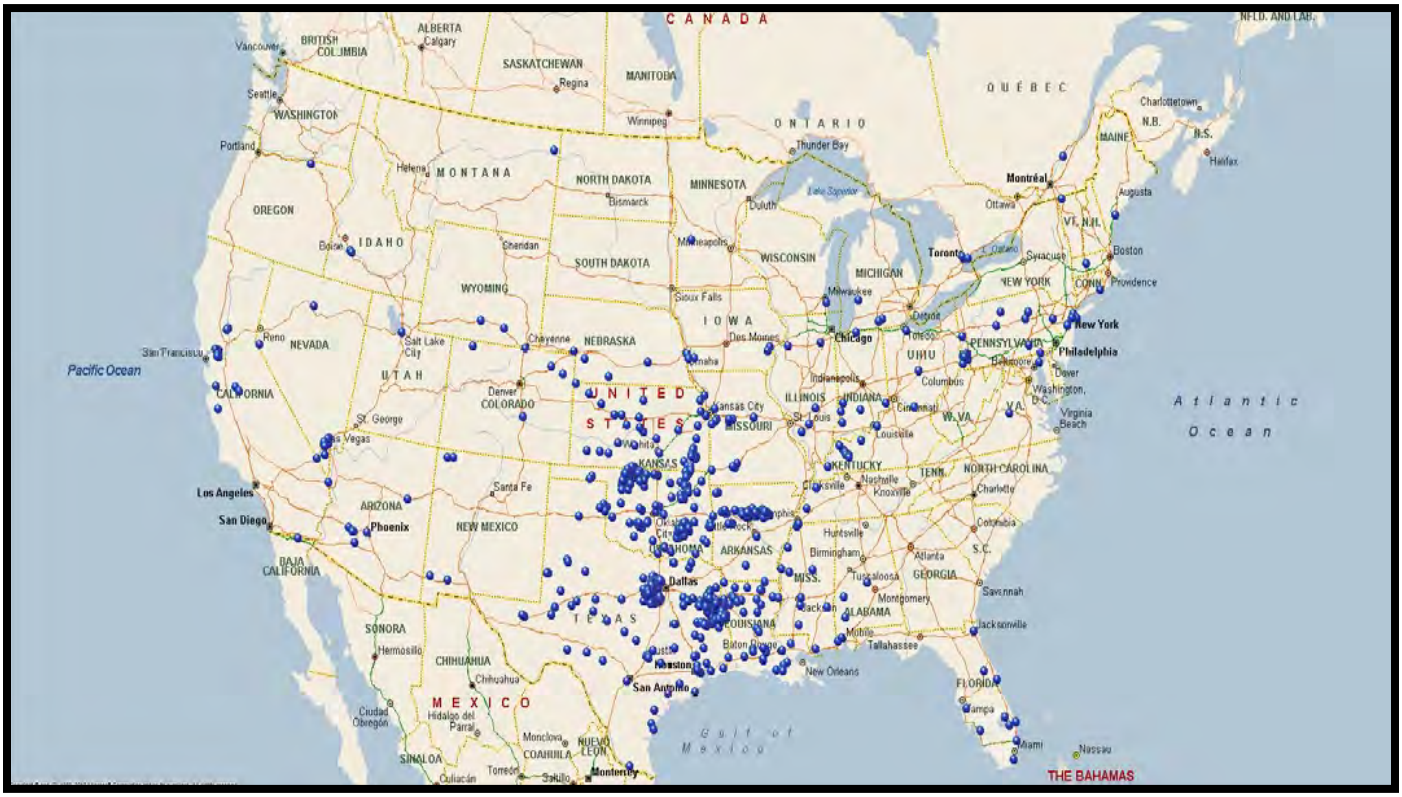
ENGINE TESTING EXPERIENCE

Air Hygiene conducts emission testing nationwide and is familiar with all fifty (50) state agencies and EPA requirements. The map below shows our emission testing project locations across the U.S.

