

Date	April 21, 2008
N ^o	AN20010807
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One of the most common questions that we are asked at Sperian Instrumentation is: *“How often should I calibrate my gas detector?”*

Sensor Reliability and Accuracy

Today’s sensors are designed to provide years of reliable service. In fact, many sensors are designed so that with normal use they will only lose 5% of their sensitivity per year or 10% over a two-year period. Given this, it should be possible to use a sensor for up to two full years without any significant loss of sensitivity.

A lot of sensors indeed do last that long with only minimal loss of sensitivity. However, there are a number of reasons why a sensor may unexpectedly lose additional sensitivity or even fail to respond to gas. Such reasons include desiccation, poisoning, physical restriction of airflow, overexposure, leakage, and mechanical damage due to dropping or immersion.

Verification of Accuracy

With so many reasons why a sensor can lose sensitivity and given the fact that dependable sensors can be key to survival in a hazardous environment, frequent verification of sensor performance is paramount.

There is only one sure way to verify that a sensor can respond to the gas for which it is designed. That is to expose it to a known concentration of target gas and compare the reading with the concentration of the gas. This is referred to as a “bump” test. This test is very simple and takes only a few seconds to accomplish. **The safest course of action is to do a “bump” test prior to each day’s use.** It is not necessary to make a calibration adjustment if the readings are inside of the acceptable ranges.

When performing a bump test, O₂ sensors should be between +/- 0.5% O₂ of the expected value. For example, if using a gas concentration of 18%, the reading should be between 17.5% and 18.5% O₂. LEL and toxic sensors should be between 90% and 120% of the expected value. For example, when using a gas concentration of 50 PPM, then it is not necessary to perform a

calibration unless the readings are either below 45 PPM or above 60 PPM.

Lengthening the Intervals between Verification of Accuracy

We are often asked whether there are any circumstances in which the period between accuracy checks may be lengthened.

Sperian is not the only manufacturer to be asked this question! One of the professional organizations to which Sperian belongs is the Industrial Safety Equipment Association (ISEA). The “Instrument Products” group of this organization has been very active in developing a protocol to clarify the minimum conditions under which the interval between accuracy checks may be lengthened.

A number of leading gas detection equipment manufacturers have participated in the development of the ISEA guidelines concerning calibration frequency. Sperian procedures closely follow these guidelines.

If your operating procedures do not permit daily checking of the sensors, Sperian recommends the following procedure to establish a safe and prudent accuracy check schedule for your Sperian instruments:

1. During a period of initial use of at least 10 days in the intended atmosphere, check the sensor response daily to be sure there is nothing in the atmosphere that is poisoning the sensor(s). The period of initial use must be of sufficient duration to ensure that the sensors are exposed to all conditions that might have an adverse effect on the sensors.
2. If these tests demonstrate that it is not necessary to make adjustments, the time between checks may be lengthened. The interval between accuracy checking should not exceed 30 days.
3. When the interval has been extended the toxic and combustible gas sensors should be replaced immediately upon warranty expiration. This will minimize the risk of failure during the interval between sensor checks.
4. The history of the instrument response between verifications should be kept.

Any conditions, incidents, experiences, or exposure to contaminants that might have an adverse effect on the calibration state of the sensors should trigger immediate re-verification of accuracy before further use.

5. Any changes in the environment in which the instrument is being used, or changes in the work that is being performed, should trigger a resumption of daily checking.
6. If there is any doubt at any time as to the accuracy of the sensors, verify the accuracy of the sensors by exposing them to known concentration test gas before further use.

Gas detectors used for the detection of oxygen deficiencies, flammable gases and vapors, or toxic contaminants must be maintained and operated properly to do the job they were designed to do. Always follow the guidelines provided by the manufacturer for any gas detection equipment you use!

If there is any doubt regarding your gas detector's accuracy, do an accuracy check! All it takes is a few moments to verify whether or not your instruments are safe to use.

One Button Auto Calibration

While it is only necessary to do a “bump” test to ensure that the sensors are working properly, all current Sperian gas detectors offer a one button auto calibration feature. This feature allows you to calibrate a Sperian gas detector in about the same time as it takes to complete a “bump” test. The use of automatic bump test and calibration stations can further simplify the tasks, while automatically maintaining records

**Don't take a chance
with your life.
Verify accuracy frequently!**

Please read also Sperian application note: AN20010808 *“Use of ‘equivalent’ calibration gas mixtures”*. This application note provides procedures to ensure safe calibration of LEL sensors that are subject to silicone poisoning.