Personal Monitoring vs. Industrial Hygiene

CHOICES IN GAS MONITORING INSTRUMENTATION

Author Details

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In today's gas detection market, there are a number of choices that an occupational health and safety professional faces each time he/she decides to purchase a single or multi-gas monitor. With companies downsizing, industrial hygienists and safety officers are facing this dilemma more often. There are many different things to look for when purchasing gas detection equipment. For instance, the OEHS professional must consider whether the monitor is going to be used as a personal monitor to protect workers in the field, or used for industrial hygiene and monitoring purposes.

As a buyer of portable gas detection equipment, the first thing to consider is the application in which the monitor is going to be used. Is the monitor going to be worn continuously throughout the day to provide personal safety monitoring, or will it be used intermittently to gather samples, confined space entry, or other industrial hygiene applications? For each of these situations, specific features are desired in the gas monitoring equipment.

Personal Safety Gas Monitor Considerations

When selecting a personal safety monitor, one should look for a single or multi-gas monitor that can be worn continuously throughout a work shift. This monitor will be worn between 8-12 hours a day either on the user's belt, over-alls, or hardhat. For this reason size and weight of the instrument are key features. Since each person is different, a variety of clips and carrying cases should be readily available so the user can attach the instrument to their clothing, as they desire.

Personal safety monitors should have a full feature set of alarms including low, high, TWA, STEL and low battery warnings to alert the user of any unsafe condition. When the instrument goes into alarm, loud audible, bright visual, and internal vibrating alarms alert the user that there is a hazardous condition.

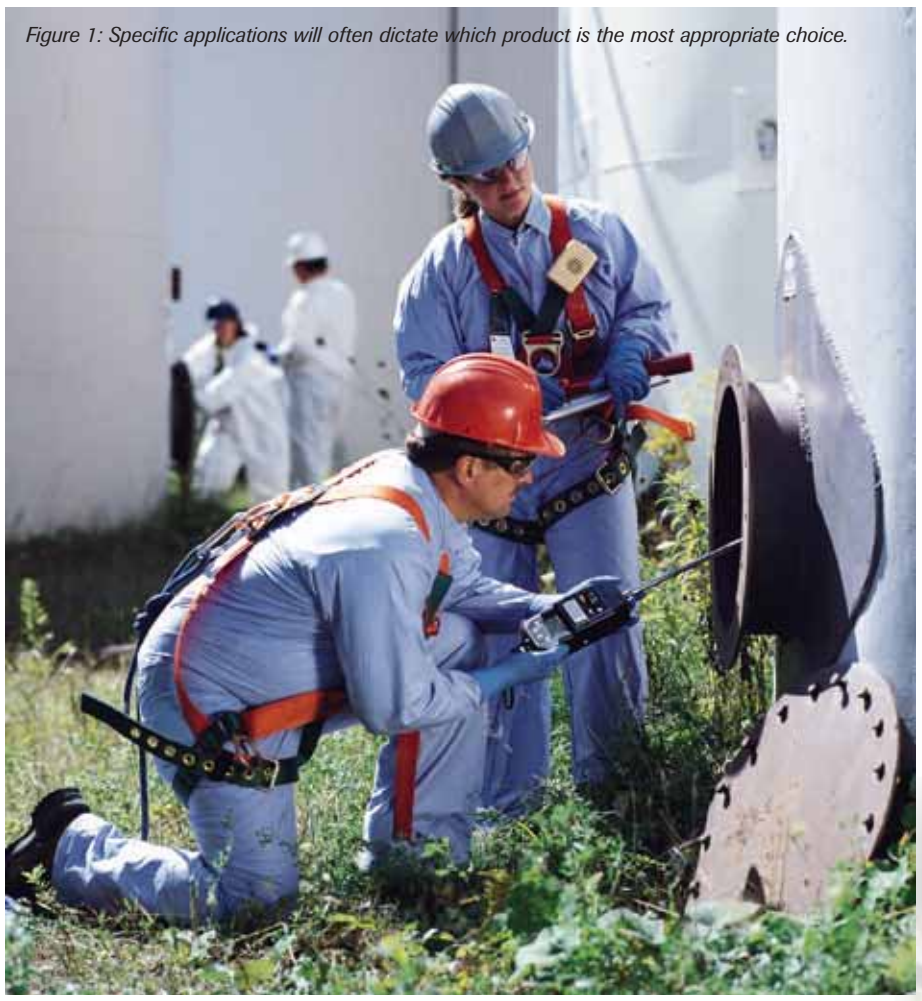

Figure 1: Specific applications will often dictate which product is the most appropriate choice.

Figure 2: Compact sized, personal multi-gas monitors are ideal for a wide variety of hazardous and confined space applications.

LCD displays to show the real-time readings are valuable so workers can see the gas concentrations and monitor battery life. LCD's can also be used for selecting menu items, setting alarms, and for user feedback for bump tests and calibration information.

