

Complex  
measurement  
challenges now  
have a Single  
Source Solution



**CleanAir**<sup>®</sup>  
*Engineering*

- ***Fugitive Emissions***
- ***Leak Detection***
- ***Fenceline Monitoring***
- ***Greenhouse Gases***
- ***Hazardous Air Pollutants***
- ***Flare Performance Testing***
- ***Real-Time Process Gas Analysis***
- ***Cloud-Based Remote Monitoring***

Our ultimate goal is to generate high quality data that will form the basis for sound environmental and/or process decisions.

Industry today faces ever-changing and increasingly complex regulatory requirements for air emissions. Every day, the engineers and scientists at Clean Air Engineering apply decades of experience to help our clients understand and comply with these requirements. Our expertise includes assisting clients with permitting issues, regulatory negotiations and consent decrees, training, and of course, air emissions testing and monitoring.

Our years of experience and extensive involvement with resolving air pollution issues have put us in a unique and enviable position. We are uniquely qualified to assist you with selecting the emissions management options that meet or exceed EPA expectations. From an endorsement perspective to a future rule-making perspective, CleanAir has been an integral participant in high profile EPA/Department of Justice Consent Decree negotiations.

We have also developed white papers and provided our research to support industry positions and our customers. These efforts have led to achievable, science-based settlements that have helped our clients retain the flexibility they need to meet their compliance obligations more cost-effectively. Since our founding in 1972, our philosophy has been to seek out innovative technologies that can be applied to the often-complex measurement challenges of our customers.

Our ultimate goal is to generate high quality data that will form the basis for sound environmental and/or process decision. At times, this involves developing new methods of using advanced monitoring techniques in client applications. With our experienced staff of environmental engineers and scientists, we are not only excited by these challenges – we thrive on them.

No matter how complex or challenging your monitoring needs, you can count on CleanAir measurement technologies in a broad range of ambient and industrial applications. Our service commitment to you is simple: Performance Beyond Measure.

# Open-Path or Extractive FTIR Monitoring



Any monitoring method that aims to provide real-time analytical data must be fast, accurate, sensitive, and reliable. CleanAir offers real-time monitoring of up to 200 different gases including organics, inorganics, acids and volatile organic compounds (VOCs) using Fourier Transform Infrared (FTIR) monitoring technology as part of an open-path or extractive monitoring system.

Our FTIR monitoring systems offer automated calibration covering a wide range of analytes, and are capable of autonomous operations in even the most extreme weather conditions. While the open-path FTIR monitoring system transmits an infrared beam of light through the air and captures this beam after traversing the air mass, the extractive FTIR system uses a sampling pump to pull ambient air or sample gas extracted from an industrial source through an internal sampling cell for detection.

For more information and access to downloadable documents detailing the respective advantages of each system, please visit: [www.cleanair.com](http://www.cleanair.com)

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CleanAir offers  
real-time  
monitoring  
of up to 200  
different gases.

## Applications

- Fenceline Monitoring
- Leak Detection
- Fugitive Emission Rates
- Accidental Release Detection
- Greenhouse Gases
- Hazardous Air Pollutants
- Source – Level and Process Measurements

## Features

- Field-proven and rugged systems able to withstand extreme weather conditions
- Monitors up to 50 compounds in real-time
- Alarm capability for each compound
- Remote monitoring and control
- Fully automated calibration
- Open-path system: measurement path ranges from 10 m to 1000m with ability to monitor multiple paths
- Extractive system: 5 cm to 80 m path length cells available

# Open-Path or Extractive UV-DOAS Monitoring



## Applications

- Fenceline Monitoring
- Leak Detection
- Fugitive Emission Rates
- Accidental Release Detection
- Hazardous Air Pollutants
- Source – Level and Process Measurements

## Features

- Field-proven and rugged systems able to withstand extreme weather conditions
- Monitors up to 20 compounds in real-time
- Alarm capability for each compound
- Remote monitoring and control
- Fully automated multi-compound calibration
- Open-path system: measurement path ranges from 10 m to 1000m.
- Extractive system: 5 cm to 32 m path length cells available.

Differential Optical Absorption Spectroscopy in the Ultraviolet region of the spectrum (UV-DOAS) provides superior sensitivity for compounds such as benzene, toluene, ethyl benzene, xylene (BTEX) as well as nitric oxide, nitrogen dioxide, sulfur dioxide and chlorine, among others. CleanAir offers real-time monitoring of UV-DOAS specific target compounds using a monitoring system that can simultaneously detect and measure up to 20 gaseous compounds over a path range up to 1000 meters.

UV-DOAS determines concentrations of trace gases by measuring their absorption features in the ultraviolet spectral region. In an open path UV-DOAS system, UV light is transmitted through ambient air. In an extractive UV-DOAS system, sample gas is pulled via a sampling pump through an internal sampling cell for analysis. The sample gas can consist of ambient air or originate from industrial sources. Wide concentration ranges can be addressed by a variety of interchangeable sampling cells with different path lengths, covering source-level and ambient concentrations.

