



A short guide to  
gas monitoring in  
**LABORATORIES**

**ANALOX**  
Sensor Technology

# HOW ARE GASES USED IN LABORATORIES?

There are many different gases which are used in different laboratories. Some of the key ones are:

## Carbon dioxide

Carbon dioxide gas ( $\text{CO}_2$ ) is widely used as a laboratory gas in incubators, gas chromatography machines and mass spectrometers and sample transportation. Dry ice is also made of carbon dioxide, which can be used to freeze specimens and in cryogenic applications.



## Nitrogen and inert gases

Inert gases (often known as 'noble gases') such as neon (Ne), argon (Ar) and helium (He), as well as nitrogen (N), are used as carrier gases in laboratories as they are unreactive.

Inert gases are also used in cryogenics, and to preserve specimens.

Reactions are often conducted under an inert gas environment rather than air in order to minimise the risk of fire.



## Enriched oxygen

Laboratories also store and operate with high levels of enriched oxygen ( $\text{O}_2$ ) is used in gas production and gas blending stations.



# THE DANGERS OF A GAS LEAK

Many gases used in laboratories have no taste, colour or smell, which makes it hard to tell if there is a gas leak.

All it takes is a leak from a gas cylinder or fixed piped gas system to cause a potentially fatal incident.

## Carbon dioxide

Carbon dioxide is naturally present in the air, but an increase in concentration can be dangerous and can cause effects including headaches, reduced hearing and sight and an increase in blood pressure. Higher levels can cause unconsciousness, coma and eventually death. Carbon dioxide is heavier than air and can concentrate at ground level.

If you get a monitor, it is essential to put the central unit or alarm at head height so you don't have to bend down to read it.

We sometimes see people getting carbon dioxide and carbon monoxide confused. The two are totally different gases and need to be monitored in different ways.

## Inert gas

Like nitrogen, inert gases displace oxygen in the atmosphere, causing oxygen levels to deplete. This causes asphyxiation which can lead to unconsciousness and death from suffocation.

## Nitrogen

Nitrogen displaces oxygen in the atmosphere and an increase could mean that oxygen drops to dangerous levels causing asphyxiation.

Liquid nitrogen expands when it evaporates. One litre can turn into approximately 700 litres of gas, which can cause an oxygen-deficient atmosphere really quickly. In 2011, a scientist was found dead in a laboratory after using liquid nitrogen to freeze blood samples.

## Enriched Oxygen

Enriched oxygen increases the flammability of any combustible matter in the vicinity, causing a potential fire risk.

Enriched oxygen can also be toxic, with high levels causing damage to the body.

# WHICH GAS MONITOR IS RIGHT FOR ME?

## The Ax60+ - our fully customisable solution



The **Ax60+** is a wall-mountable customisable product which comes with a central display unit, sensor units and alarm units. The sensor options we currently offer are O<sub>2</sub> for enrichment and also depletion from inert gases, and CO<sub>2</sub>. There is scope for additional gases to be developed and added in the future. The CO<sub>2</sub> and O<sub>2</sub> sensors are interchangeable and can be fully integrated as part of a multi-point, multi-gas detection and alarm system.

The Ax60+ can be connected to a maximum of four sensors and eight alarms, making it fully customisable for both small and large laboratories. Alarm set-points can be fully customised by the user to adhere to specific local regulations.

## The Aspida - portable and backup monitoring

The **Aspida** is our hand-held gas monitor which can be used to personally protect staff from the dangers of a leak of carbon dioxide, enriched oxygen or inert gas. It is easily clipped on the belt of the user. It is also useful as backup when a primary gas monitoring system fails.

The Aspida can be used to monitor carbon dioxide or oxygen or can also come as a dual monitor which can monitor both. It offers audio/visual alarms, data logging and a man down alarm.



## The O2NE+ - accurate oxygen depletion monitor

The **O2NE+** is an easy to use oxygen deficiency monitor which can be used to detect nitrogen leaks, as well as any other inert gases. It comprises of a wall mounted main sensor unit and a repeater to warn of danger outside of the room.

It is ranged from 0 to 25% and has two low audio/visual alarms. The sensor is long life and calibration is only required every 12 months which can be achieved using certified air.

What is an oxygen depletion monitor?



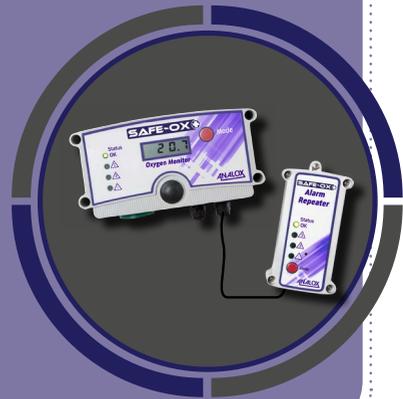
## The Safe-Ox+ - ideal for low and high oxygen levels

Ideal for use in laboratories where nitrogen, inert gases and enriched oxygen are used, the **Safe-Ox+** monitors both low and high levels of oxygen in the atmosphere.

It consists of a wall mounted main sensor unit and a repeater. It is ranged from 0 to 25% and has 1 low and 1 high audio/visual alarm. The sensor is long life and calibration is only required every 12 months which can be achieved using certified air.

The Safe-Ox+ has been installed across laboratories at the Centre for Process Innovation (CPI), which is based in the UK.

How can high levels of oxygen be dangerous?



## OEM Solutions

We also offer a range of highly accurate, robust original equipment manufacturer (OEM) sensors, which you can use in your own gas monitoring systems.

The **5S3** and **MIR** are infrared carbon dioxide sensors whilst the **MEC range** can monitor a range of gases.

# IS IT THE LAW TO HAVE A GAS MONITOR?



It depends on which country you are in. Some countries have standards and recommendations when it comes to gases, and others don't.

The US-based **OSHA (Occupational Safety and Health Administration)** and European **EH40** standards both have set permissible exposure limits for gases.

**Italy has established a set of guidelines** for storing nitrogen in laboratories, stating that laboratories must have an oxygen sensor in the area deemed at risk and a detection unit to highlight any danger before personnel enter, is placed outside the room.

Singapore has the **Workplace Safety and Health (WSH) Act** which aims to protect workers in all workplaces.

There are also guidelines and legislation that are applicable in a laboratory environment, including **The Confined Spaces Regulations 1997** and The Corporate Homicide Act 2007.

Bear in mind that it is not a legal requirement to follow standards, but even if it is not a legal requirement to have a gas monitor; it is highly advisable to have one in order to ensure the safety of your staff and customers.

# I WANT TO KNOW MORE

If you would like to know more about gas monitoring, why not sign up to our blog where you will receive an article once a week, straight to your inbox.



Sign up to our blog

If you work in the laboratory industry and are considering a gas monitor, we are more than happy to help recommend the perfect gas monitor for you. Contact us today and we will help you choose.



Contact us

If you know which gas monitor you need, you can visit our distributor section to find your nearest supplier.



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