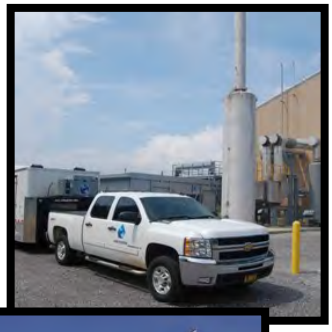


TESTING SUCCESS STORIES

AIR HYGIENE personnel have performed thousands of testing projects which have yielded significant benefits for our clients. The following project descriptions briefly discuss some of these emission testing projects.

- ***Performed testing on 80 engines for EPA MACT Floor testing in Texas, Oklahoma, & Kansas including on-site data for NOx, CO, VOCs, SO2, O2, HAPS including formaldehyde, ammonia, speciated C1—C6, and Greenhouse gases (N2O, CO2, CH4)!***
- ***Currently perform periodic engine testing in 25 states for over 1,500 engines per year following EPA Methods 3a (O_2 & CO_2), 7e (NOx), 10 (CO), 19 (exhaust flow), 18/25a/320 (VOCs), and 320/ASTM D-6348 (formaldehyde).***
- ***Natural Gas Fired Compressor Engines per RICE MACT (40 CFR Part 63 Subpart ZZZZ) for formaldehyde and/or inlet & outlet CO. Selected methods depend on state and client preference.*** Over 1,000 engine tests in 25+ states.
- ***Testing per 40 CFR Part 60 Subpart JJJJ for NOx (EPA Method 7e), CO (EPA Method 10), VOCs (EPA Method 18/25a with on-site GC by VIG 210), O2/CO2 (EPA Method 3a), and exhaust flow (EPA Method 2/4 or 19).***
- ***Combustion Turbine Testing and Add-On Services that include:***
    1. Turbine emission mapping and emission performance testing
    2. R&D emission data research and turbine control optimization
    3. 40 CFR Part 60 Subpart GG – Turbine Compliance Testing
    4. 40 CFR Part 75 – Acid Rain Classified Equipment Testing
    5. RATA Testing on CEMS systems for NOx, CO, SO_2, H_2S, O_2, Flow, and/or CO_2

COMPRESSOR ENGINE TESTING SERVICES



Thank you for your consideration of **Air Hygiene's** engine testing services. The following list details some of the testing services and extras **Air Hygiene** includes with each testing job.

Types of Air Testing Services for Compressor Engines:

- Periodic monitoring for NOx, CO, VOCs, formaldehyde, HAPS.
- Engine Compliance Testing to meet state and federal requirements ZZZZ (RICE MACT), JJJJ Testing, Permit by Rule, Compliance.
- Pre and Post Catalyst testing for pollutant destruction efficiency.
- Engine performance testing to verify manufacturer's emission guarantees.
- Research and Development (R&D) emission data research and engine optimization.
- Initial permit compliance testing for PM, PM-10, PM-2.5, SO_2, NO_x, CO, exhaust flow, moisture, O_2, CO_2, Formaldehyde, other HAPs.

AHI will provide the following on engine equipment tests:

- Our own power supply!
- On-site test data and report!
- Fuel F-Factor calculation data sheet!
- 25 QSTI certified personnel!
- Fuel Flow Meter and On-Site Man Lift!
- Electronic reports provided on CD upon request!
- Extensive experience with all state agencies in the U.S.
- EPA Protocol 1 Certified Gases for precise calibration!
- Low range (0-10 ppm) equipment calibration and measurement available!
- Test protocol preparation, coordination with state agency, and site personnel!
- 50 mobile testing labs, which may be used for your projects across the U.S.!
- State-of-the-art data logging technology to allow real-time examination of meaningful emission data.

Air Hygiene specializes in 40 CFR Part 60 Subpart JJJJ (4J) Testing:

For most 4J testing the scope is 3, 1-hour test runs monitoring for NO_x, CO, VOCs, and O_2. The VOC analysis methodology described in Table 2 of the regulation calls for:

"Methods 25A and 18 of 40 CFR part 60, appendix A, Method 25A with the use of a methane cutter as described in 40 CFR 1065.265, Method 18 or 40 CFR part 60, appendix A, Method 320 of 40 CFR part 63, appendix A, or ASTM D6348–03 (incorporated by reference, see §60.17)".

