

## PRODUCT SPECIFICATIONS

# Sentinel PRO environmental mass spectrometer

## Highly precise gas analyzer to detect toxic volatile organic compounds

The advanced Thermo Scientific™ Sentinel PRO Environmental Mass Spectrometer is a highly reliable, precise, and flexible gas analyzer ideal for analyzing toxic volatile organic compounds (VOCs) from fugitive emissions in industrial settings.

### Features

- Ensures worker safety by monitoring fugitive emissions of toxic gases in industrial plants
- Capable of monitoring 100 or more sample points within 15 minutes from 0.01-1 ppm
- Membrane inlet for enhanced sensitivity to VOCs
- Scanning magnetic sector technology

### Fugitive emissions of toxic VOCs

Wherever there is potential danger for fugitive emissions of toxic organic vapors from a chemical production unit, regulating authorities often require plants to keep records of ambient vapor concentrations to protect workers from long-term exposure. Various forms of capture include evacuated vessels, organic vapor monitors, or purge and trap devices, all of which require samples to be sent for analysis. Alternatively, electrochemical sensors or open path FT-IR spectroscopy can provide more immediate results.

However, none of these technologies are capable of providing the spacial and



temporal resolution required to qualify as actionable information.

### Comprehensive data collection

With speed and precision, the Sentinel PRO analyzer monitors all the critical areas for short-term exposure levels of toxic VOCs, as well as provides accurate eight-hour, time-weighted, average exposure data.

With a high number of available sample points, many can be located close to potential leak points, such as valve stems,

etc., enabling leak detection and correction before any toxic hazard is created.

### Membrane inlet mass spectrometry

The analyzer is fitted with a membrane inlet to reduce the pressure of the sample air from atmospheric to the working pressure of the enclosed ion source. This allows a method of sample introduction that greatly enhances the system's sensitivity to VOCs. Since the membrane is more permeable to VOCs than to major air gases, it can often provide enrichment by several orders of magnitude, including a benzene detection limit of <0.01 ppm. In addition, the ergonomic design of the probe permits easy membrane replacement during annual routine maintenance to minimize downtime and increase productivity.



Thermo Scientific™ Sentinel PRO Environmental Mass Spectrometer

## Analytical Platform

The primary feature of the Sentinel PRO mass spectrometer is the magnetic sector

analyzer. This field-proven technology has demonstrated the strongest performance for industrial on-line gas analysis.

Magnetic sector technology offers precision, accuracy, long intervals between calibrations.

Specifications	
Ion source	Enclosed electron impact with dual filaments, temperature controlled (settable over range 120-200°C, to ± 0.1°C)
Analyzer type	Scanning, laminated electromagnet, 6 cm radius, 80° deflection
Mass range	1-150 amu at 1000V ion energy; 1-300 amu at 500V ion energy
Resolution	Switchable between two collector resolving slits, resolving powers of 60 (1mm) and 20 (4 mm) are standard. Optionally 140/85 (0.36 mm/0.69 mm) or 100/45 (0.56 mm/1.45 mm) or 140/45 (0.36 mm/1.45 mm) may be fitted
Mass scale stability	Measured at mass 28 < 0.013 amu over 24 hours
Peak shape	At 60 resolution, the ratio of the width of the flat-top (99% height width) to the base peak width (5% height width) 0.5
Detector	Faraday and optional Faraday/SEM dual detector
Inlet	Temperature controlled micro-capillary with Molecular leak and bypass (standard configuration)
Vacuum system	Turbo-molecular pump and external rotary pump Alternatively, turbo-molecular Pump and internal diaphragm pump
Sample streams	249
Analysis time	0.3-1.0 sec/gas component
Ambient temperature	12-25°C (12-35°C optional)
Lower Detection Double SEM	1 ppm typical (may vary with gas matrix)
Lower Detection Single SEM	0.1 ppm typical (may vary with gas matrix)
Lower detection faraday	20 ppm typical (may vary with gas matrix)
Precision	All readings within 0.5 ppm of calibrated value (24 hours)
Linearity	<1% relative over a decade change in concentration (typical, application dependent)
Dynamic range	1 ppm – 100% (theoretical, application dependent)
Stability	Better than 10% relative over one month
Power requirements	115/230 VAC, consumption 1500 VA
Serial connections	RS232/422/485
Communications protocols	Modbus, Siemens 3964, Siemens 3964R, VGCP, PVGCP
Physical dimensions	65 cm (26") L × 150cm (59") H × 70 cm (28in) W 300 kg (660lbs) configuration dependent
Area classification options	General purpose: Z-purged Div 2 (optional); X-purged Div 1 (optional); CENELEC/ATEX Zone 1, IIC T3 (optional)

## Species-specific detection from 0.01 ppm to 1 ppm

Acetone, acetonitrile, acrylonitrile, benzene, butadiene, carbon disulphide, carbon tetrachloride, chloroform, chlorobenzene, cyclohexane, dichloromethane, dimethylacetamide (DMAC), dimethyl formamide (DMF), 1,4-dioxane, epichlorohydrin, ethyl benzene, ethylene oxide, freons, hexamethyldisilazane, hydrogen cyanide, methyl bromide, methyl ethyl ketone, methyl iodide, methyl isobutyl ketone, methyl methacrylate, 1-methyl-2-pyrrolidinone, methyl tertiary-butyl ether (MTBE), propylene oxide, propan-2-ol, perchloroethylene, styrene, tetrahydrofuran, tetrachloroethylene, toluene, trichloroethylene, vinyl acetate, vinyl bromide, vinyl chloride, xylene.

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