

EXPERIENCE IN INDUSTRIAL AND ANALYTIC FIELDS

Infrared Industries, Inc. (IRI) was founded in the late 1950s and initially produced infrared detecting elements, instruments, and control systems for the military and aerospace industries. When the company went public in 1959, the initial public offering was a huge success because they were considered a successful “space age” company. Infrared Industries continued to deliver solutions to these markets for many years, but also began to capitalize on that experience in the development of commercial products for the medical, automotive, industrial, analytic, research, petroleum, utilities, and environmental industries.

LEGACY PRODUCTS FOR INDUSTRIAL AND ANALYTIC FIELDS

The first product that Infrared Industries developed that served the industrial market was the **IR-702 Dual-Gas Analyzer**, which was introduced to market in 1974. It was the first dual-gas analyzer of its kind. Infrared Industries also developed these products, which were variations on the IR-702:

- **IR-703 Single-Gas Analyzer**
- **IR-705 Single-Gas Dual-Range Sealed Analyzer**
- **IR-702 and IR-703A Mobile Analyzer**
 - Each analyzer was enclosed in a mobile cart and included a self-contained sample conditioning system.



IR-702 Dual-Gas Analyzer

The **IR-700** series products were the predecessors to the **IR-2003**, which came out in 2003. To stay out in front of the competition, Infrared Industries put all its knowledge and experience to work to produce the most powerful analyzer to date: the **IR-208**, which was released in 2008.

Another legacy product that Infrared Industries developed was the **IR-711 Portable Hydrocarbon Analyzer**. It was used to detect health hazards around fuel tanks and other enclosures and was particularly good at detecting kerosene.



*IR-711 Portable
Hydrocarbon Analyzer*

IRI developed the **IR-7100 Infrared Bench**, **IR-7200 Infrared Bench**, and **IR-7500 Infrared Bench**, which were available in single-gas, dual-gas, and sealed gas configurations.

Infrared Industries was first to market with the **IR-7761**, the first specifically designed **Methane Compensated THC (Total Hydrocarbon) Analyzer**, which was introduced in 1997. This has now been replaced by the **IR-8400DC**, which is the compensated version of the **IR-8400D**.

Infrared Industries developed the **IR-400 Blackbody Series** product line in the 1970s that was used to calibrate guidance systems for rockets and missiles. These products were also widely used for the calibration of radiometers, pyrometers, and infrared detection and measurement systems.

The **IR-2200** started out as a continuous monitoring Oxygen Analyzer. It expanded into an industrial-grade, continuous monitoring electro-chemical gas analyzer to detect and measure any of 11 toxic and hazardous gases. Today, Infrared Industries offers the **IR-2200D Gas Analyzer**, which is described below.

CURRENT PRODUCTS FOR INDUSTRIAL AND ANALYTIC FIELDS

Current Infrared Industries products for industrial and analytic fields include the following:

- **Gas Analyzers**
 - IR-8400D Digital Gas Analyzer
 - IR-208 Gas Analyzer
- **NDIR Optical Benches**
 - IR-510 NDIR Optical Bench
 - IR-400 Series NDIR Optical Bench
- **Sample Conditioners**
 - IR-741 and IR-741XP Sample Conditioners
 - IR-1150 and IR-1151 Sample Conditioners
- **High-Performance Pumps**
 - HM Pumps
 - XD Pumps
 - CEP-1 Pump
 - IR-1050 Centurion Explosion-Proof Pump
- **Filters**
- **InfraView Software**

Infrared Industries Gas Analyzers

Infrared Industries is a leading developer and producer of state-of-the-art gas analyzer instrumentation. The company is widely respected and recognized in the automotive, oil and gas, industrial, environmental, analytic research, and utility industries for its rugged, reliable, accurate, and affordable gas analyzers.

IR-8400D Digital Gas Analyzer

Infrared Industries developed the **IR-8400** in 1984 and it was replaced by the **IR-8400D** in 2002. The **IR-8400** was one of the first analyzers specifically designed to be a continuous emissions monitoring (CEM) analyzer approved for a hazardous environment.

The **IR-8400D** is a Non-Dispersive Infrared (NDIR) gas analyzer, capable of simultaneously monitoring several target gases in a sample stream for extended periods of time. The **IR-8400D Digital Gas Analyzer** is designed specifically for the measurement of Hydrocarbons (HC), Carbon Dioxide (CO₂), Carbon Monoxide (CO), and Oxygen (O₂). The ranges for the **IR-8400D** are specified by customers to meet their unique requirements.



