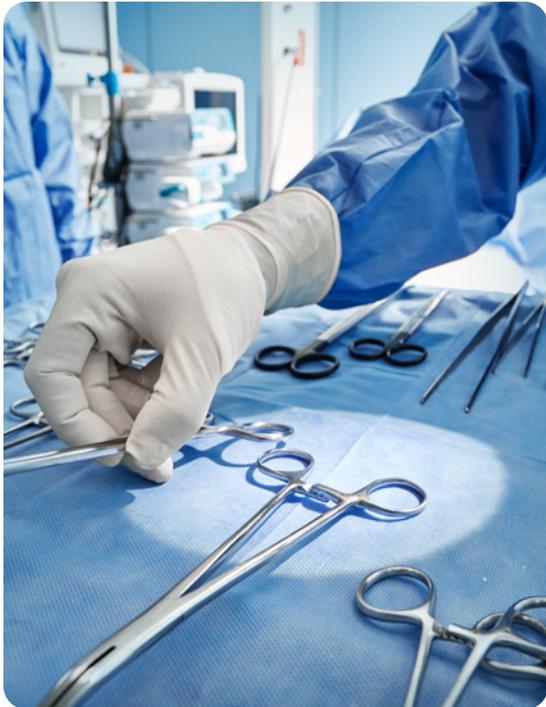




The future of real-time
environmental data monitoring



Real-Time Ethylene Oxide Monitoring



“Understanding how much EtO is in the air and where is an important step to helping communities have a better understanding of their risk and to reducing emissions to protect health.”

Environmental Protection Agency*

The EPA has finalized stricter limits on how much ethylene oxide commercial sterilizers can release into the outside air

Recent National Emission Standards for Hazardous Air Pollutants (NESHAP) are intended to reduce emissions of ethylene oxide (EtO) while the future Interim Decision (ID) will reduce risk to workers.

Montrose Environmental Group and Thermo Fisher Scientific have collaborated to provide an all-encompassing solution for organizations facing challenges with indoor and stack EtO emissions monitoring, testing, and regulatory compliance. Montrose has integrated its project services expertise, the Sensible Environmental Data Platform (EDP), and Thermo Fisher's StarBoost™ Optically Enhanced MAX-iAQ™ OE-FTIR Gas Analyzer and EMS-10 Continuous Emissions Monitoring System. This powerful combination enables clients to monitor emissions in real-time while streamlining compliance efforts and maintaining safe operations.

NESHAP Continuous Compliance Requirements

- Continuous Emissions Monitoring Systems (CEMS) are required for facilities that use 100 pounds per year of EtO or more
- Control device outlet and inlet CEMS are required because all standards are efficiency standards
- Site Wide Emissions Limit (SWEL) provides an alternative means of complying with the stringent efficiency standards
- Option for SCV inlets allow EtO to be calculated based upon the EtO usage (scales/ flow meters) and the other inlet streams (if any)
- Each CEMS must include EtO and volumetric flow
- Allows the time sharing of one instrument to monitor multiple locations if meeting PS 19 requirements
- CEMS data must be reported electronically on a quarterly basis through EPA's CEDRI website

A Comprehensive Solution for Indoor Air Quality & Stack Emissions Monitoring



The combination of Thermo Fisher's advanced technology and Montrose Environmental Group's expertise in air quality monitoring creates a comprehensive solution for organizations to tackle the challenges of EtO emissions monitoring, regulatory compliance, and maintaining safe operations.

Thermo Fisher Scientific boasts 25+ years experience making monitoring instrumentation. Combined with Montrose Environmental's Air Quality Services division, customers have access to multiple service and support locations. Cutting edge technology achieves detection levels of <1ppb as required to comply with stringent federal regulations, while its high sensitivity and accuracy enable organizations to detect and measure EtO emissions in real-time—ensuring adherence to the most stringent regulatory requirements.



Did you know...

According to the Food and Drug Administration, EtO is currently used to treat approximately 50 percent of sterile medical devices, about 20 billion medical devices annually. For some devices, EtO is the only safe and effective sterilization method currently available.*



Ensuring Precision and Reliability: Max-iR FTIR Gas Analyzer

- StarBoost™ Optically Enhanced (OE-FTIR)
- 50x lower MDL compared to other FTIRs
- MDL of <1 ppb
- Wide dynamic range from <1 ppb to 10,000 ppm allows for inlet/outlet monitoring
- FTIR technology suitable for high moisture stack environments as well as indoor air



MAX-iQ™ OE-FTIR Continuous Monitoring System

The MAX-iQ™ is a fully automated 20-channel ambient air monitoring solution for low-level detection of EtO, even in high humidity environments. It can quantify EtO to a detection limit of 1 ppb using advanced StarBoost™ technology while maintaining short cycle times. It is also designed to operate as a continuous monitor with little-to-no user interaction.



MAX-EMS-10™ OE-FTIR Continuous Monitoring System

The EMS-10™ Continuous Emissions Monitoring System (CEMS) is a fully automated 4-channel stack emission monitoring system designed specifically for hot wet samples. The EMS-10 system can quantify ethylene oxide down to a detection limit of compounds down to a detection limit of 1 ppb and as high as 10,000 ppm while maintaining short cycle times, using advanced OE-FTIR spectral analysis and Thermo Scientific™ StarBoost™ Technology. This makes the EMS-10 an ideal alternative to Cavity Ring-Down Spectroscopy (CRDS) based systems that typically have a very limited measurement range.



