



Impact of Using an ALTAIR® 5X Gas Detector Configured with Both Phosphine & Hydrogen Sulfide Sensors

Technical Bulletin



WE KNOW WHAT'S AT STAKE.

What is Phosphine?

Phosphine, PH_3 , is a colorless and very toxic gas that is immediately dangerous to life and health at 50 ppm. PH_3 gas is typically used in the semiconductor industry to introduce phosphorus into silicon crystals. It is also used as a fumigant, a polymerization initiator, and as an intermediate for the preparation of several flame retardants.

Phosphine



Colorless



Odorless



Toxic

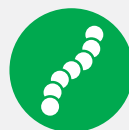
Uses



Semiconductor Industry



Fumigant



Polymerization Initiator



Flame Retardants

What is Hydrogen Sulfide?

Hydrogen sulfide, H_2S , is a colorless gas with the characteristic foul odor of rotten eggs. It is poisonous, corrosive, and flammable.

H_2S gas is a fairly common gas found in many different industrial applications such as manufacturing facilities (typically, where sulfuric acid is present or used in process), oil refineries, food processing (as an insecticide), drainage and sewage areas, agriculture, and any mining operation.

Hydrogen Sulfide



Colorless



Rotten Egg Odor



Poisonous

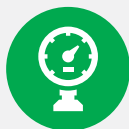


Corrosive



Flammable

Uses



Manufacturing Facilities



Oil Refineries



Drainage & Sewage



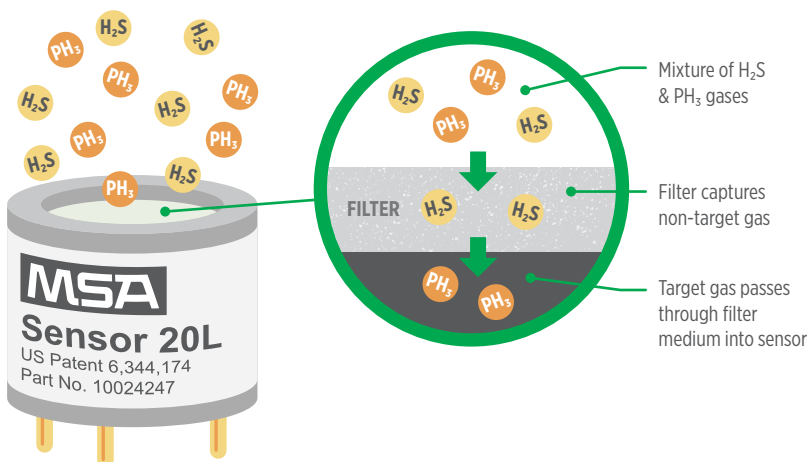
Agriculture



Mining

What is Cross Sensitivity?

Many electrochemical sensors can experience cross sensitivity, which is a reaction to gases or vapors other than the target gas. Most sensors have internal filters to reduce the exposure to and limit the impact of non-target gases. The filters are selective and absorb certain competing gases by chemically bonding it and preventing the passage through the sensor. Phosphine (PH_3) sensors have a known cross sensitivity to hydrogen sulfide H_2S .





Impact of H₂S on a PH₃ Sensor

When H₂S and PH₃ sensors are configured into the same ALTAIR 5X Gas Detector, the bump and calibration processes cause the PH₃ sensors to be exposed to H₂S. The internal filter in the PH₃ sensor will capture H₂S, but over time will outgas the H₂S. Continued exposure to H₂S through calibration and bump testing over time will cause the sensitivity of the PH₃ sensor to gradually decrease and shorten its life; in some cases the life of the PH₃ sensor can be reduced to a few months. Because the decrease from bump and calibration exposure is gradual, calibrating and daily bump testing in accordance with the operating manual* will identify the drift from the H₂S cross sensitivity effect. As long as the ALTAIR 5X Gas Detector continues to pass the bump test and/or calibration, the PH₃ sensor is still within the acceptable limits and performance is not negatively impacted. If bump testing and calibration are not performed in accordance with the operating manual, over time the H₂S exposure can result in erroneously low readings for PH₃. As a reminder, the operating manual contains the following warnings related to bump testing:

WARNING

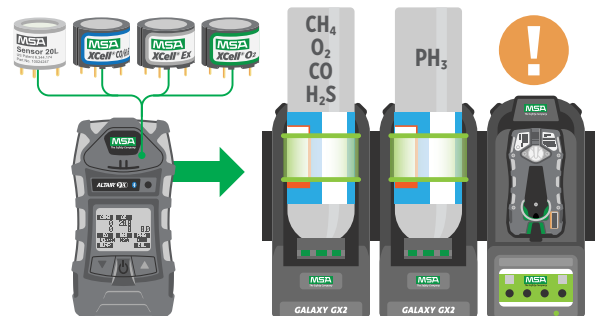
- It is recommended that a Bump Test is performed before each day's use, and adjust if necessary.
- Perform a Bump Test more frequently if exposed to silicone, silicates, lead-containing compounds, hydrogen sulfide, or high contaminant levels.

Incorrect use can cause death or serious personal injury.

If your detector is configured with a PH₃ sensor, and no H₂S sensor, you can prolong the life of your PH₃ sensor by not unnecessarily introducing H₂S during the calibration and bump test. For example, if your detector is configured with PH₃, CO, O₂, LEL, do not use a mixture of "quad gas", which contains CO, H₂S, O₂, and combustible gas. Rather use a mixture of CO, O₂, and combustible gas along with a separate cylinder for PH₃. MSA has an extensive list of gas mixtures and can assist with your selection.

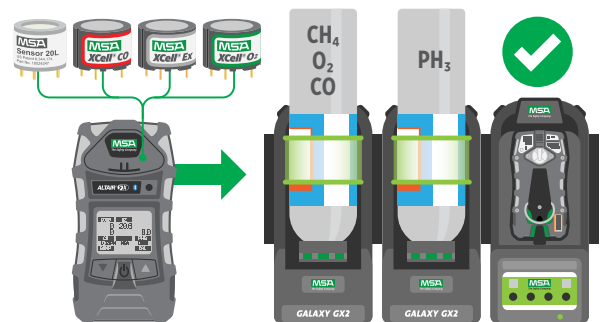
* Operating Manual
ALTAIR® 5X Multigas Detector
ALTAIR® 5X IR Multigas Detector
Or
Operating Manual
ALTAIR® 5X PID Multigas Detector

Note: This Bulletin contains only a general description of the products shown. While product uses and performance capabilities are generally described, the products shall not, under any circumstances, be used by untrained or unqualified individuals. The products shall not be used until the product instructions/user manual, which contains detailed information concerning the proper use and care of the products, including any warnings or cautions, have been thoroughly read and understood. Specifications are subject to change without prior notice. MSA is a registered trademark of MSA Technology, LLC in the US, Europe, and other Countries. For all other trademarks visit <https://us.msasafety.com/Trademarks>.



Typical Configuration:
ALTAIR 5X with PH₃, CO/H₂S,
Combustible, O₂

Proper GALAXY GX2 Test System configuration,
however H₂S exposure will expedite
the decline in PH₃ sensor life.



Configuration where H₂S
is not needed: ALTAIR 5X
with PH₃, CO, Combustible, O₂

Best practice is to use a multi-gas cylinder
that does not contain H₂S if it is not necessary.

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