**IR-8400D Digital
Gas Analyzer**

The **IR-8400DC** version offers a Methane Compensation feature, which is able to differentiate between methane and the Total Hydrocarbons (THC). With methane being a naturally occurring hydrocarbon, it is outside the mandatory compliance standards for THC emissions. With the **IR-8400DC's** ability to measure methane independently from the THC reading, it is able to provide the customer with an independent methane reading along with the THC reading. With this information, the methane value can be automatically or manually subtracted from the THC emissions value. With increasingly stringent emissions mandates, the ability to report the actual THC in lieu of the methane elevated values can defer or eliminate additional processes, resulting in substantial savings.

The **IR-8400D** and **IR-8400DC** are well-suited to the industrial and analytical markets because they meet a host of requirements set forth by industry standards. They are suitable for operation in hazardous environments and meet safety standards, accuracy standards, and functionality standards.

The IR-8400D and IR-8400DC meet the following hazardous area definitions and standards:

- Certification for operation in NEMA 7 Class 1, Division 1 hazardous areas
- Explosion-proof enclosure
- Hermetically sealed device (* optional feature)
- Dust-ignition proof and dust-tight
- Intrinsic safety, intrinsic safety barrier, intrinsically safe circuit, intrinsically safe equipment (apparatus, circuits, and wiring), intrinsic safety ground bus, and intrinsically safe system
- RS-232 bi-directional digital communication
- 4-20 mA and 0-100 mV analog outputs

What sets the IR-8400D apart from competitive products?

- The analyzer is encased in explosion-proof housing.
- It has an optional auto-calibration feature. With AutoCal, manual service for scheduled calibration and accuracy checks often required by federal and state municipalities can be eliminated. Even when the unit is located at an accessible site, the AutoCal feature reduces manpower requirements and reduces costs.
- Infrared Industries can add features to the **IR-8400D** if customers need them.
- It meets the requirements for operating in a NEMA 7 Class 1, Division 1 hazardous area.

- The **IR-8400DC** version provides methane compensation, which other companies cannot do.
- Up to 16 analyzers can be viewed, managed, and logged from one PC console with the addition of **InfraView** software.

IR-208 Gas Analyzer

The **IR-208 Gas Analyzer** is the latest evolution of Infrared Industries' industrial/analytic analyzer. Introduced in 2008, it eclipses all of its predecessors. Infrared Industries designed the **IR-208** to be a platform analyzer, allowing it to be specifically tailored to a customer's needs. The customer stipulates which gases they want to measure and over what ranges. The **IR-208** features enhanced capabilities, enabling it to utilize infrared and additional sensor technologies. This enables the **IR-208** to offer the customer a choice of over 250 gases.



IR-208 Gas Analyzer

The IR-208 Gas Analyzer meets the following hazardous area definitions and standards:

- Dust-protected enclosure
- RS-232 bi-directional digital communication
- 4-20 mA, 0-100 mV, and analog DC outputs in the range the customer specifies

What sets the IR-208 apart from competitive products?

- It provides a choice of 250 gases that can be measured.
- Infrared Industries can completely customize the analyzer to the exact gases and ranges the customer needs.
- Up to six gases can be measured by one analyzer.
- Up to 16 analyzers can be viewed, managed, and logged from one PC console with the addition of **InfraView** software.

IR-2200D Gas Analyzer

The **IR-2200D Gas Analyzer** is a continuous monitoring electro-chemical analyzer designed for stability, performance, reliability, and accuracy. It offers three ranges, a digital display, recorder output, and ambient air calibration. Options include an inboard sample pump, 4-20 mA output, dual set-point alarms, and specialized enclosures. It can measure Oxygen (O₂), Carbon Monoxide (CO), Hydrogen Sulfide (H₂S), Nitric Oxide (NO), Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Chlorine (CL₂), Hydrogen (H₂), Hydrogen Cyanide (HCN), Hydrogen Chloride (HC1), and Ammonia (NH₃).

The IR-2200D Gas Analyzer meets the following hazardous area definitions and standards:

- Explosion-proof enclosure (* optional feature)
- Dust-ignition proof (* optional feature)
- Hermetically sealed device (* optional feature)
- RS-232 bi-directional digital communication
- 0-10mV, 0-100 mV, 0-1V, and 0-5V DC analog outputs

- 4-20 mA analog output (* optional feature)

What sets the IR-2200D apart from competitive products?