MAX-iR Mobile Monitoring

The MAX-iR FTIR Gas Analyzer with Thermo Scientific Starboost™ Technology is at the core of every mobile cart system and is typically configured with Automated Sample Console (ASC-10) and the Thermal Oxidizer Module (MAX-OXT). In combination with a cart and laptop, these three modules can be arranged and optimized for many monitoring applications including low-level detection of ethylene oxide and other hazardous gases in stack emissions, indoor air quality, and at the facility's fenceline.



Montrose PTR Van

Unmatched Innovation—Mobile Laboratory Solutions

Montrose uses the most advanced Proton Transfer Reaction Time-of-Flight Mass Spectrometer (PTR-TOF-MS) instrumentation available today—our PTR mobile monitoring solution (PTR Van). With Sensible EDP's PTR Van, you have an on-the-go, mobile laboratory solution for real-time detection of organic and inorganic compounds at parts per trillion (ppt) levels. The PTR mobile solution provides precise measurements to accurately identify and measure fugitive emissions, indoor air quality, or map a city or community for background levels of ethylene oxide.

Additional Services for Emissions Monitoring

Montrose and Sensible EDP deliver a broad range of services for EtO sterilization facilities and chemical manufacturing plants. We offer expertise in air quality measurement with the most innovative, emerging technologies in ambient, fenceline, and community air monitoring. Our expanded service expertise includes real-time software (via the environmental data platform), source testing, laboratory analysis, CEMS installation, and regulatory compliance assistance. With a collection of services encompassing air quality monitoring, our customers receive full, end-to-end service with a partner they can trust.



Fenceline Monitoring

Advanced Fenceline Monitoring

Various regulations such as the refinery fenceline rule and the proposed Hazardous Organic NESHAP, as well as consent decrees and Section 114 requests, require fenceline monitoring. Through Sensible EDP, we integrate various advanced techniques that provide, actionable data, collected along a facility fenceline. Whether it's real-time data collected to meet a regulatory requirement or consent decree, or data collected to support a fenceline program involving sample collection and analysis, Sensible EDP utilizes the most current technologies to ensure you stay compliant with regulations, while also remaining cost-efficient.

Passive Tubes and Canister Sampling

Fenceline monitoring for EtO uses evacuated canisters for sample collection with analysis as outlined in EPA Method TO-15 and EPA Method 327. **Montrose's NESHAP-accredited subsidiary, Enthalpy Analytical, can provide turnkey support for fenceline monitoring programs—from siting of canisters, to collection, sampling, analysis and reporting. The sampling and analytical methods pioneered by Montrose and Enthalpy currently operate in multiple programs nationwide.**

Ruling	How Sensible EDP & Montrose Can Help
NESHAP	Continuous Emissions Monitoring Systems (CEMS) for EtO down to less than 1 ppb with volumetric flow
PID (soon to be ID)	Indoor Air quality monitoring and alerting down to 1 ppb
AQMD RULE 1405	CEMS, fence-line monitoring using TO-15 or continuous monitoring systems, and mobile monitoring using our PTR-MS mobile van
Method 320 (FTIR)	Stack testing services for documenting your compliance status and certifying your CEMS

Why use Sensible-EDP for EtO Monitoring?

- **Rapid Installation Timeframe:** Hardware lead time 12-16 weeks; PO to active monitoring is approximately 25 weeks.*
- **Proven Technology:** Various industries has relied on FTIR for over 25 years to monitor difficult gases. Updated Optically Enhanced FTIR offers a multitude of additional benefits.
- **User-Friendly:** Our system features automated QA/QC procedures per EPA methodology, making it very easy to use.
- **High Reliability:** With over 99% uptime, our system surpasses the NESHAP requirement of 90%.
- **Single-system Design:** One system handles both inlet and stack monitoring ranging from <1ppb up to 10,000ppm (1%).
- **Regulatory Compliance:** Our solution meets PS-19 standards.
- **Partnership with Thermo Fisher Scientific:** The combined expertise and reputations of Montrose and Thermo Fisher provide superior EtO monitoring.
- **Comprehensive Services:** Montrose can handle all aspects of Ethylene Oxide compliance due to our specialization in stack and air quality monitoring.
- **Dedicated Support:** Our Specialty Monitoring Services team is dedicated to installation and ongoing support and backed by Thermo Fisher.

Choosing the Sensible Environmental Data Platform and Thermo Fisher for continuous emissions monitoring of ethylene oxide offers customers the benefits of stability, extensive resources, advanced technology, industry expertise, and superior customer support. These advantages ensure reliable, effective, and compliant monitoring solutions, setting Montrose Environmental Group apart from other industry competitors.

Need assistance with your EtO monitoring solution? Let Sensible EDP and Montrose Environmental Group help you revolutionize your environmental data monitoring needs.

Contact us or visit us online at sensible-edp.com.

