



WHITE PAPER

The Importance of Gas Detection in Wineries

Solving the problem of dangerous gas exposure in wineries

▶ Wineries face a unique set of challenges when it comes to safeguarding workers from the potential harm caused by hazardous gases.

Gas exposure has the potential to occur at every stage of the wine production process, from the moment that the grapes arrive at the winery facility, through to the fermentation and bottling activities. Care must be taken at each stage to ensure that workers are not exposed to unnecessary risk.

There are several specific environments within the winery facility that pose a risk of gas leakage and exposure, including fermentation rooms, pits, barrel cellars, sumps, storage tanks and bottling rooms.

The main gas hazards that are found during the winemaking process are carbon dioxide, and oxygen displacement, but also hydrogen sulphide, sulphur dioxide, ethyl alcohol and carbon monoxide.

In this whitepaper, we will take an in-depth look at how these gas hazards may arise, what the health implications are for employees, and what you can do to mitigate the risk.

Fermentation rooms, tank rooms, and cellars are all places that may pose a risk.

What Are The Dangers?

Open Fermentation Tanks

Any worker whose job involves carrying out operations over an open fermentation vessel or tank may be at a high risk of gas exposure, especially to CO₂, or oxygen depletion. It has been shown that a worker who leans over the top of an open fermenter during full production, even though they may be as much as 10 feet off the ground, can potentially be exposed to 100% CO₂. Therefore, particular care and attention to gas detection should be taken in these areas.

Exposure Due To Inadequate Ventilation

The fermentation process needs to take place in environments that are well ventilated to avoid the build-up of toxic and asphyxiant gases. Fermentation rooms, tank rooms, and cellars are all places that may pose a risk. During cold weather or night time, increased levels of gas may build up as door and window vents may be shut.

Confined Spaces

Confined spaces such as pits and sumps are often problematic and well known for the potential build-up of hazardous gases. The definition of a confined space in a winery is one that contains, or may contain, a hazardous atmosphere, has the potential for engulfment by material, or an entrant to the environment may become trapped or asphyxiated.

Multiple Units

As a winery grows and expands their operations, they may want to add new production units to meet the demand. However, it is important to remember that potential gas exposure risks differ between environments, e.g. the gas risk in a fermentation cellar is not the same as a barrel room. Therefore, different types of gas detectors may be needed in different areas.



Regulations

All businesses and commercial properties in the UK are covered by the [Health & Safety Executive \(HSE\) EH40/2005 Workplace Exposure Limits](#).

Here are the safe working limits (in parts per million) for the most common gas hazards found in wineries:

	Safe working limits	
	Long term exposure	Short-term exposure
Hydrogen Sulphide (H ₂ S)	5 ppm	10 ppm
Sulphur Dioxide (SO ₂)	0.5 ppm	1 ppm
Ethanol (ethyl alcohol)	1000 ppm	no set safe working limit
Carbon Dioxide (CO ₂)	5,000 ppm	15,000 ppm.

(NB: long-term exposure refers to an 8 hour reference period, short-term exposure refers to a 15 minute reference period)



Potential Health Impact of Gas Exposure

Hydrogen Sulphide (H₂S)

Hydrogen sulphide poses severe respiratory risks, even at a relatively low concentration in the air. The gas is very easily and rapidly absorbed into the bloodstream through the lung tissue, which means it is distributed throughout the whole body very quickly.

The main health effects of hydrogen sulphide are respiratory paralysis, convulsions, and at higher concentrations, cardiac arrhythmias, coma, and death. Fatalities can occur within minutes of inhalation of hydrogen sulphide in a high concentration. Fortunately it is rare for the lower concentrations present in breweries.

Sulphur Dioxide (SO₂)

Sulphur dioxide is a gas that can cause irritation to the airways, nose, and throat. Workers who are exposed to high levels of sulphur dioxide may experience vomiting, nausea, stomach cramps, and irritation or corrosive damage to the lungs and airways. Long-term inhalation of sulphur dioxide at any concentration can lead to chronic and acute breathing problems.

Contact with the skin can cause soreness, blisters, and rashes. Eye contact may cause irritation, and in very high concentrations, unusual in brewery or winery settings, even blindness.

Ethanol (ethyl alcohol)

The fumes given off by ethanol or ethyl alcohol can irritate the airways and lungs if inhaled, with the possibility of intense coughing and choking. Exposure to a high concentration of ethanol fumes over a long period of time may cause confusion, blurred vision, vomiting, sweating, and mobility problems. It can also irritate the skin, causing soreness, swelling, or rashes.

Carbon Dioxide (CO₂)

Carbon dioxide in the air can cause headaches, dizziness, and at high concentrations breathing problems and asphyxiation. It is especially harmful to health in confined spaces such as tanks and cellars, as it can displace oxygen. Carbon dioxide is 1½ times as heavy as air so it collects from the floor up.



When it comes to preventing accidental gas exposure, winery owners have a responsibility to take as many available precautions as possible.

Responsibilities for winery owners

When it comes to preventing accidental gas exposure, winery owners have a responsibility to take as many available precautions as possible.

The HSE oversees health and safety in the workplace in the UK and they are in charge of making sure that employers comply with the Control of Substances Hazardous to Health (COSHH) legislation.

COSHH states that all employers must control any substances that may be hazardous to health in the workplace. The risk of potential gas exposure must be assessed and managed carefully to make sure that workplace exposure limits are not exceeded.

The most effective way to reach compliance with COSHH legislation is to use gas detectors to alert you and your employees to unsafe levels of hazardous gas in the atmosphere.

Here at Crowcon, we provide a variety of in-situ and portable gas detectors which are capable of detecting and alerting you to the presence of many different gases, including hydrogen sulphide, sulphur dioxide, ethanol, and carbon dioxide.

Contact us today to find out [more](#)

