US EPA ARCHIVE DOCUMENT

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Fenceline Monitoring Technologies Overview

U.S. EPA Technology Market Summit
American University
May 14, 2012

Mike Nemergut
Vice President/General Manager
Air Quality Instruments

We are the World Leader in Serving Science

We are the leading provider

of analytical instruments, equipment, reagents and consumables, software and service for research, analysis, discovery and specialty diagnostics

Global Scale

- 39,000 employees in 40 countries
- $12 billion in annual revenues
- Unparalleled commercial reach

Unmatched Depth

- Innovative technologies
- Applications expertise
- Laboratory productivity partner

Leading Brands

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Fisher Scientific

Unity™ Lab Services

We enable our customers to make the world healthier, cleaner and safer

Air Quality Monitoring Market Segments

Industrial Hygiene

- Gas & Particulate Analysis and Detection
- Monitoring for known gases or filed emergency response detection.

Ambient Air

- Particulate & Gas Monitoring
- U.S. EPA and Internationally approved methods

Source

- Continuous Emissions Monitoring Solutions
- World renowned ***i***Series Platform

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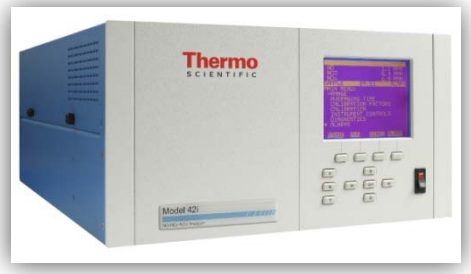
Instrumentation

- SO_2, NO_X, CO, O_3
- HCL, H_2S, NH_3
- CO_2, CH_4, N_2O
- Hydrocarbons
- Toxic Chemicals
- Particulate Matter



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Stationary and Mobile Ambient Monitoring of Gases

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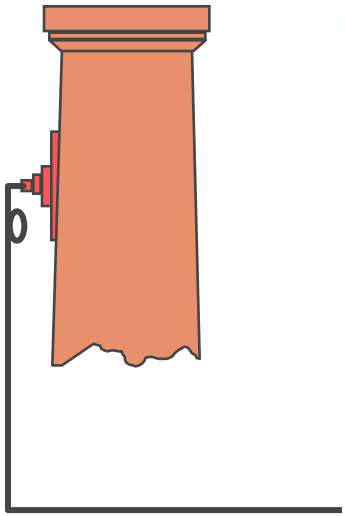
Continuous Emissions Monitoring of Source Gases



- Exceptional measurement reliability
- Installation simplicity and application flexibility
- Broad range of detector technologies
- Comprehensive diagnostics
- Field proven system accuracy

40 Years of Regulatory Instrumentation Development

iSeries Source & Ambient Gas Analyzers
U.S. EPA Reference Method

U.S. EPA Designated
Partisol iSeries Samplers

Mercury Freedom System
Utility MACT Ready

TEOM 1405 Series
U.S. EPA PM
Equivalent Monitors

MSHA and NIOSH Approved
PDM3600 Personal Dust Monitor

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History of Leadership in Addressing Global Air Quality Regulations

Continuous Emissions

Leader in gas analysis and particulate monitoring

Ambient Air Monitoring

U.S. Regulatory Milestones

1970	Clean Air Act (CAA)	CAA Acid Rain Program	Fine Particulates	Clean Air Mercury Rule	2012	Greenhouse Gases Utility MATS Rule*

- 1st supplier for 1970 Clean Air Act
- Industry-leading technologies, performance and data capture
- Manufacturing and integration capabilities in U.S., Europe, China and India
- Close cooperation with regulatory authorities, research institutes and industry leaders to clearly understand monitoring needs

Broad capabilities for current and future air quality regulations

**Mercury and Air Toxics*

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Fenceline Monitoring Applications Overview

Industry	Application(s)	Pollutants Of Interest	Thermo Scientific Measurement Technologies
Petrochemical/Refining	Plant perimeter monitoring Tank farm monitoring Fugitive Emissions Monitoring	VOCs	Portable/Fixed FID/PID MS/MS
Animal Feeding Operations	Air emissions monitoring	H2S, PM, NH3, N20, VOCs	Pulsed Fluorescence TEOM/ Beta Attenuation Chemiluminescence FID Tunable Diode Laser
Environmental Remediation	Site perimeter monitoring	PM, Multi-metals, VOCs	Nephelometry/TEOM/ Beta Attenuation X-ray Fluorescence MS/MS
Iron and Steel	Plant perimeter monitoring	PM, Multi-metals	Nephelometry/TEOM/ Beta Attenuation X-ray Fluorescence
Landfills	Air emissions monitoring Leak testing	CH4	FID TDL NDIR Catalytic Bead

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Applications Back-Up

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Site Remediation Monitoring Tools

- Light Scattering Nephelometry as used in the **Area Dust Monitor ADR1500** provides immediate response to high dust excursions, permitting timely notification and corrective actions
- The **TEOM 1405 Series** of monitors provides highly accurate NIST Traceable PM-2.5 direct mass measurement
- Beta Attenuation technology, utilized in the **5014i Beta Monitor**, offers a balance between improved accuracy and cost
- The **Toxic Vapor Analyzer, TVA1000B** offers the combination of PID/FID based VOC detection capabilities.

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Fugitive Emissions Monitoring Tools

- The **Toxic Vapor Analyzer, TVA1000B** offers dual detection (FID / PID) in a portable intrinsically safe instrument and provides field detection of organic and inorganic compounds
  - Used in conjunction with metrological station to determine source of emission
  - 3.5 second response time provides immediate notification of gaseous releases
  - FID extremely stable for longer term monitoring

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Landfill Monitoring Tools

- The **Toxic Vapor Analyzer, TVA1000B** offers dual detection (FID / PID) in a portable intrinsically safe instrument and provides field detection of both naturally occurring methane and potentially dangerous inorganic compounds

- Mid-IR Tunable Diode Laser Absorption Spectroscopy (TDLAS) technology used within the **IRIS Series of analyzers** for CH_4 and N_2O monitoring

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Animal Feeding Operation Monitoring Tools

- U.S. EPA Designated **NO-NO_2-No_x Model 42i Analyzer** bench utilized for NH_3 ambient monitoring within the **Model 17i**.
- U.S. EPA Designated **SO_2 Model 43i Analyzer** bench utilized for H_2S ambient monitoring.
- Mid-IR Tunable Diode Laser Absorption Spectroscopy (TDLAS) technology used within the **IRIS Series of analyzers** for CH_4 and N_2O monitoring
- Stationary **FID Analyzer** used for CH_4/NMHC monitoring

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Iron & Steel Plant Perimeter Monitoring Tools

- The **TEOM 1405 Series** of monitors provides highly accurate NIST Traceable PM-2.5 direct mass measurement

- Beta Attenuation technology, utilized in the **5014i Beta Monitor**, offers a balance between improved accuracy and cost

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