- It offers, as standard, three ranges: 0-1, 0-10, and 0-25%.
- It has a long life cell design.
- Its performance in terms of speed of response and high accuracy is second to none.
- It has dual set point alarms with separate fail-safe SPDT contact closures.
- It can be built with a choice of standard configuration options: explosion-proof, dust-proof, weather-proof, and open frame custom.
- Up to 16 analyzers can be viewed, managed, and logged from one PC console with the addition of **InfraView** software.



IR-2200D Gas Analyzer

Infrared Industries NDIR Optical Benches

Infrared Industries makes NDIR optical benches for integration into OEM gas analyzer systems. Infrared Industries benches offer a wide range of abilities and features including custom detectors, optical filters, custom samples cells, sources, specialized materials, and mechanical designs.

Infrared Industries was the initial supplier of benches to some of the largest automotive manufacturers in the world during 1970s, 1980s, and 1990s—including North American Draeger, Sun Automotive, Bear Automotive, Allen Test—and has built upon that technology to offer benches today that fit a wide range of needs. Today, Infrared Industries builds OEM benches for Nova Analytical and many other well-recognized and respected companies.

IR-510 NDIR Optical Bench

The **IR-510 NDIR Optical Bench** offers greater design flexibility to OEMs due to its small overall size and low power consumption, combined with the ability for Infrared Industries to customize subsystem designs to OEM specifications. It measures up to three gases simultaneously through NDIR. Two auxiliary sensor inputs are available for use with electrochemical, paramagnetic, or other gas sensor technologies.

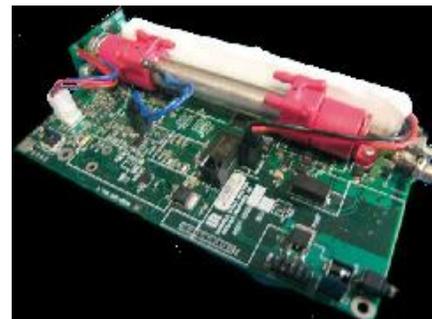
The IR-510 NDIR Optical Bench features the following:

- RS-232 bi-directional digital communication
- 1V, 5V, or 10V DC analog outputs
- 4-20 mA output (* optional feature)
- Onboard data logging

What sets the IR-510 apart from competitive products?

- It provides a choice of gases that can be measured.
- It offers enhanced optics for low-level gas sensing.
- Up to 16 analyzers can be viewed, managed, and logged from one PC console with the addition of **InfraView** software.

Applications for this bench for the industrial and analytic fields include hydrocarbon (HC), carbon monoxide (CO), and carbon dioxide (CO₂) monitoring, process chemical gas analysis, combustion efficiency, controlled atmospheres, and respiration studies.



IR-510 NDIR Optical Bench

IR-410 NDIR Optical Bench

Introduced in 2009, the **IR-410 NDIR Optical Bench** is a state-of-the-art NDIR optical sensor designed to meet worldwide gas measurement standards. Up to three gases can be measured under infrared from a choice of over 250 under infrared technology. The **IR-410** also features two additional optional ports for additional gas sensor inputs.

The IR-410 NDIR Optical features the following:

- RS-232 bi-directional digital communication
- 4-20 mA and 0-100 mV analog outputs (* optional feature)
- 1V, 5V, or 10V DC analog outputs
- Onboard data logging



IR-410 NDIR Optical Bench

What sets the IR-410 apart from competitive products?

- It provides a choice of gases that can be measured.
- It offers enhanced optics for ultralow-level gas sensing.
- Up to 16 analyzers can be viewed, managed, and logged from one PC console with the addition of **InfraView** software.

Applications for this bench for the industrial and analytic fields include hydrocarbon (HC), carbon monoxide (CO), and carbon dioxide (CO₂) monitoring, process chemical gas analysis, combustion efficiency, controlled atmospheres, and respiration studies.

Infrared Industries Sample Conditioners

Infrared Industries produces four sampling conditioners to meet the unique needs of its customers: the **IR-741**, **IR-741XP**, **IR-1150**, and **IR-1151**, which were initially developed in the late 1980s. The sampling conditioners preprocess the sample stream, removing undesirable elements and allowing for additional features in the operation of the analyzers.



