

RECOMMENDATIONS FOR CHEMIRERESISTOR SENSOR TESTING

The performance of Synkera's metal oxide semiconductor based sensors is dependent on a number of factors, and it is important to take these into account when setting-up systems for evaluation and/or calibration. A major consideration is achieving the desired temperature of the sensor element. It is important that potential heat transfer issues be considered while setting up the testing and operation of this type of sensor. The factory recommended heater voltage to be applied to the sensor heater is for optimum performance in a set-up that allows for the sensor to be suspended and where the gas flow rate is moderate compared to the volume of the test chamber. In addition, the environment that the sensor will be exposed to during use needs to be considered.

Synkera recommends the following guidelines for testing and use of our metal oxide, chemiresistor sensors.

1. Position the sensor, making contact only to the sensor pins, in the environment that the sensor is going to be used. It is particularly important that the sensor can is not in contact with anything that will act as a heat sink and transfer heat away from the sensor element, thus reducing sensor performance.
2. If using the sensor in a flow system, use moderate flow rates relative to the chamber the sensor is in. A chamber volume of 10 to 20% of the gas flow rate per minute is recommended. Thus, if a flow rate of 500 ml/min is used a chamber volume of 50 to 100 ml is an appropriate range. Slight variations in flow rate and chamber volume should not have a significant impact on sensor performance; however, larger changes will likely affect the performance of the sensor. Excessive flow of gas across the sensor leads to heat loss, which, in-turn, leads to the degradation of sensor performance. Very low flow rates will affect the apparent response and recovery times of the sensor due to the time it takes to introduce and remove the analyte gas.
3. Try to mimic, as closely as possible, the actual application when setting-up a system for sensor evaluation and/or calibration. This includes not only the above considerations that affect heat transfer from the sensor, but also environmental considerations such as ambient temperature and humidity. In addition, the gas composition where the sensor will be exposed to (for non-ambient applications) should be considered. This includes the oxygen level and potential cross-interferent gases in the gas stream.

If a particular situation does not allow for the above guidelines to be followed, there is a possibility that adjustments to the heater input voltage can be made to compensate for issues related to increased heat transfer. Please contact Synkera to discuss the necessary adjustment, as this will vary depending on the application and sensor being used.