AIR HYGIENE is capable of meeting this requirement with on-site, real-time data. Our primary option utilizes a VIG 210 VOC analyzer that incorporates the Method 25a and Method 18 technologies into a single analyzer with built in gas chromatograph providing simultaneous data for Methane, Ethane, VOC's, and Total Hydrocarbons. **AIR HYGIENE** can also provide testing by Method 25a total hydrocarbon analyzer coupled with an MKS FTIR analyzer utilizing the Method 320 test technology to determine methane & ethane and provide real-time VOC data. Utilizing either methodology, **AIR HYGIENE** is able to provide you with real-time VOC results on-site.

Converting emission concentrations (e.g. ppm) to emission rates (e.g. lb/hr, g/hp*hr, tpy) is another important 4J field testing consideration. 4J requires that stack exhaust flow be either physically measured utilizing Methods 1-4 or stoichiometrically estimated using Method 19 and a fuel flow meter. Method 19 approach when taken, provides a stoichiometric approach typically resulting in stack exhaust flow rates that are anywhere from five to ten percent lower than the manual measurement approach. This is due to both an over dependence on oxygen content for the Method 19 calculations and the human error aspect coupled with the "puffing" of the engine for the manual measurement calculations.

Testing Solutions for a Better World

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Air Hygiene can complete numerous engines in a single day and has experience with testing large engine fleets within short duration or on a repeated schedule to meet periodic monitoring requirements.

Exxon · Mitsubishi Power · Siemens · Boardwalk Pipeline Partners · MPLX · Halliburton · Flywheel Energy · dcp Midstream · devon · Diamond Offshore · OGE · Buzzi Unicem · Baker Hughes · Cemex · LafargeHolcim · Central Plains Cement Company · Oklahoma Natural Gas (A Division of ONE Gas) · DuPont · XTO Energy

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Air Hygiene University

Air Hygiene University supports the mission and values of Air Hygiene, Inc. and defines the future of stack testing by creating the best educated work force, solidly grounded in the essential basics of the industry and trained to utilize the latest in revolutionary technology.

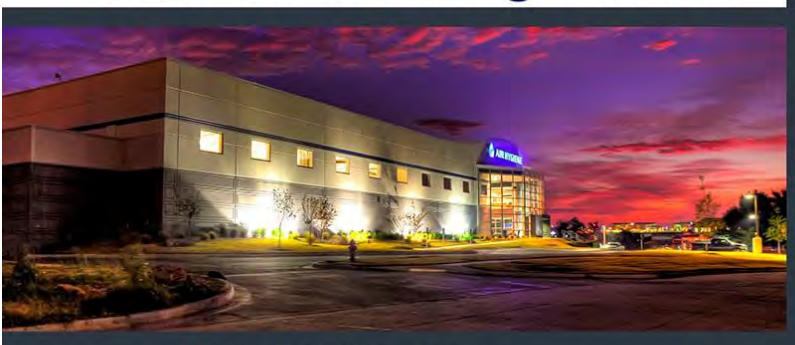
Constantly striving to be recognized globally as the worldwide leader in Stack Testing Training, AHU has developed a baseline foundation and curriculum that allows students to proactively improve; which results in fewer test errors, higher final product quality, reduced staff turnover, and predictable growth potential.

Using a unique indoor emissions testing facility, practice stack, and over 15 years of real-world field testing experience, AHU's class work combines customized training modules focusing on presentation, testing, resource utilization, and hands-on experience.

Luminant · Bechtel · OG&E · aps · JEA · SRP · wfec western farmers electric cooperative · Weatherford · XTO Energy · DEQ Oklahoma Department of Environmental Quality · JW · dcp Midstream · ndep

AIR HYGIENE

AIR HYGIENE
Stack Testing Services



QSTI PREPARATION

Air Hygiene University (AHU), understands stack testing. Combining this understanding of the industry with time proven training techniques, AHU prepares rookie and veteran stack testers for QSTI exams by exploring each of the applicable test methods.

