



## ***Cerex Monitoring Solutions, LLC***

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# **Product Information – UVCanary Single Gas Analyzer**

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Cerex Monitoring Solutions, LLC is pleased to submit the following information to describe our UVCanary point monitor. This gas analyzer will be specifically configured for the detection of a single (UV absorbing) gas.

Typical systems have been supplied for the detection of Benzene, Chlorine, Mercury, Formaldehyde, etc.

The system quoted was designed for this project with the following intended specifications;

- \* Rapid detection of gas (<5 seconds )
- \* Wide dynamic range to cover the concentration range without the need for dilution systems
- \* Ruggedized for desert deployment
- \* Redundant data storage – Results are seen at the remote trailer, and also stored locally within the analyzer.
- \* Equipped with radio link for remote deployment
- \* Power from generator, or shorter term with battery
- \* High MTTF >4000 hours – plus easy and inexpensive to service
- \* Reliable technique- based on absorption spectrometry, and not electrochemical



\* Unlike electrochemical – the system is not “poisoned” by a large gas exposure. When the gas clears the air, the system returns to zero, and is immediately ready for the next detection to occur. This is also very important to provide information as to when it is safe for workers to re-enter an area previously flooded by gas.

## **UV Canary Product Highlights**

### **Method of Detection**

The UVCanary utilizes absorption spectroscopy as the method of detection. Light is produced and projected through a long path sample cell. If gas is present, the light is preferentially absorbed in the spectral region of i. The reduction in signal intensity from the resulting absorption is measured and quantified. The value is related to concentration.

## Main Analyzer

Until recently, the traditional method of analysis was to utilize a broadband spectrometer, and a source capable of producing energy throughout the 200 to 300nm band of UV. This is usually accomplished with a miniature spectrometer and a xenon UV source.

## UV Source

UV LED's have been under development for years, but have recently become available as standard off the shelf, cost-effective sources. The UV LED's are available in a variety of specific wavelengths, and the particular model suited to Benzene detection has a centerline frequency at 250 nm. Unlike the broadband xenon sources, the LED is more like a laser source, whereby a very narrow emission line is produced, usually encompassing the center frequency +/- 10 or 20nm.

The image above shows the absorbance for benzene, and overlaid is the detection "window" offered by the UV LED. The 250nm was specifically chosen to enable the system to "look" in the window of highest absorption for this gas.

## UV Receiver

Since other interfering chemicals may be present, a full range spectrometer is utilized. This enables the full fingerprint of the benzene feature to be analyzed, and compared against a suitable library spectra. In this way, if the shape recognition is not a good match, then the system flags a false positive.

## Cell

The sample cell measures 0.1 to 1.0 meters in length, and approximately 1cm inner diameter. Construction is stainless steel and Teflon, with UV silica windows. The nature of these materials is such that there is excellent chemical resistance to Benzene. The cell can be easily dis-assembled for cleaning if required, although this is not anticipated to be required due to the design of the filter.

## Air Pump

The sample is drawn through the cell with a high efficiency miniature (rotary piston) vacuum pump. The pump is rated for extremes of temperature. Flow rates are typically up to 5 liters per minute. The large flow rate, combined with the low-volume cell produce near instantaneous gas measurements.

## Air Filter

An air filter (on the sample intake line) is located on the outside of the analyzer case...easily accessible for changing. The filter acts to prevent desert dust and other particles from entering the cell and contaminating the optics. The filter screws onto a 3/4" bulkhead threaded fitting which protrudes through the case. The filters are easily changed by simply unscrewing, and replacing (hand tight).

## Flow Diagnostics

A flow sensor is attached internally within the sample stream. If the flow stops, or is obstructed due to clogged filter, an automated software error message alerts the operator that there is a fault in the pneumatic line.

## Maintenance

The system is designed such that maintenance is simple, and cheap. There are only 3 consumables...

- 1) The UV LED. Eventually, this will need to be changed. Recommend replacing at 4000 hours operation. Approximate cost is less than \$500
- 2) The vacuum pump will eventually need to be replaced. Recommend replacing at 4000 hours. Approximate cost is less than \$300
- 3) Air Filter will need to be replaced. How often depends on local operating conditions. The price of the replacement cartridge is less than \$50.

Every item is user-serviceable. No need to send back to the factory.

\* Rated for harsh conditions - System is rated for mil-spec ambient temperature operation -40 to +60C. System can withstand dust, rain, moisture, salt

\* Virtually no maintenance required – the only consumables are a dust filter for the sample intake, and the sample pump (rated to 3000 hours). The pump is easily replaced and costs less than \$200.00

\* Advanced Technology - The UV Source is a low-power LED. These devices only became available in the last year. Lifetime is rated at 4000+ hours.

\* Redundant Data - The system is supplied with a built-in micro-controller. All of the concentration data collected is stored locally, in the event the wireless signal is lost during a particular event or field test.

\* Universal Data Storage – Provision is made for the local data to be sent directly to a standard USB storage drive. Depending on the quantity of data stored, this could be a simple pen-drive.

\* Wireless Data Transmission - Data is sent via 900Mhz . A software application runs on the local pc (inside the trailer) which accepts the incoming data from all the sensors. Concentration, fault condition, time, and other parameters are displayed for each analyzer.

\* Fast response time – the system will respond to changes in concentration and produce updates in less than 5 seconds (usually 1 to 2 seconds)

\* Wide dynamic range – The system has been specifically designed to report Benzene gas over a very wide dynamic range. There are no dilution systems required.

\* Solid State design – The system does not utilize electrochemical cells. Therefore the associated problems, limitations, and maintenance costs associated with that technology are not present in this design.

\* Additional Specifications;

Dimensions; 20”(w) x 15”(h) x 5”(l)

Weight; 12 lbs

Power; 120/240VAC 50/60Hz

Options; Generator/Battery(limited)