



For further information
visit www.eiga.org

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 free downloads of the following important documents;

Newsletter 77/03 - Campaign Against Asphyxiation

Presentation - Oxygen Deficiency

Doc 44/00 - Hazards of Inert Gases

Doc 40/02 - Work Permit Systems

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

Other publications that specifically address the control of the risks of asphyxiation in the UK can be purchased from the following:



British Compressed Gases Association's Guidance Notes:

GN11 Use of Gases in the Workplace: the Management of Risks Associated with Reduced Oxygen Atmospheres

GN9 The Application of the Confined Spaces Regulations to the Drinks Dispense Industry

Call BCGA on **01491 825533** or access www.bcgga.co.uk



HSE's Approved Code of Practice

L101 Safe Work in Confined Spaces (includes the Confined Spaces Regulations 1997)

Call **01787 881165** or access www.hsebooks.co.uk



British Compressed Gases Association
6 St Mary's Street
Wallingford OX10 0EL
enquiries@bcga.co.uk - www.bcgga.co.uk



European Industrial Gases Association
Avenue des Arts 3-5
B-1210 Brussels
info@eiga.org - www.eiga.org

I am
invisible

I am **silent**

I have
no smell

and I am a
killer.



DANGER ASPHYXIATION

Asphyxiation - the hidden killer.

Common risks & hazards - Be aware and be safe

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

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**
- **Insufficient training and supervision**
- **Inadequate management controls**

Know the Hazard

- Inert gases give no warning - the human body does not detect oxygen deficiency
- Oxygen is life - Without enough oxygen you cannot live
- Normally, air contains 21% oxygen, but becomes hazardous when the concentration falls to 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

Observe the regulations - Know your responsibilities

Confined Spaces

Many confined spaces where asphyxiation accidents may 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**

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 equipment**
- **Respiratory protective equipment**

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**
- **Connecting the wrong gases to breathing systems**
- **Incorrect operation of food freezing tunnels**
- **Using gases in unventilated cellars and basements**
- **Filling and emptying solid CO₂ containers**
- **Attempting rescue without first considering asphyxiation risks**



DANGER ASPHYXIATION