During each class, relationships are established between the format of the QSTI exam and applications of each test method in the stack testing environment. Through this association, participants are prepared to pass the examinations and also to apply new and refreshed knowledge about each test method to everyday work practices.

EXAMPLE CLASSES

- QSTI Preparation
- Portable Analyzer Training
- Basics of Emission Testing
- Stack Test Observer Training
- Basics of CEMS Certifications
- New Stack Tester Basic Training
- Basics of RATA Certification Testing

Air Hygiene University

Thomas K. Graham, PE, QSTI I-IV
Director of Education

1600 W. Tacoma Street
Broken Arrow, OK 74012

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Office: 918-307-8865 / **Fax:** 918-307-9131
Email: tom@airhygiene.com

AIR HYGIENE, INC.

Testing Solutions for a Better World

ONSITE PM AND WET CHEMISTRY ANALYSIS !

Air Hygiene Mobile Lab #701 has TCEQ-NELAP accreditation!
Certified for PM/PM-10/PM-2.5, NH3, HCl, and Hg!

Our Mobile Lab #701 provides On-Site Analysis for MATS requirements and more including:

- **PM, PM-10, PM-2.5!**
- **Total Mercury (Hg)!**
- **Speciated Mercury (Hg)!**
- **Ammonia (NH3)!**
- **HCl! H2SO4/SO3 and more!**

Mobile Lab #701 has already been utilized by numerous clients for projects like:

- **PM correlation testing versus a PM CEMS for on-site rush data!**
- **Hg, HCl, and PM preliminary MATS rule testing!**
- **NH3 and PM rush/on-site analysis for new construction gas fired power plant**

TCEQ/NELAP Certificate #:1M104704523-14-1

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Headquartered in Broken Arrow, Oklahoma, Air Hygiene serves clients throughout the continental United States as well as internationally. Its client base includes companies from various industries including oil and gas companies, utilities, manufacturers, and others.

Air Hygiene has fifty (50) emission testing labs, capable of testing real-time pollution data as well as providing remote transmission of data and continuous, 24 hour testing services to meet the needs of our wide variety of clients.

Our pricing and flexibility are second to none. **Air Hygiene** takes pride in our testing efficiency, incredible service, and flexibility.

Below are some examples of the high level profile customers served by **Air Hygiene.** Please contact us for more information about employment at **Air Hygiene**!

BLACK & VEATCH
BECHTEL
FPL
Kiewit
SIEMENS
ZACHRY
APS
PACIFICORP
MITSUBISHI POWER
Duke Energy
SNC·LAVALIN
TENASKA
CALPINE
AEP AMERICAN ELECTRIC POWER
Bluewater ENERGY
J-POWER Group
OGE
PSEG Keys Energy Center LLC
MCDERMOTT
Luminant

Air Hygiene International, Inc.

www.airhygiene.com
Toll-free (888) 461-8778

For More Information

Please contact:
JJ Cavender, Director of Business Development

E-mail to jcavender@airhygiene.com

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25th ANNIVERSARY AIR HYGIENE SINCE 1997

AIR HYGIENE

Stack Testing You can TRUST!

ACCREDITATIONS:

- **A2LA - TNI FSMO V1 2007, Rev 0.1**
  Certficate No. 3796.01
- **A2LA – ISO/IEC 17025:2005**
  Certficate No. 3796.01
- **A2LA - ASTM D7036 & STAC**
  Certificate No. 3796.02
- **NELAC – TCEQ & VDEQ (fixed PM labs)**
  Certificate No. 1M104704523-15-2 & No. 7809 respectively
- **NELAC – TCEQ & VDEQ (mobile office labs)**
  Certificate No. 1M104704523-15-2 & No. 7810 respectively
- **PADEP – Lab ID: 68-03140**
- **LDEQ – LELAP (Certificate No. 04030)**
- **SCAQMD (Reference #:03LA1017)**
- **CARB**

Headquarters & Training Center:
Broken Arrow, OK

Field Test Offices:
- Pittsburgh, PA
- Shreveport, LA
- Fort Worth, TX
- Las Vegas, NV

CLIENT REFERENCES