Ultima® X **Chlorine Monitor Calibration**

MSA
The Safety Company

Application

Concerns over chlorine sensor stability and initial startup have raised questions as to the best calibration procedure to ensure accuracy and repeatability. The electrochemical sensor is a dynamic system with several active components that must align for the sensor to work as designed; therefore, premature calibration will enable unstable conditions that will produce erratic results.

Because electrodes inside the sensor must be wetted with electrolyte for the reaction to occur on the surface, sensors can exhibit some position sensitivity. As chlorine is a very heavy gas, it also introduces its own diffusion characteristics to the procedure that can affect instrument response. Coupled with high reactivity of chlorine, delivery of a precise calibration sample to the sensor becomes an important and difficult step in establishing system reliability.

Chlorine sensors have a bias voltage applied between the working and counter electrodes. Any sensors that use this technique to drive the desired reaction require at least a two-hour warmup to stabilize before attempting calibration. If an individual were to watch sensor output during the warmup period, he or she would observe the baseline drifting downscale slowly until equilibrium is attained within the sensor. For these reasons, it is recommended that sensors be installed and calibrated in the upright position with sensors facing downward. At the very least, a sensor should be calibrated in the same position as it will be installed.

Solution

MSA has recently endorsed a revised calibration procedure for chlorine and other reactive gas detectors to be used for all MSA diffusion sensors, meaning that all sensors will be calibrated at 1.5 lpm with no calibration cap. MSA also recommends that a dedicated regulator for reactive gases still be used.

Originally, to obtain more calibrations from expensive reactive gas cylinders, a lower flow was used. At low flow, significant percentages of the sample were absorbed or consumed in the tubing and regulator of the delivery system. Multiple calibration attempts were required to passivate the surfaces to ensure that a stable sample was presented to the sensor for proper adjustment. High flow rate simplifies this process and makes it less reliant upon technique.

Due to discrepancies in readings that may be the result of shipping and handling, and differences in standards or gas delivery techniques, MSA recommends that users always perform an initial calibration.

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