

## INTRODUCTION

Various fumigants including Phosphine ( $\text{PH}_3$ ), Methyl Bromide (MeBr or  $\text{CH}_3\text{Br}$ ), Vikane Sulfuryl Fluoride, or  $\text{SO}_2\text{F}_2$ , Hydrogen Cyanide (HCN), Carbon Monoxide (CO), Carbon Dioxide ( $\text{CO}_2$ ) and Ozone ( $\text{O}_3$ ) are used as pesticides in such applications as food storage, customs shipment quarantines and building pest control.

This Application note focuses on using the AirWatch for Fumigation purpose. Therefore the main focus is on Phosphine ( $\text{PH}_3$ ), Carbon Monoxide (CO), Carbon Dioxide ( $\text{CO}_2$ ) as fumigation gas and other gases, which are used as a fumigant, depending on the application itself. Currently there is no Methylbromide or Vikane sensor available for the AirWatch.

## FUMIGATION OF SHIPPING CONTAINERS

Sea containers will be shipped all over the world. To make sure pests of unwanted animals, bugs and bacteria do not stand any chance, containers will be fumigated with highly toxic gas, that usually attacks the nerve system. Some gases are also used to prevent cargo from rotting. Typical transport goods are bulks, such as Rice, Cocoa, Coffee etc. When sea containers arrive at harbors, the harbor workers should fumigate the shipment containers. To make sure that these unwanted animals, bugs and bacteria are dead, they have to monitor the concentration of the fumigant.

This turns out to be difficult, since devices for gas monitoring are on one hand in need of a power supply or on the other hand not designed for constant real-time monitoring.

## THE AIRWATCH FOR SHIPPING CONTAINER FUMIGATION

The AirWatch, as a semi-fixed gas monitor, offers the solution. Just contact your distributor for the special designed Fumigation AirWatch. The Fumigation AirWatch is available in 2 versions: With an 8-day-battery-GasPod or the eco-friendly solar-power version, which runs for weeks and months. You can choose between your preferred fumigant. The AirWatch offers sensors, which are designed for long time monitoring in high concentrations.



Figure 1: AirWatch GasPod for Shipping Container Measurement

And not only that: The Fumigation AirWatch provides two pumps to ensure the fresh air supply for the sensor, since no sensor can withstand a constant, high gas input without purging. It provides an outlet for the gas, which is suitable for a hose to lead back the deadly gas concentrations into the container. A max. 50m hose and probes can be ordered separately.



Figure 2: AirWatch Solar-power

The purging itself is programmable, so that you can adjust it for your needs. Normally we recommend an interval of 2 min high gas concentration and 13 min fresh air purging to get most accurate results, but contact your sales person to figure out the best suitable interval for your application. To make sure you have the ultimate proof of fumigation there is an additional Datalog available for the AirWatch, which is uses a normal SD-Card. You can choose in which interval between 1 – 60 minutes you want to log.

The AirWatch is suitable for measuring  $\text{PH}_3$ ,  $\text{CO}$ ,  $\text{CO}_2$ ,  $\text{NH}_3$  and  $\text{HCN}$ . The beauty of the AirWatch is, you can order it to your situation. For fumigating shipment containers, just take a  $\text{CO}_2$ ,  $\text{O}_2$ ,  $\text{PH}_3$  or  $\text{NH}_3$  sensor and you are prepared as good as possible for the most fumigation situations.

Below you will find a list of the most common gases that have been encountered with all different kinds of freight:

- Phosphine ( $\text{PH}_3$ )
- Carbon Monoxide ( $\text{CO}$ )
- Carbon Dioxide ( $\text{CO}_2$ )
- Ammonia ( $\text{NH}_3$ )
- Hydrogen Cyanide ( $\text{HCN}$ )

## KEY ADVANTAGES OF THE FUMIGATION AIRWATCH

- Longtime monitoring of high toxic gases & vapours
- GasPod or Solarpower supply available
- Datalog available & programmable
- 2 Internal Pumps
- Exhaust hose available
- Internal programming for sensor purging allows long sensor lifetime
- Wireless texts messaging option

## FUMIGATION OF BUILDINGS

Typical gases for fumigating furniture, wooden products, electrical instruments, entire rooms and tall buildings are mainly Hydrogen Cyanide ( $\text{HCN}$ ) besides Phosphine, Methyl Bromide and Sulfuryl Fluoride.

When entire buildings get fumigated, usually a risk area of 10m around the building gets fenced off. The risk area is defined as area or space, where the fumigant gas has been applied and where the gas may move to. With other words: The area, where the gas is a potential threat to fumigators and others. The fumigation area has always to be sealed from other areas and made as gas tight as possible. Only the fumigator-in-charge can give permission for entering this danger area, in case of emergency such as fire. Therefore, he must be aware of the actual concentrations, which means there must be a real-time gas monitor.



Figure 3: Fumigation tent

## THE AIRWATCH FOR FENCELINE MONITORING

Like the container fumigation, usually you must decide between constant real-time-monitoring or independency from an external power supply. The AirWatch is the optimal solution for this kind of application, since it is specially designed for real-time-monitoring with its own power supply. No matter if you need for a week or months a gas monitor, with the GasPod or the Solar power version, you are best prepared for your fence line monitoring application.

Thanks to the robust casing and protecting case of the AirWatch, it can withstand any weather conditions. The internal pump protects the sensors from rain and the covered display prevents insects and particles from entering.

The AirWatch can be entirely self-contained and wireless regarding both power supply and data transmission, if you wish so. The only power cable runs from the GasPod

or solar panel to the AirWatch and a backup battery ensures constant monitoring even on rainy days.

The Wireless function allows the AirWatch to communicate to another AirWatch within a 300m distance and as soon as one AirWatch detects an alarm, the Beacon Sounders of the other AirWatches light up blue. This ensures that no one is getting into the danger zone, when there is an alarm.

Optional there is an AirWatch Repeater available, which allows to bypass a higher distance without an AirWatch itself. Also, the AirWatch Receiver allows the fumigator-in-charge to monitor every AirWatch on one personal computer with the monitoring Software, which is provided for free with the Receiver.

### ADVANTAGES OF THE AIRWATCH:

- Wide variety of sensors for fumigation gases
- Semi-fixed gas monitoring of up to 4 gases
- Own power supply provided
- Low installation costs
- AirWatch Receiver with Monitoring Software
- Internal pump protects sensors
- Wireless function available

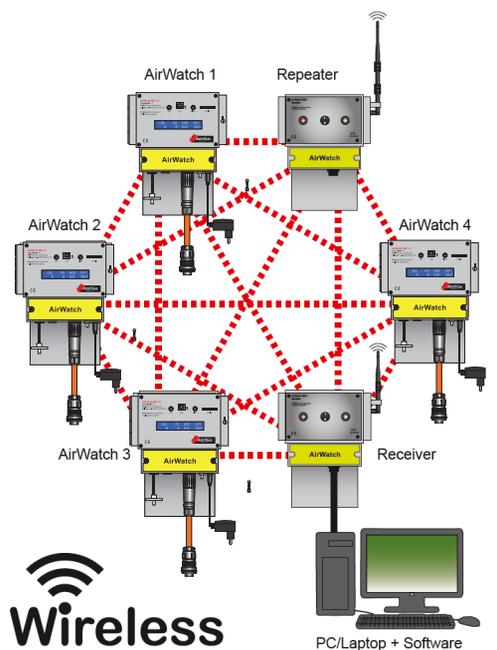


Figure 4: AirWatch mesh network with one receiver, one repeater and four AirWatches.