



Monitoring Gas Exposure Data: New Technologies Raise the Bar

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Tools of the trade used by industrial hygienists and environmental health and safety occupational and professionals have advanced to the point where instruments are chock-full of exceptional features, many of which come standard with the product. New or improved technologies have helped to raise the bar, as well as market expectations, resulting in better products and more choices. Portable gas detectors for monitoring and recording exposure data include microprocessor-driven electronics, next generation signal processing, state-of-the-art battery choices and enhanced data manipulation and storage.

Although the gas detection market has matured over the years, it has become increasingly technologically savvy. Just as today's students use calculators instead of slide rules, similarly, today's professionals are armed with high-tech instruments that provide more precise information in an instant. Safety managers juggle computer folders, not paper files. Intuitive software programs that graphically display the readings for the professional overwhelmed with added responsibilities have replaced manual calculations of short term exposure limits (STEL) and time weighted averages (TWA). Gas monitors have become compact personal assistants that have on-board calculations and storage of industrial hygiene measures tied to the employee(s) that used the instrument and the area(s) of exposure.

The instruments have become so intuitive and intelligent, that there has been concern that anyone can operate them therefore anyone can interpret the data stored in the unit. The fact is that the instruments' capabilities raise the bar and challenge the expectations for workplace safety by bringing more accurate data to the forefront. This supports the sense of mission idealized by the industrial hygienist or safety manager, in that they are continually seeking better working conditions for employees. The fact that anyone can operate

today's simple-to-use gas monitors and training requirements are minimal means there is no excuse for lack of worker protection from hazardous gases.

In the past, the products came as standard 4-gas monitors and professionals would need to choose the additional features they most desired and the price of the product would be calculated accordingly. These days, the apple-to-apple comparison of all the features and benefits takes a discerning evaluation. So what features can you expect to see out there in today's gas monitoring equipment? For this discussion, let's ignore the compliance-type bare bones product, and look at the versatility of the multi-gas monitors serving most industries' needs.



One to six gas monitoring with interchangeable sensors – Multi-gas designs provide flexibility of monitoring for a variety of applications. Interchangeable “smart” sensors allow you to have an instrument set up to monitor chlorine and sulfur dioxide today and configure it for carbon monoxide and nitrogen dioxide tomorrow if the need arises. This adaptability reduces operating costs and training expenses. Field-changeable sensors reduce downtime associated with instrument and sensor service.

User configurable operating system – Sophisticated programming of the instrument's operating system allows you to adjust it to your specific application for display choices, alarms, calibration, datalogging and other instrument operations.

Text / numeric display toggle – Worker efficiency and skill level may determine a manager's decision to activate a text-only vs. readings mode. A “go/no go” text-only mode provides minimal display data while real-time readings of all gases simultaneously allows the operator to view all sensor readings at a single glance. Some instruments have the ability to activate a text-only display for the end user

while at the same time having the more advanced features working in the background for industrial hygiene uses.

STEL and TWA calculations – Real-time calculations of Short Term Exposure Limits and Time Weighted Average provide managers with precise measurements for occupational health assessments.

Datalogging of gas exposure data – Previously an optional additive, 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. Accompanying downloading and graphing software provides an analytical tool for the industrial hygienist.

Data input for user and site ID recording – A data input element further enhances the 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. Field data input can be achieved manually or be automated by scanning bar codes or memory devices carried by the user or attached to the site being monitored.

Peak readings – A peak / hold function allows professionals to track peak exposures during job functions at the end of a work shift or after a monitoring incident has occurred. This feature can provide the tracking of workers' gas exposures or provide useful evidence during incident investigations without the complexity of logging data.



Latching alarms – Usually a selectable option, high alarm levels “latch” on to ensure a warning is not ignored and the user acknowledges the danger. Latching alarms cannot be turned off unless the atmosphere is clean and conditions are safe.

Security code / password protection – Management controls and configurations can be access-protected through secured login with a security code.

One button operation and calibration – User-friendly operation and maintenance through the touch of a button simplifies training and encourages field use and trust of the instrument. Simple calibration routines reduce the time and calibration gas required for each calibration.

Auto-calibration or automated calibration – Smart electronics result in simplified calibration, either through instrument push button routines, or automated calibration stations. Minimizing human error and liability through complete automation that provides hands-off calibration and record keeping reduces overall instrument operating costs and ensures proper documentation.

Calibration clock – next / last cal date – Many instruments provide the option to track and display the last calibration date and/or the next date the instrument is due for calibration. This feature allows you to be certain that the instrument has been calibrated and maintained within an acceptable time frame.

Interchangeable power supply / battery choices – Most monitors offer a variety of power sources, including the latest rechargeable battery technology which can provide round-the-clock monitoring capabilities, as well as alternate

battery power available at a moment's notice. Extended instrument run-time allows for lasting power throughout long shifts for continuous worker protection.

LEL/CH4 sensor over-range protection – An electronic switch shuts off power to the sensor after reading high levels of combustible gas, which extends the life of the sensor, ensures sensor integrity and lowers replacement costs.

Intrinsic safety certifications – One of the most important factors of using any piece of equipment in a hazardous location is knowing that the equipment can be used safely in a dangerous environment. Third-party certification from an independent agency such as Underwriters Laboratories or Canadian Standards Association ensures that the equipment is appropriate for the environment you are working in.

Ingress Protection (IP) ratings – Portable gas monitoring instruments are used in some of the harshest environments imaginable. They are carried in dusty coal mines, used on oil drilling rigs, dropped to bottom of manholes filled with water and kicked in the mud at construction sites. The ingress protection rating is used to ensure that the instrument will withstand these tough environments; that the elements that it is used in will stay outside the instrument. An IP rating of 67 means that the unit is dust tight and water tight.

Radio Frequency Interference (RFI) protection - In almost every application where portable gas monitoring instruments are used, portable communication radios are used as well. Radio Frequency Interference protection, certified to international standards, ensures that the communications equipment does not adversely affect the reliability of the monitoring equipment. False alarms caused by RFI quickly lead to a lack of confidence and mistrust in the monitoring equipment and could create the opportunity for a deadly situation to arise.



Alarms – audible, visual and vibrating – These are among

the options available and often required for providing the user of the equipment with an indication that dangerous conditions exist. It is important that the audible alarms are intense, the visual alarms bright and able to be seen from a wide angle and that a vibrating alarm is strong so that they grab your attention immediately when an alert is necessary. After all, a portable gas monitor is nothing more than an alarm that has a gas sensor attached to it.

Today's life-preserving gas monitors are technically advanced and purpose-built with features that are designed to deliver superior performance and longevity. Industrial hygienists and safety professionals need to identify what features are desirable for their various applications, environments, and future needs. Careful examination of the features and benefits of the instrumentation is the start of an evaluation that should include long-term cost of ownership, serviceability and warranty, flexibility for standardization and ease of training, manufacturers' support and reputation, and third-party proof of quality and performance standards. As the saying goes, "You get what you pay for." Or at least that's still true in some markets. Just make sure you are getting what you need.

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