

Understanding Gases

Oxygen

Number 8 on the Periodic Table, Oxygen (O) has eight protons in the nucleus and is pale blue in its liquid and solid states.

A non-metal element, Oxygen is colourless gas at room temperature, making up 21 percent of Earth's atmosphere.



Blood absorbs Oxygen from the air in our lungs to fuel the cells in our bodies. If Oxygen levels are depleted, we are in danger of serious injury or death. However, it is not unusual for an exposed person to be unaware of the symptoms.



However, if over-exposed to Oxygen, symptoms are more obvious as the increased levels of Oxygen in the lungs will overwhelm the blood's ability to carry it away.

16%

A 16% increase in volume leads to increased breathing and heart rate, drowsiness and nausea as free Oxygen binds to the surface proteins of the lungs, interfering with the operation of the central nervous system and attacking the retina

What are the dangers of Oxygen?

Oxygen is an essential component for life, consumed during respiration, however, high concentrations cause an enriched environment which can lead to accelerated combustion.

Increased Oxygen levels (enrichment) dramatically increases the flammability of combustible matter. Materials which do not burn readily in air, such as metals, can become readily combustible in Oxygen enriched atmospheres and spontaneous combustion can occur.

Risks can also occur with reduced Oxygen levels. Reduced Oxygen levels (depletion) can happen by the increased presence of other gases (e.g. Nitrogen, or Helium). Oxygen depletion can also occur due to biological or chemical processes.

All these situations pose a significant risk to life. However, oxygen depletion, in particular, can lead to drowsiness, unconsciousness, brain damage and death.

Why and where would Oxygen detection be required?

Oxygen detection is important anywhere where inert gases or Oxygen are used or stored as oxygen can be displaced by other gases. It is particularly important in confined spaces within laboratories, hospital MRI suites, food and chemical plants.

How do you detect, measure and report on Oxygen?

Detector placement needs to consider both air movement and breathing height. Oxygen detectors are frequently located at approximate head height so that they can monitor the air that best reflects what workers are breathing and give early notification of a potential problem.

In depletion applications, the density of the depleting gas, for example Helium, also needs to be considered as it will rise. Helium applications typically have special alarm levels, as Helium increases the rate at which Oxygen diffuses into the sensor.



Increased levels of oxygen may dramatically increase the flammability of any combustible matter.



Oxygen depletion: Exposure to atmospheres containing between 10% and 13% oxygen can bring about unconsciousness very rapidly; death comes very quickly if the oxygen level drops below 6% volume.



Oxygen O₂ is a gas without color, taste or smell.