IR-741 Sample Conditioner

IR-741 and IR-741XP Sample Conditioners

The **IR-741 Sample Conditioner** is used for both laboratory and industrial low-pressure system applications. It is certified for NEMA 4 enclosures and is available for either corrosive or non-corrosive operation.

The **IR-741XP Sample Conditioner** is for low-pressure system applications requiring NEMA 7 compliance and has an explosion-proof enclosure.

IR-1150 and IR-1151 Sample Conditioners

The **IR-1150** and **IR-1151 Sample Conditioners** are for high-pressure applications and can withstand up to 3000 psi. These two conditioners are constructed of corrosive-resistant stainless steel.

The **IR-1151** incorporates the **IR-1050 Centurion Explosion-Proof Pump**. This system meets NEMA-7 requirements, which includes UL (Class I, Div I, Group B, C, and D), CSA, and ATEX (EExd IIC T4 IP65) classifications.



IR-1150 Sample Conditioner

Infrared Industries High-Performance Pumps

Infrared Industries has designed compact, high-performance diaphragm pumps, available at a competitive price. All of IRI's pumps are balanced to cut down on vibration, reduce noise, and extend the life of the pump.

HM Pumps

There are two versions of the **HM Pump**: the single-headed **HMS Pump** and the dual-headed **HMD Pump**. These are offered in various configurations to meet your needs.

The **HMS Pump** is a brushless DC motor-driven, single-head micro pump that handles liquids or gases. Its compact size allows it to be used in systems where size and weight are a factor. It can be used for vacuum, pressure, or alternating vacuum/pressure operations and in low flow applications. It handles a pressure range of 0-24+ PSIG, vacuum range of 0-20 In Hg, and has a maximum unrestricted flow range of 2.5 LPM.



HMS Pump



HMD Pump

The **HMD Pump** is a brushless DC motor-driven, dual-head micro pump for handling gases and liquids. One head can be used for low flow and one for high flow. Also, one head can be

used for air and one for liquid. Each head can be configured for vacuum operation, pressure operation, or alternating vacuum and pressure operation. It handles a pressure range of 0-24 PSIG, vacuum range of 0-20 In Hg, and has a maximum unrestricted flow range of 5 LPM.

XD Pumps

There are two versions of the **XD Pumps**: the single-headed **XDS Pump** and the dual-headed **XDT Pump**. These are offered in various configurations to meet your needs.

The **XDS Pump** is a DC motor-driven, single-head miniature pump that handles liquids or gases. It can be used for vacuum, pressure, or alternating vacuum/pressure operations and in low flow applications. It handles a pressure range of 0-25 PSIG, vacuum range of 0-25 In Hg, and has a maximum unrestricted flow range of 6.0 LPM.



XDS Pump



XDT Pump

The **XDT Pump** is a DC motor-driven, dual-head miniature pump that handles both gases and liquids. Each head can be configured for vacuum operation, pressure operation, or alternating vacuum and pressure operation. It handles a pressure range of 0-28 PSIG, vacuum range of 0-25 In Hg, and has a maximum unrestricted flow range of 11 LPM.

CEP-1 Pump

The **CEP-1 Pump** is heavy-duty industrial pump designed for applications where extend or continuous operation is required. This pump is of all metal and ball bearing construction featuring a brushless AC motor for long life and a Teflon diaphragm to assure exception chemical compatibility.

This pump handles a maximum pressure range of 23.4 PSIG, a maximum vacuum In HG of 21.4, a maximum flow of 6.8 LPM, a maximum flow of 0.24 CPM, and a maximum BAR of 1.61.



CEP-1 Pump

IR-1050 Centurion Explosion-Proof Pump

The **IR-1050 Centurion Explosion-Proof Pump** is UL and CSA listed Class I, Division 1, Group C and D and Class II, Group F and G certified. It includes explosion-proof motors on your choice of a single-head, double-head, or quad-head pump.



**IR-1050 Centurion
Explosion-Proof Pump**

The single-head handles a pressure range of 6.1-71 PSIG, the dual-head handles a pressure range of 55-75 PSIG, and the quad-head handles a pressure range of 70-75 PSIG, all depending on how they are configured. The single-head has a vacuum range of 8.4-25.2 In Hg, the dual-head has a vacuum range of 24-28.4 In Hg, and the quad-head has a vacuum range of 24.8-29.3 In Hg, depending on configuration. The single-head has a maximum flow range of 9.4-30.2 LPM, the dual-head has a maximum flow range of 51.1-73, and the quad-head has a maximum flow range of 100-142.2, depending on configuration.