For applications in which a remote sample may be taken, whether occasionally or continuously, remote sampling pumps can be used. These accessory pumps can be internal to the instrument, which will affect size and weight, or external and detachable to the unit, which offers the most flexibility for the user.

Battery options have increased over the years, providing improved features and selections. Newer battery technologies such as lithium-ion, offer extended runtimes, typically in excess of 24 hours of continuous operation on a single charge. Lithium-ion batteries have a higher charge density than other battery technologies. This allows manufacturers to use smaller batteries while achieving longer runtimes. This reduces the overall size and weight of the monitor. Finally, lithium ion batteries do not exhibit the memory effects that older nickel cadmium batteries were susceptible to.

With the everyday wear and tear these instruments face, maintenance should be a consideration in the choice of monitor. There have been many advances in maintenance tools over the past five years. Many manufacturers offer bump test and calibration stations, while others offer complete instrument management systems. Such systems will automate the bump/calibration routines, reducing time, money, and ensuring the instrument is in proper working condition.

When it comes to choosing monitors for personal protection, all these factors play a significant role in the decision making process. Decision-makers should look at all available monitors, and make an educated choice.

Industrial Hygiene Gas Monitoring Choices

Monitors that are used for industrial hygiene/monitoring applications share some of the same desired features as personal protection instruments, but there are additional features that should factor into the decision-making process. The instrument should be fully featured with a large graphic LCD display

that is used for a variety of purposes. The display allows the industrial hygienist or safety officer to take readings for confined spaces or gas samples, and instantaneously see them. Each working sensor installed in the instrument and corresponding gas reading should be displayed simultaneously on the LCD, large enough for the user to read. Visual menu-driven operating systems offer the user more features that are easy to access and program.

User adjustable low, high, STEL (short term exposure limit) and TWA (time weighted average) alarms are typically standard. When any of these alarm levels are reached, onboard audible and visual alarms alert the user of a hazardous condition. Programmable STEL and TWA time bases are also offered.

Generally, full-featured multi-gas monitors are used daily by safety officers to check for emissions, leaks, and confined space entry. They must be durable and reliable. These instruments may see some of the harshest conditions and dirtiest environments in industry. They will be dropped, sprayed with water, kicked, run over, bounced off steel objects, submerged, exposed to high concentrations of dust, or thrown into the bed of a truck. The instruments must continue to work and operate after such treatment.

The user should be able to use a remote sampling pump to draw a sample from either a well or pit, or extend a probe to check pipes for leaks or emissions. Today many remote sampling pumps are available internal to the instrument or externally attached to the instrument. Detachable pumps are a nice feature because if the pump stops working for any reason, it can be easily removed and the worker is still protected by using the instrument in a diffusion mode. There are a number of ways to power attachable pumps. Some have their own power source, while others get their power from the instrument's battery pack. The parasitic style pump eliminates the need for the user to either replace or recharge the batteries in the pump. This reduces maintenance time and replacement battery costs.

Many times datalogging capabilities are essential features of a gas monitor. Being able to capture each gas reading, temperature, instrument user ID, site ID, and time/date of a sample are all valuable information that most safety officers and hygienists require. A number of options are available for users to log this information. User-selectable logging intervals from one second up to five minutes are available. Some special features such as "log on alarm" 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. More advanced datalogging systems let the users know how long the data logger has been turned on, or how long until the datalogger's memory is full. Data can be extracted from the instrument and viewed or saved on a PC. This allows for analysis later on as well as record-keeping.

Advances in instrument maintenance and management have been made over the past couple of years. These improvements significantly help today's hygienist and safety officers maintain records and calibrate/test the instruments. Instrument docking systems are available that allow users to charge the instrument, download the hygiene data, schedule routine calibrations and bump tests, and run diagnostic tests. More advanced systems allow users in multiple locations to share data over networks. This allows companies with multiple locations in a city, or around to world to manage and store all of their instrument data in one centralized location. Being able schedule bump testing and calibration reduces maintenance time and cost for the end user. These functions can be programmed to happen automatically on a specific day and time. This will allow the user to "dock" their instrument

Figure 3: Systems such as the Docking Station provide automated instrument management and recordkeeping.

at the end of their working day and come in the next day to pick up their unit, knowing it has been properly calibrated, tested, and charged.

No matter if you are using the instrument for personal monitoring or industrial hygiene, proper maintenance of the instruments is strongly recommended. Bump testing the instrument prior to each days use with a known concentration of gas ensures that the sensors are responding. Regularly scheduled calibrations ensure that the instruments are accurate and working properly. Choosing the right instrument for the job and properly maintaining it are keys to ensuring worker safety and personal protection.

The next time you are faced with the decision to buy a gas monitor, take a few moments to think about what application the instrument is going to be used for. Don't settle on something that might work in some circumstances but may compromise health and safety in others. Considering the application, environment, maintenance, end user, and the features of the products and ultimately this will lead you to purchasing the best instrument for the job.

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