

**Carbon monoxide****ALSA019**

2.3 : Toxic gas.



2.1 : flammable gas.

**Danger****SECTION 1. Identification of the substance/mixture and of the company/undertaking****Product identifier**

Trade name : Carbon monoxide  
SDS Nr : ALSA019  
Chemical description : Carbon monoxide  
CAS No :000630-08-0  
EC No :211-128-3  
Index No :006-001-00-2  
Registration-No. : Registration no : 01-2119480165-39  
Chemical formula : CO

**Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use. Laboratory use Use for metal treatment Chemical reaction / Synthesis.  
Contact supplier for more uses information

**Details of the supplier of the safety data sheet**

Company identification : AIR LIQUIDE (PTY) LTD  
Crn Vereeniging Road & Andre Marais Street  
Alrode, Alberton  
Gauteng SOUTH AFRICA  
Tel. : +27 87 288 1100  
E-Mail address (competent person) : scr.sales@airliquide.com

**Emergency telephone number**

Emergency telephone number : +27 87 288 1100

**SECTION 2. Hazards identification****Classification of the substance or mixture****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

- Health hazards : Acute toxicity, Inhalation - Category 3 - Danger - (CLP : Acute Tox. 3) - H331  
Reproductive toxicity - Unborn Child - Category 1A - Danger - (CLP : Repr. 1A) - H360D  
Specific Target Organ Toxicity - Repeated exposure - Category 1 - Danger - (CLP : STOT RE 1) - H372
- Physical hazards : Flammable gases - Category 1 - Danger - (CLP : Flam. Gas 1) - H220  
Gases under pressure - Compressed gas - Warning - (CLP : Press. Gas) - H280

**Classification EC 67/548 or EC 1999/45**

: F+; R12  
Repr. Cat. 1; R61  
T; R23-R48/23

**Carbon monoxide**
**ALSA019**
**SECTION 2. Hazards identification (continued)**
**Label elements**
**Labelling Regulation EC 1272/2008 (CLP)**

## • Hazard pictograms



## • Hazard pictograms code

: GHS06 - GHS02 - GHS08 - GHS04

## • Signal word

: Danger

## • Hazard statements

 : H331 - Toxic if inhaled.  
 H220 - Extremely flammable gas.  
 H360D - May damage the unborn child.  
 H372 - Causes damage to organs through prolonged or repeated exposure.  
 H280 - Contains gas under pressure; may explode if heated.

## • Precautionary statements

## - Prevention

 : P260 - Do not breathe gas, vapours.  
 P210 - Keep away from heat, sparks, open flames or hot surfaces. – No smoking.  
 P202 - Do not handle until all safety precautions have been read and understood.

## - Response

 : P304+P340+P315 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention.  
 P308+P313 - If exposed or concerned : get medical advice.  
 P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
 P381 - Eliminate all ignition sources if safe to do so.

## - Storage

 : P405 - Store locked up.  
 P403 - Store in a well-ventilated place.

**Other hazards**

: None.

**SECTION 3. Composition/information on ingredients**
**Substance / 3.2. Mixture**

Substance.

Substance name	Contents	CAS No	EC No	Index No	Registration no	Classification
Carbon monoxide	: 100 %	630-08-0	211-128-3	006-001-00-2	01-2119480165-39	F+; R12 Repr. Cat. 1; R61 T; R23-48/23 ----- Flam. Gas 1 (H220) Repr. 1A (H360D) Acute Tox. 3 (H331) STOT RE 1 (H372) Press. Gas (H280)

Contains no other components or impurities which will influence the classification of the product.

\* 1: Listed in Annex IV / V REACH, exempted from registration.

\* 2: Registration deadline not expired.

\* 3: Registration not required: Substance manufactured or imported &lt; 1t/y

Full text of R-phrases see chapter 16. Full text of H-statements see chapter 16

**Carbon monoxide****ALSA019****SECTION 4. First aid measures****Description of first aid measures**

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- Skin contact : Adverse effects not expected from this product.
- Eye contact : Adverse effects not expected from this product.
- Ingestion : Ingestion is not considered a potential route of exposure.

