

piD-TECH[®] eVx

PHOTOIONIZATION DETECTORS

Total Volatile Organic Compound Measurement

Features

- Easiest, most efficient way to detect VOC levels
- Wide array of sensitivities and ranges
- Real time measurement

Introduction

Volatile Organic Compounds (VOC's) are potentially dangerous compounds created by industrial and natural processes that vaporize under normal atmospheric conditions. VOC levels are much higher in indoor environments as they can be emitted by many manufactured products such as carpet, paint, and cleaning supplies. Outdoor sources can include landfills, industry, and hydrocarbon emissions.

Prolonged human exposure to VOC's have been known to cause respiratory problems, cancer, and neurological damage. Environmental damage can include air, water, and soil pollution.

Detection Using a PID

Photoionization Detectors (PIDs) are the easiest and most efficient way to detect VOC levels. Although not as selective without the use of a gas chromatography column, a stand alone PID provides real time measurement of many volatile organic compounds in a portable format or fixed format that anyone can use. These detectors enable the user to react swiftly to any potential threat, without waiting for the evaluation of a time-weighted average (TWA). Sensitivity can be increased by the selection of ultraviolet (UV) lamp, as well as detector range.



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Applications

- Industrial Hygiene & Safety Monitoring
- Soil Contamination & Remediation
- Arson Investigation
- EPA Method 21 and Emissions Monitoring
- Homeland Security and Federal Customs
- Sick Building Syndrome
- Electronics Manufacturing
- OSHA, NIOSH, EPA
- Waste Disposal
- Agricultural Monitoring
- Military Operations
- Storage Locations
- Confined Space
- Confined Space Entry
- Hazmat Sites and Spills
- Low Concentration Leak Detection
- Indoor Air Quality
- Fenceline Monitoring
- Petrochemical Plants
- Paint Booths
- Construction Sites
- Paper Manufacturing
- School Air Monitoring
- Drums & Containers
- Transportation Regulation
- Emergency Services



Ionization Potentials & Response Factors

The sample gas is exposed to an ultraviolet light from a lamp which ionizes the target gases to be detected by the instrument and reported as a concentration. VOC's with an ionization potential (IP) less than the eV of the lamp will be detected by photoionization. The most common lamp is the 10.6 eV, although a 10.0 eV can also be used for increased selectivity.



The ratio between the sensitivity of isobutylene to that of a target compound is called a response factor (RF). For example, the piD-TECH® eVx sensor has a typical sensitivity of 1 mV/ppm for isobutylene and 2 mV/ppm for benzene. That means that benzene's RF is equal to 0.53.

The RF allows the user to measure the concentration of various gases without actually calibrating the sensor with the target gas. A comprehensive list of ionization potentials and response factors (Bulletin A037) is available from MOCON - Baseline at your request.

Common VOCs

Chemical	Source	IP	RF
Acetone	Solvent	9.69	1.2
Arsine	Electrical manufacturing	9.89	2.6
Butadiene	Rubber / Elastomers	9.07	0.69
Benzene	Petroleum / Polymer	9.25	0.53
Cumene	Petroleum / Polymer	8.75	0.54
Dimethoxymethane	Solvent	10.00	11.3
Ethyl mercaptan	Natural gas	9.29	0.6
Hydrogen sulfide	Natural gas	10.46	3.2
Mesityl oxide	Manufacturing by-product	9.08	0.47
Methyl ethyl ketone	Solvent	9.53	0.9
Methyl mercaptan	Natural gas	9.44	0.6
Nitric oxide	Manufacturing by-product	9.25	7.2
Phosphine	Electrical manufacturing	9.87	2.8
Styrene	Petroleum / Polymer	8.47	0.4
Toluene	Petroleum / Polymer	8.82	0.53
Vinyl chloride	Manufacturing by-product	10.00	1.8



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