Infrared Industries Filters

Infrared Industries makes filters that remove particle sizes down to one micron and coalescing filters for removing water vapor and other contaminants in the sample stream.

Why buy these filters from Infrared Industries? Infrared Industries has spent years perfecting the system for optimal performance and reliability. IRI also makes them in-house so they can offer them at a low cost and the customer gets the convenience and assurance of buying them from a trusted source.



Infrared Industries Filters

InfraView Software



**InfraView Software Manages
Several Analyzers**

InfraView from Infrared Industries is an easy-to-use yet powerful software program for control and display of its industry-leading portfolio of gas analyzers. Up to eight analyzers can be managed and viewed from one PC console, which makes efficient operation possible.

InfraView includes datalogging, which allows unlimited recording of test data to be stored on a PC hard drive. **InfraView** is available for all Infrared Industries gas analyzer models.

Reasons to Choose Infrared Industries

Infrared Industries has many years of experience working with companies—like ALCOA Aluminum—who need the very best process control instruments. IRI reinvests the knowledge gained from that experience back into the products and has honed and refined the technology and end products they deliver to customers.

What are the reasons to choose Infrared Industries?

- Fifty years' experience and industry-leading innovation, which enable Infrared Industries to stay forefront and relevant in meeting customers'—and the market's—needs
- Many years of experience working with universities, research companies, and high-profile and exacting industrial customers
- Customization of products to specific features and options and other customer requirements
- Maintaining quality through manufacturing its own pumps, filters, optics, optical benches, enclosures, and pneumatics
- Passing on cost savings to the customer
- Software developed by Infrared Industries, which is integrated between the bench and analyzer and can be tailored for the customer
- Exceptional and responsive customer support—one call fixes it all
- Outstanding product life and continuity of service, giving you the assurance that your investments with Infrared Industries will be well supported long into the future
- A wide range of products with capabilities not found in competitive products and from one source
- Infrared Industries' extensive and well-regarded background in the aerospace and military industries and conversion of that expertise into civilian products

Applications for Infrared Industries Products

Infrared Industries helps industrial and analytic companies meet federal standards and achieve monitoring to ensure health and safety in any situation where a gas is emitted.

Some applications where Infrared Industries analyzers are being used in the industrial and analytic industries are:

- Compliance testing market in applications such as:
 - Water heaters, gas furnaces, pool heaters, floor waxers, wood stoves, gas stoves, gas fire place inserts, and textiles
- Process monitoring
- Measuring the percent of methane in the gases produced from landfills as garbage decomposes
- Monitoring gases in a clean room where electronics are built
- Monitoring the carbon monoxide produced by forklifts in warehouses

- Measuring cows' methane emissions
- Measuring carbon dioxide content to determine water quality
- Providing safety in university, educational, and multi-user and multi-use laboratories
- Combustion efficiency of burners and boilers and commercial ovens
- Stack monitoring
- Mine safety
- Refineries
- Flue gas monitoring
- Steel production
- Fruit and vegetable storage
- Respiration studies
- Greenhouses, fermentation, carbon dioxide and oxygen based ventilation, and other controlled atmospheres
- Atmosphere analyzers used in heat treatment furnaces

Future Plans

Infrared Industries is developing the next generation of environmental monitors, which will have the ability to measure more gases over a wider diversity of ranges within a single analyzer. The future of the market is multi-gas digital analyzers with software integration, which will be a real boon to the customer in cost savings and flexible functionality. Infrared Industries will continue to be on the leading edge of this new wave of environmental monitoring instruments for the industrial and analytic markets.

Bringing You Tomorrow's Technology...Today

Infrared Industries combines over 50 years of experience and innovation with cutting-edge technology, comprehensive manufacturing capabilities, and personalized service to optimize your organization's competitive edge.

We help you verify that you meet federal compliance standards for emissions, improve processes, cut operating costs, and capitalize on untapped opportunities for profit such as landfills where garbage naturally decomposes into methane gas that can be measured and sold.

Improving processes, cutting costs, realizing new profit streams...it all starts with measuring the things you can't see. And that all starts with Infrared Industries—bringing you tomorrow's technology...today.