**Most important symptoms and effects, both acute and delayed**

- : Symptoms may include dizziness, headache, nausea and loss of co-ordination. Delayed adverse effects possible. Refer to section 11.

**Indication of any immediate medical attention and special treatment needed**

- : Obtain medical assistance.

**SECTION 5. Fire-fighting measures****Extinguishing media****Extinguishing media**

- Suitable extinguishing media : All known extinguishants can be used.

**Special hazards arising from the substance or mixture**

- Specific hazards** : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products** : None.

**Advice for fire-fighters**

- Specific methods** : If possible, stop flow of product.  
Coordinate fire measure to the surrounding fire. Cool endangered containers with water spray jet from a protected position. Do not empty contaminated fire water into drains.  
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
- Special protective equipment for fire fighters** : Use self-contained breathing apparatus.

**SECTION 6. Accidental release measures****Personal precautions, protective equipment and emergency procedures**

- : Try to stop release.  
Evacuate area.  
Consider the risk of potentially explosive atmospheres.  
Eliminate ignition sources.  
Monitor concentration of released product.  
Ensure adequate air ventilation.  
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

**Environmental precautions**

- : Try to stop release.

**Methods and material for containment and cleaning up**

- : Ventilate area.

**Reference to other sections**

- : See also sections 8 and 13.

**Carbon monoxide****ALSA019****SECTION 7. Handling and storage****Precautions for safe handling****Safe use of the product**

: Only experienced and properly instructed persons should handle gases under pressure. The product must be handled in accordance with good industrial hygiene and safety procedures.  
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.  
Avoid exposure, obtain special instructions before use.  
Take precautionary measures against static discharge.  
Purge air from system before introducing gas.  
Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.  
Keep away from ignition sources (including static discharges).  
Do not smoke while handling product.  
Assess the risk of potentially explosive atmosphere and the need for explosion-proof equipment.  
Consider the use only non-sparking tools.  
Ensure the complete gas system was (or is regularly) checked for leaks before use.  
Installation of a cross purge assembly between the cylinder and the regulator is recommended.  
Avoid suck back of water, acid and alkalis.

**Safe handling of the gas receptacle**

: Refer to supplier's container handling instructions.  
Suck back of water into the container must be prevented.  
Do not allow backfeed into the container.  
Protect cylinders from physical damage; do not drag, roll, slide or drop.  
When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.  
Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.  
If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.  
Never attempt to repair or modify container valves or safety relief devices.  
Damaged valves should be reported immediately to the supplier.  
Keep container valve outlets clean and free from contaminants particularly oil and water.  
Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.  
Close container valve after each use and when empty, even if still connected to equipment.  
Never attempt to transfer gases from one cylinder/container to another.  
Never use direct flame or electrical heating devices to raise the pressure of a container.  
Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

**Conditions for safe storage, including any incompatibilities**

: Keep container below 50°C in a well ventilated place.  
Segregate from oxidant gases and other oxidants in store. Containers should be stored in the vertical position and properly secured to prevent toppling. Stored containers should be periodically checked for general condition and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials. All electrical equipment in the storage areas should be compatible with the risk of potentially explosive atmosphere.  
Observe all regulations and local requirements regarding storage of containers.  
Containers should not be stored in conditions likely to encourage corrosion.

**Specific end use(s)**

: None.

**Carbon monoxide****ALSA019****SECTION 8. Exposure controls/personal protection****Control parameters**

<b>Occupational Exposure Limits</b>	: Carbon monoxide : TLV <sup>©</sup> -TWA [ppm] : 25 Carbon monoxide : ILV (EU) - 8 H - [ppm] : 20 Carbon monoxide : ILV (EU) - 15 min - [mg/m <sup>3</sup> ] : 117 Carbon monoxide : ILV (EU) - 15 min - [ppm] : 100 Carbon monoxide : ILV (EU) - 8 H - [mg/m <sup>3</sup> ] : 23
<b>DNEL: Derived no effect level</b>	: 20ppm long term / 100ppm short term
<b>PNEC: Predicted no effect concentration</b>	: None available. Substance is a gas and is extremely unlikely to reside in the aquatic compartment

