

Open Path Detection Capabilities of Cerex UVDOAS and FTIR

		AirSentry FTIR	UV Sentry (Deuterium - 100m)	UV Sentry (Xenon - 1000m)			
Criteria	Sulfur Dioxide	✓	✓	✓			
	Nitric Oxide	✓	✓				
	Nitrogen Dioxide	✓	✓	✓			
Volatile Organic Compounds	Acrolein	✓	✓	✓			
	1,3 Butadiene	✓	✓				
	Styrene	✓	✓	✓			
	BTEX	Benzene	NR	✓	✓		
		Toluene	✓	✓	✓		
		Ethylbenzene	✓	✓	✓		
		m-Xylene	✓	✓	✓		
		o-Xylene	✓	✓	✓		
		p-Xylene	✓	✓	✓		
	Alkanes	Pentane C5	✓				
		n-Hexane C6	✓				
		TVOC	Methane C1	✓			
			Ethane C2	✓			
			NMHC	Butane C4	✓		
				Propane C3	✓		
			NMNEHC	Formaldehyde	✓	✓	✓
				Propene	✓		
				Ethene	✓		
				Acetylene	✓		
Acetaldehyde				✓	✓		
Methanoic Acid				✓			
Methanol		✓					
INT	CO2	✓	N/A	N/A			
	Water Vapor	✓	N/A	N/A			
Other	Hydrogen Cyanide	✓					
	Hydrogen Fluoride	✓					
	Ammonia	✓	✓				
	Hydrogen Sulfide	NR					

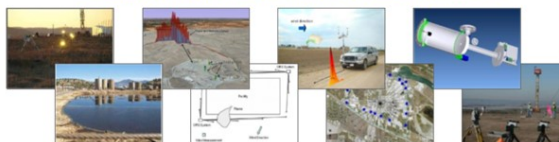
Open Path FTIR is not recommended for Benzene and Hydrogen Sulfide monitoring due to poor detection limits.



Testing of Cerex Open-Path Ultraviolet Differential Optical Absorption Spectroscopy Systems for Fenceline Monitoring Applications

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FTIR AND UVDOAS TECHNOLOGY FOR FENCELINE COMPLIANCE MONITORING



USEPA Method 325 A/B
SCAQMD Rule 1180
BAAQMD Rule 12-15

 **CEREX**
MONITORING SOLUTIONS, LLC.

Cerex UVDOAS as an Alternative for Method 325?

For regulatory compliant refinery fence-line benzene monitoring, technology choices do not end with Method 325 A/B. As a component within a multi-technology approach to 40 CFR 63.658 compliance or as a stand alone system, the Cerex UV Sentry meets USEPA criteria for OP UVDOAS as an alternative method for regulatory compliant refinery fence-line benzene monitoring.

EPA Criteria for OP UVDOAS

Sub PPB Detection Limits for Benzene Insitu, Traceable QA Audit at Full Path with Ambient Interferent Gases Present

Time Resolved Monitoring

Real Time MDL Output as DQI

Real Time Signal Intensity Output as DQI

Retention of Raw Spectral Data



Left: UV Sentry undergoing multi-point span audit at USEPA NRMRL open path test range 2015.

Below Left: AirSentry FTIR at USDoE Hanford Site, monitoring 59 COPCs.

Below: Fixed mount UV Sentry for Acrolein, NO₂.



Cerex FTIR and UVDOAS for Rules 1180 and 12-15 Compliance

Criteria gases, VOCs, Acids and Organics present refineries with a challenging list of compounds to monitor. The Cerex AirSentry FTIR adds significant capability to our UV Sentry to simplify 1180 and 12-15 compliance with a minimum of hardware and a single software and integration platform.

Both the AirSentry FTIR and UV Sentry data streams are readily integrated into plume dispersion models for source location and downstream impact. Integrated DQI eases QA when streaming data to the public.

The AirSentry FTIR meets all TO-16 requirements for regulatory compliant monitoring and the UV Sentry meets EPA's requirements for UVDOAS as an alternative for Method 325 compliance.

Importance of EPA Criteria

EPA criteria for UVDOAS has deep roots in TO-16 and applies to both UVDOAS and FTIR.

EPA tested, the UV Sentry achieves part per trillion detection limits for benzene in real world conditions. Data however is indefensible without traceable QA, and real time data quality may be suspect without real time data quality indicators.

The UV Sentry and AirSentry FTIR both provide real time data validation in the form of signal and minimum detection limit measurements.

Quality assurance audits are multipoint span audits, performed with primary standard calibration gases at installed path lengths with ozone and oxygen present.

Cerex provides three methods for QA, one of which does not require calibration gas to be stored on site:

- External linear QA cell filled offsite with calibration gas. Slides onto analyzer.
- Internal short path linear QA cell for multipoint span audit. Permanently mounted in beam path.
- External half meter linear cell for multipoint span audit. Placed between analyzer and retro-reflector

Like TO-16, using UVDOAS for compliance monitoring requires the analyzer to save raw spectral data.

This data contains a permanent record of the species and concentrations of gases in the air at the time of monitoring.

It is independent of calibration and may be used at any time to verify real time measurements