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UV-DOAS offers  
real-time monitoring  
for BTEX compounds.



## Applications

- Flare Performance Testing
- Combustion Exhaust Plume Emissions

## Features

- Remote detection of target compounds
- Monitors up to 20 compounds in real-time
- High quality telescope allows for large stand-off distances

Traditional extractive sampling methods collect gases from within a stack before they are released into the atmosphere. However, for some emission sources, such as flares, those traditional methods are impractical to conduct. CleanAir offers real-time remote sensing of flare and other combustion exhaust plume emissions using Passive Fourier Transform Infrared (PFTIR) technology.

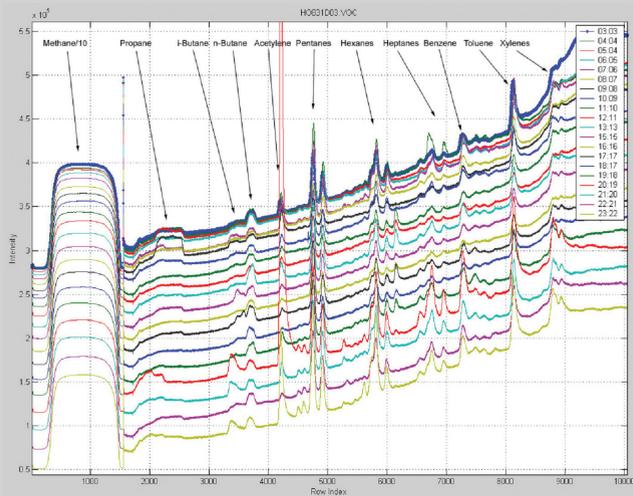
PFTIR technology not only reduces the need for monitoring manpower, it eliminates many of the difficulties of working in challenging conditions and allows for the cost-effective, continuous sampling of flare emissions at a safe distance. Compounds of interest can be determined from the absorbance spectrum, allowing the remote sensing of emissions from hot exhaust plumes.

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The PFTIR system is the perfect means of testing flares when traditional methods are impractical.

# Pneumatic Focusing Gas Chromatography



Using proprietary monitoring techniques, CleanAir can help you analyze samples for a wide range of volatiles. We now offer continuous monitoring for ambient volatile organic compounds (VOCs), Hazardous Air Pollutants (HAPs) and ozone precursors using Pneumatic Focusing Gas Chromatography (PFGC). PFGC is an online gas chromatograph that compresses a gas sample prior to analysis. This pressurization concentrates (focuses) the sample and removes water vapor, which otherwise can interfere with the analysis. This monitoring method is near real-time, accurate, simple, highly sensitive, and easily automated. As a result, it yields continuous, ambient-level, high-quality data.

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This monitoring method is near real-time, accurate, simple, highly sensitive, and easily automated.

## Applications

- Low level VOC and HAP Monitoring
- TO-14A Alternative
- Ozone Precursor Monitoring
- Reduced Sulfur Compounds
- Fluorinated Greenhouse Gases

## Features

- Direct-sampling method (no sample handling, no storage, no adsorbents, no cryogenic sample preparation)
- Near real-time monitoring with TO-14A sensitivity at a fraction of the cost
- High sensitivity, e.g. 50 pptv for Benzene
- High precision
- Field-proven and rugged
- Automatic, internal, multi-compound calibration
- Available with conventional and non-conventional detectors, e.g., FID, PID, PFPD



CleanAir offers real-time monitoring of process streams by applying Raman spectroscopy to gas analysis. This powerful technique can be used for both qualitative and quantitative analysis. It measures target compounds by detecting radiation scattered by these compounds when exposed to an incident laser light beam, typically in the visible region of the spectrum. Applying Raman spectroscopy to process gas streams allows for a rapid characterization of gas composition.

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This powerful technique can be used for both qualitative and quantitative analysis.

## Applications

- Continuous Flare Vent Gas Composition Monitoring
- Real-time Analysis of Industrial Gas Streams
- Dynamic Process Control
- Continuous BTU Content Monitoring

## Features

- Measurement range from ppm levels to 100%
- Full characterization of process gas stream including nitrogen, hydrogen and oxygen
- Alarm capability for each compound
- Remote monitoring and control
- Built for continuous unmanned operation
- Automatic calibration

# Cloud-Based Remote Monitoring



CleanAir has added secure cloud-based remote monitoring to its advanced lineup of services. This highly sophisticated offering allows for the more effective management of all monitoring technologies. The ever-expanding lineup of CleanAir services also includes: cloud-based data hosting, and customizable web-based data visualization and reporting on a variety of platforms, including mobile devices.

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This highly advanced offering allows for the more effective management of all monitoring technologies.

## Applications

- Fenceline Monitoring
- Video Monitoring
- Ambient Air Monitoring

## Features

- Web-based monitoring software and data visualization
- Cloud-Based data hosting and management
- Extensive Alarm Capability with SMS, Email, and Phone Alerts
- Remote monitoring and control
- Optimized for mobile & touch enabled devices.



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