

Response Time of Gas Detectors



Have you ever considered the response time of your gas detector?

Humans walk at around 80 metres per minute; some gas detectors take up to a minute to respond, by then you may be 80 meters from the sampling point!

Gas detection is a fundamental requirement in maintaining a safe working environment. To determine the composition of an atmosphere, reliable fast response instruments should be used to draw air samples. If possible, do not open the entry portal to the confined space before samples have been taken. Sudden changes in atmospheric composition within the confined space could cause violent reactions, or dilute the contaminants in the confined space, giving false low gas concentration readings.

Always test in the following order:

1. Oxygen content
2. Flammable gases and vapours
3. Potential toxic air contaminants

Some gases are heavier than air, and tend to collect at the bottom of a confined space. Others are lighter, and usually collect near the top of the confined space. Still others are the same molecular weight as air, so they can be found in varying concentrations throughout the space. This is why test samples should be drawn at the top, middle and bottom of the space.

In order for combustion to occur, there must be three elements: Fuel, oxygen and heat. If you remove any one of these elements, combustion will not occur. Knowing the percentage of combustible gas in the air is important as well. For example, a manhole filled with fresh air is gradually filled by a leak of combustible gas, mixing with the fresh air. As the ratio of gases changes, it passes through three ranges: lean, explosive and rich. In the lean range, there isn't enough gas in the air to burn. While the rich range has too much gas and not enough air to burn. In the explosive range there is just the right combination to form an explosive mixture. Care must be taken with rich mixtures as dilution with fresh air could bring the mixture into the flammable or explosive range.

Compact, battery-powered devices such as MSA's ALTAIR 4X or SX can be used to measure levels of oxygen, combustible or toxic gases. When measuring for toxic gases the monitor uses an electrochemical cell. If the gas of interest enters the cell, a current is produced proportional to the amount of gas in the sample, if this amount exceeds a preset level audible and visible alarms will sound. These devices are well suited for use in confined spaces containing motors or engines, which can generate large quantities of CO. They are also ideal for use in sewers, waste treatment plants and "sour crude" processing stations which tend to have hazardous volumes of H₂S.

To ensure the accuracy of all monitoring and detection equipment, calibration should be performed regularly and the instrument adjusted if the reading differs significantly from the values of the known standard. Automated bump and calibration units such as MSA's GALAXY unit make this task simple and economical while removing the risk of human error from the process.

Recently safety alerts were issued in mining to warn people of the potential to walk into hazards whilst being distracted or awaiting for sensor response, particularly to rapidly depleting oxygen. MSA's new XCELL sensors have a typical response time of less than 15 seconds for all sensors including oxygen, four times faster than the required response time (AS/NZS) and up to eight times faster compared to some industrial detectors.

Speed is everything, how fast is the sensor in your gas detector?

Note: This bulletin contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products.



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