

<b>Honeywell</b> Application Note	<b>PHD6 Units Equipped With  Sulfur Dioxide (SO<sub>2</sub>) and  Ammonia (NH<sub>3</sub>)</b>	Date	27MAY2011	Rev	1.1
		N <sup>o</sup>	13-365		
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**Applications Note**

Sulfur Dioxide (SO<sub>2</sub>) Electrochemical Gas Sensors – Performance Issues Associated with Ammonia (NH<sub>3</sub>) Exposure

**Summary**

All standard electrochemical gas sensors for sulfur dioxide (SO<sub>2</sub>), if exposed to ammonia (NH<sub>3</sub>), will exhibit a period of inhibition as well as slowed response times with subsequent exposure to SO<sub>2</sub>. The severity of these effects depends on the duration and concentration of NH<sub>3</sub> exposure. If an SO<sub>2</sub> sensor is exposed to NH<sub>3</sub>, it must be reconditioned with SO<sub>2</sub> to restore its performance prior to use in the field.

**Background**

If an SO<sub>2</sub> sensor is exposed to NH<sub>3</sub>, at a concentration greater than 10 PPM for any duration greater than a few seconds, immediately thereafter it will exhibit two performance issues. When exposed to SO<sub>2</sub>, there will be a period of time when the sensor will be unresponsive; and when it does respond, it will be slower to give the ultimate reading and slower to recover. The severity of these effects is dependent on the NH<sub>3</sub> concentration and exposure duration. An instrument equipped with both an SO<sub>2</sub> and an NH<sub>3</sub> sensor will experience this condition after calibration due to exposure of the SO<sub>2</sub> sensor to the ammonia calibration gas, typically 50 PPM for 60-90 seconds. The period of inhibition immediately thereafter will be on the order of 1 to 2 minutes, and response/recovery times will slow by a factor of 10-15X.

*Such a detector should not be used to enter any location where appreciable levels of SO<sub>2</sub> might be present until the situation is corrected.*

The SO<sub>2</sub> sensor gradually recovers when left in a clean air environment. For example, after the exposure given above, the period of inhibition declines to 10-20 seconds, and the speed of response is only slower by a factor of 3-5X. If left for a period of 16-24 hours, there will only remain a slightly slower response/recovery and essentially no period of inhibition.

**Resolution**

The best practice to immediately restore sensor performance is to recondition the detector with SO<sub>2</sub> calibration gas after any known or potential exposure to NH<sub>3</sub>. This can be done by applying the calibration gas until the sensor reads at least 90% of the concentration listed on the gas cylinder.