EIGA believes that all workers should understand and search for potential asphyxiation hazards, in enclosed spaces as well as near to equipment containing gases or cryogenic liquids... take care and warn others.
EIGA Life Saving Rule

This leaflet contains only an outline summary of the hazards of inert gases and methods that can be used to control the risks in the workplace.

Visit the EIGA website to obtain information about asphyxiation, oxygen deficiency or the hazards of inert gases.

Doc 44 - Hazards of Oxygen Deficient Atmospheres

Doc 40 - Work Permit Systems

Safety Info 24 - Carbon Dioxide Physiological Hazards

These will help you to train your staff and create safe systems of work in your operations when using inert gases.

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EIGA

I am invisible

I am silent

I have no smell

and I am a killer

European Industrial Gases Association
www.eiga.eu

DANGER ASPHYXIATION

Asphyxiation - the hidden killer

Common risks & hazards –

Be aware and be safe

Each year there are a number of deaths reported to EIGA that involve asphyxiation caused by industrial gases. The majority of these fatalities are caused by people entering a confined space where there is an oxygen deficient atmosphere, usually caused by the presence of an inert gas.

Cause & Effect

Rather than being due to unforeseen circumstances, most cases of death by industrial gas asphyxiation are the result of a failure of health and safety procedures. Most failures follow a familiar pattern and reveal:

- Incorrectly applied working procedures (e.g. work-permit)
- Insufficient training, awareness and supervision
- Inadequate management controls
- No, or inadequate, risk assessment

Know the Hazard

- Many gases, in particular inert gases, give no warning - the human body does not detect oxygen deficiency
- Oxygen is life - Without sufficient oxygen you cannot live
- Normally, air contains 21% oxygen, however the hazard potential increases significantly once the concentration falls below 18%
- Below 10% oxygen, fainting occurs without warning, brain damage and then death occur in a few minutes unless resuscitation is carried out immediately
- Just two breaths of nitrogen or other inert gas causes immediate loss of consciousness and death follows rapidly
- Carbon dioxide presents an intoxication as well as an asphyxiation hazard. For example it is possible to have an atmosphere with 21% oxygen, but with a concentration of carbon dioxide of 5% or more it will be a potentially lethal environment.

Observe the regulations and procedures –

Know your responsibilities

Confined Spaces

Many confined spaces where asphyxiation accidents can occur, such as closed tanks, vessels and sewers, are generally easy to identify. Others are less obvious, but equally dangerous; for example open topped tanks, vats, closed and unventilated rooms and cellars.

Accidents due to oxygen deficient atmospheres have been caused by:

- Entry into confined spaces which had not been purged into a breathable atmosphere
- Process lines which had not been adequately isolated
- Leaks from cylinders or hoses
- Spillages from dewars
- Process vents which had not been routed to a safe area
- Connecting the wrong gases to breathing systems
- Incorrect operation of food freezing tunnels

Other activities which carry a risk of asphyxiation include:

- Filling open dewars/Transport of dewars in closed vehicles
- Incorrect use of breathing gas container adaptors
- Using gases in unventilated cellars and basements
- Filling and emptying solid carbon dioxide containers
- Attempting rescue without first considering asphyxiation risks

Before entering a confined space, a safe system of work must be developed that has identified all the hazards and ensured that the necessary controls are in place to ensure workers are not exposed to oxygen deficient atmospheres

A safe system of work would typically be in the form of a comprehensive “permit to work” and would include requirements for:

- Risk assessments & method statements
- Physical isolations
- Safe access & egress
- Gas analysis & personal monitors
- Standby man and rescue plan, including equipment
- Respiratory protective equipment