

The Power of Datalogging

by Kay Mangieri

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Tracking & reviewing gas exposure data provides critical information about hazards



There's no doubt that a gas monitor's most critical function is to signal a blatant warning that the surrounding atmosphere may be hazardous to human health and safety. Direct reading instruments provide real-time gas levels of all installed sensors on a visible display; however, the user is not expected or encouraged to watch the screen and self-interpret the readings. Monitors are designed to activate audible, visible and, oftentimes, vibrating alarms to signal the warning that pre-set low or high alarm levels have been reached or exceeded. The obvious intent is to motivate the person wearing the instrument to vacate the area until the gas hazard has been cleared or otherwise abated.

After the problem has been safely researched and confirmed, the next step would be to mitigate the risk and perform corrective action for a permanent solution if possible. After diagnosis, steps toward preventive action for future events should be applied globally across all similar applications or processes.

But what if this was seemingly a one-time event?

Would it be necessary to fulfill corrective and preventive action obligations? On the other hand, what if the same alarm event occurs sporadically, but across 20 different plants owned by the same company during the same process? Without the ability to save the data and have an overarching view of all the events, a potential problem would not be diagnosed easily.

Potential parameters

In addition to real-time readings, most monitors today offer automatic datalogging or recording of gas exposure data. Dataloggers are capable of using flexible recording intervals and having data storage periods up to one year or more. Advanced datalogging systems let users know how long the datalogger has been turned on, or how long until the datalogger's memory will be full. Data can be extracted from the instrument and viewed or saved on a PC.

Beyond storing gas levels, instruments can store calibration dates, temperature readings, on/off times, minutes of operation and user identification and location information. These parameters are useful for establishing what has occurred in the past (lagging indicators), and predicting what potentially may occur in the future (leading indicators).

Following are some parameters that can be logged and viewed real-time or downloaded for further analysis.

Gas sensor readings

Continuous recording of all gas sensor readings provides valuable data for immediate or future diagnosis. User-selectable logging intervals are available from one second up to five minutes. In addition to alarm-level exposure events, datalogging typically captures each gas sensor reading, temperature, instrument ID, and time and date of the sample. Not only is this information important for the immediate health and well being of workers who may be exposed to atmospheric hazards, but documenting the information also allows operators to make educated and calculated decisions based on trends, timing or anomalies in the data.

STEL/TWA calculations

Intuitive software programs that graphically display and record readings have replaced manual calculations of short-term exposure limits (STEL) and time-weighted averages (TWA).

STEL represents the average of a gas concentration a worker has been exposed to over a 15-minute period. If this amount exceeds safe limits, the worker must remove himself or herself from the hazard for a period of at least one hour before re-entry. STEL values may only be exceeded four times during a normal work shift.

TWA is the average amount of gas a worker has been exposed to over a given time period, usually eight hours, with predetermined limits. If a predetermined TWA value is exceeded, a worker may not re-enter the space for the balance of the workday.

STELs and TWAs are easily calculated using the sensor readings logged in the instrument, thereby providing managers with precise measurements for occupational health assessments.

Peak readings

A peak/hold function allows professionals to track the highest exposures recorded during job functions at the end of a work shift or after a monitoring incident. This feature can provide the tracking of workers' gas exposures and can provide useful evidence during incident investigations.

Data input for user and site ID recording

A data input element further enhances logged data to imprint the datalogger with user and location information automatically. One benefit this provides is the means for validating gas survey data through identification and time/date stamp of each monitored site, user, and gas measurement/exposure record. This functionality allows industrial hygiene and safety personnel to obtain information that can be used for critical problem-solving analysis today and maintained to limit potential liability in the future.

Event logging

Many of the newest gas monitors offer features such as "log on alarm" to allow the user to capture data only when the instrument goes into alarm. This reduces the amount of memory used, but still captures all of the data when the instrument goes into an alarm condition.

Downloading data

Not only is data easier to record, it is much more convenient to recover and retain. The days of connecting each monitor individually to a PC to download the day's worth of data are gone. Instrument docking products allow multiple instruments to have several days of data recovered at predetermined times. Graphing software provides an analytical tool for the industrial hygienist or EHS manager.

With automatic record keeping built into the systems, all required documentation is safely stored on computers and can be printed at any time. Databases manage the data storage and allow for easy searches on calibration histories and hygiene data.

Evolution of automated instrument docking systems means users can now link up to 100 stand-alone instrument docking modules from remote locations anywhere within a facility, across the country or around the world. This connectivity allows information from each station or site to be relayed back to one central database to administer a total, centralized, instrument management program.

Tap into the power

Previously optional, datalogging features typically are included now in the base price of a monitor. Microprocessor-driven designs allow built-in extended data capacity to provide days, weeks or even months of extended-shift, continuous data recording before exceeding memory capacity. Through easy operating system

setup, managers can program datalogging intervals, TWA parameters, pause and resume choices, overwrite capability, and automated event logging.

There's something to be said about the power of data and what can be gleaned from data analysis. Gas exposure information, peak readings, STEL and TWA calculations are valuable data that help EHS professionals maintain accurate records and documentation to meet safety regulations. Tracking and reviewing gas exposure data is critical to the awareness and correction of hazardous conditions, process deficiencies or unsafe practices. If you aren't taking advantage of this powerful tool, you may be missing some key leading indicators of gas hazards in your workplace.

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