

PHARMACEUTICAL AREAS OF EXPERTISE

In an ongoing effort to support our pharmaceutical customers, **AAL** maintains a completely separate laboratory dedicated solely to GMP-level analysis of client samples; with secured sample storage areas and full Quality Assurance review of all data generated for GMP samples.

We have undergone two full FDA inspections in the past six years without a single 483 being issued.

GMP Certified Testing

AAL can perform full GMP analysis to the following international reference standards:

- EP Air, Medicinal
- EP Air, Synthetic Medicinal
- EP Argon
- EP Carbon Dioxide
- EP Helium
- EP Nitrogen
- EP Nitrogen, Low-Oxygen
- EP Nitrous Oxide
- EP Oxygen
- USP Carbon Dioxide
- USP Helium
- USP Medical Air
- USP Nitrogen
- USP Nitrogen, 97 Percent
- USP Nitrous Oxide
- USP Oxygen
- USP Oxygen, 93 Percent
- USP <467> Residual Solvents

EP European Pharmacopoeia (Ph Eur)
USP United States Pharmacopoeia

NOTE: We can also perform testing according to most Japanese Pharmacopoeia (JP) monographs; however, we cannot currently certify gases to JP standards since the JP has not audited our GMP laboratory.

Cylinder Rental & On-Site Sampling

Here at **AAL**, we know that proper sample collection is the most important part of any analytical project. We have a large number of gas sampling cylinders available for purchase or rental, with sizes ranging from 50 milliliters to over 10 liters in volume. Sulfur-inert cylinders are also available for projects requiring ppb-level sulfur detection.



We also have equipment available for liquid-phase gas sampling, particulate measurements in gases, and various liquid and solid media for on-site sample collections.

If you are uncomfortable collecting samples or just want to make sure everything goes smoothly, we can even send one of our experienced personnel directly to your facility to collect samples on-site for you.

We look forward to working with you soon!

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Atlantic Analytical Laboratory



The Gas Testing Experts

Atlantic Analytical Laboratory (AAL) has been performing high-precision gas analysis for our customers for over 45 years, and our knowledgeable management team has well over 100 years of experience in the industry. We have a broad base of clientele including companies in the commercial, industrial, educational, pharmaceutical, and even governmental sectors.

We are fully ISO/IEC 17025 accredited.

Our daily work includes projects from the ordinary to the extraordinary; from testing the carbonated beverages that you drink and the natural gas that heats your house to analyzing the hydrogen fuel for the Space Shuttle and the hydrocarbon mixture used to keep the Olympic Torch lit.

The majority of our work involves analysis of high-purity gases, quantifying impurities to parts-per-million (ppm) levels. But we also analyze complex gas mixtures, such as natural gas and other fuel gas sources.

If you've got a problem with a gas supply cylinder, gas delivery system, process gas, gaseous by-product, outgassing, hermetic device, or exhaust gas, **we can help.**

Read on to learn more about our company.

INDUSTRIAL AREAS OF EXPERTISE

High Purity Gases

AAL can verify gas purities as high as 99.9999% (six 9's) by testing for trace-level impurities using a variety of analytical techniques. We also commonly test pure gases to the following specifications:

Compressed Gas Association (CGA)

- CGA G-4.3 Oxygen
- CGA G-5.3 Hydrogen
- CGA G-6.2 Carbon Dioxide
- CGA G-7.1 Air (SCBA, SCUBA)
- CGA G-9.1 Helium
- CGA G-10.1 Nitrogen

Federal / Military Specifications

- BB-C-101 Carbon Dioxide
- MIL-A-18455 Argon
- MIL-PRF-27201 Hydrogen
- MIL-PRF-27210 Oxygen (ABO)
- MIL-PRF-27401 Nitrogen
- MIL-PRF-27407 Helium

Cryogenic Air Separation Gases

AAL maintains a complete set of analyzers designated specifically for low-level impurity analysis of **cryogenic air separation gases**, including liquid nitrogen (LiN), liquid oxygen (LOx), and liquid argon (LAr).

Beverage Grade Carbon Dioxide

AAL has worked closely with the International Society of Beverage Technologists (ISBT) since the early 90's to help ensure the quality and purity of carbon dioxide for beverage applications; almost all of the methods adopted into their CO₂ Quality Guidelines were developed here.

AAL currently performs periodic CO₂ quality testing for over one hundred different beverage companies worldwide.

Natural & Synthetic Fuel Gases

AAL maintains instruments which are calibrated daily and dedicated solely to supporting our fuel gas customers, who submit a broad range of sample types; including **Biogas, Digester Gas, Landfill Gas, Refinery Gas, Reformer Gas, Liquefied Gases** (such as propane and butane), and other **hydrocarbon-based fuel gases**.

With this equipment, within hours **AAL** can determine the complete composition of your fuel gas including all atmospheric gases, saturated and unsaturated hydrocarbons, and use this data to generate a complete BTU workup – including density, specific gravity, and higher/lower heating values.

AAL also specializes in **ultra-high purity hydrogen analysis for fuel cell applications**; completing parts-per-billion (ppb) level analysis of many impurities due to the extremely stringent specifications for use.

Ultra-Low Level Sulfur Analysis

To complement our fuel gas analytical capabilities, **AAL** also possesses multiple analyzers capable of analyzing **volatile sulfur compounds** from percent (%) levels down to parts-per-billion (ppb) levels. Our sulfur chemiluminescence detectors (SCD's) are calibrated daily to quantitate over 20 different commonly found sulfur impurities.

Specialty Projects

One of our core strengths at **AAL** is our depth of knowledge regarding all aspects of gas-phase analysis, and our ability to apply this experience to solve customer problems.

AAL will work with you to develop **the correct analytical suite to meet your needs**, including appropriate sampling equipment, proper sampling techniques, and **custom report generation to your specifications** at the completion of the project.

Mass Spectrometry

Mass Spectrometry (MS) can identify and quantitate multiple gases simultaneously from less than 10cc of sample volume. Gases such as **hydrogen, nitrogen, oxygen, helium, neon, argon, krypton, xenon, and carbon dioxide** are routinely analyzed from the high percent to the low ppm range. Additionally, the precision of MS allows for the **differentiation of specific gas isotopes**, which have various medical and industrial uses (deuterium, ³helium, ¹³⁵xenon, etc).

Semiconductors/Integrated Circuits

One mass spectrometry technique that **AAL** specializes in is **Residual Gas Analysis (RGA) for internal water vapor content of hermetic devices** used in a wide range of industries. All analyses are performed using our custom-built mass spectrometer sample chamber and inlet systems, which were designed and developed here at **AAL**.

We are currently the only commercial RGA lab that can claim **uninterrupted Suitability** for the US Government's Defense Supply Center Columbus (DSCC) **for over 20 years** using Test Method 1018 of Mil-Std-883/750.

Hermetic Device/Light Bulb Testing

AAL also specializes in mass spectrometry analysis of the internal volumes of medical devices (pacemakers, defibrillators, etc.) and light bulbs of varying shapes and sizes; again using custom-built test chambers designed specifically for this purpose.

AUDITS AND APPROVALS

- US Food and Drug Administration (FDA)
- Defense Supply Center Columbus (DSCC)
 - Coca-Cola® and Pepsi-Cola®