**Exposure controls**

<b>Appropriate engineering controls</b>	: Product to be handled in a closed system and under strictly controlled conditions. Preferably use only permanent leak-tight installations (e.g. welded pipes). Ensure exposure is below occupational exposure limits (where available). Consider work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Provide adequate general and local exhaust ventilation. Alarm detectors should be used when toxic gases may be released.
<b>Individual protection measures, e.g. personal protective equipment</b>	: A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Wear leather safety gloves and safety shoes when handling cylinders. Consider the use of flame resistant anti-static safety clothing. Wear safety glasses with side shields
<b>Environmental exposure controls</b>	: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

**SECTION 9. Physical and chemical properties****Information on basic physical and chemical properties**

<b>Appearance</b>	
- Physical state at 20°C / 101.3kPa	: Gas.
- Colour	: Colourless.
Odour	: Odourless.
Odour threshold	: Odour threshold is subjective and inadequate to warn for overexposure.
Molar mass [g/mol]	: 28
Melting point [°C]	: -205
Boiling point [°C]	: -192
Critical temperature [°C]	: -140
Flash point [°C]	: Not applicable for gases and gas-mixtures.
Evaporation rate (ether=1)	: Not applicable for gases and gas-mixtures.
Flammability range [vol% in air]	: 10.9 to 76
Vapour pressure [20°C]	: Not applicable.
Relative density, gas (air=1)	: 1
Relative density, liquid (water=1)	: 0.79
Solubility in water [mg/l]	: 30
Partition coefficient n-octanol/water	: 1.78
Auto-ignition temperature [°C]	: 620
• Oxidising properties	: Not applicable.

**Other information**

<b>Other data</b>	: None.
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**Carbon monoxide****ALSA019****SECTION 10. Stability and reactivity****Reactivity**

: No reactivity hazard other than the effects described in sub-sections below.

**Chemical stability**

: Stable under normal conditions.

**Possibility of hazardous reactions**: Can form explosive mixture with air.  
May react violently with oxidants.**Conditions to avoid**

: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

**Incompatible materials**: Air, Oxidiser.  
For additional information on compatibility refer to ISO 11114**Hazardous decomposition products**

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**SECTION 11. Toxicological information****Information on toxicological effects**

<b>Acute toxicity</b>	: Toxic if inhaled.
<b>Rat inhalation LC50 [ppm/4h]</b>	: 1300
<b>Skin corrosion/irritation</b>	: No known effects from this product.
<b>Serious eye damage/irritation</b>	: No known effects from this product.
<b>Respiratory or skin sensitisation</b>	: No known effects from this product.
<b>LC50 [ppm/1h]</b>	: 1880 ADR P200 / ISO 10298
<b>Carcinogenicity</b>	: No known effects from this product.
<b>Germ cell mutagenicity</b>	: No known effects from this product.
<b>Reproductive toxicity</b>	: May impair fertility and cause harm to the unborn child.
<b>STOT-single exposure</b>	: Suppresses the oxygen uptake by red blood cells.
<b>STOT-repeated exposure</b>	: Causes damage to organs through prolonged or repeated exposure.
<b>Aspiration hazard</b>	: Not applicable for gases and gas-mixtures.

**SECTION 12. Ecological information****Toxicity**

: No data available.

**Persistence - degradability**: Will not undergo hydrolysis.  
Not readily biodegradable.  
Not applicable for inorganic gases.**Bioaccumulative potential**

: Not expected to bioaccumulate due to the low log Kow.

**Mobility in soil**

: Because of its high volatility, the product is unlikely to cause ground or water pollution.

**Results of PBT and vPvB assessment**

: Not classified as PBT or vPvB.

**Carbon monoxide****ALSA019****SECTION 12. Ecological information (continued)****Other adverse effects**

Effect on ozone layer : None.  
Global warming potential [CO2=1] : 1.9  
Effect on the global warming : No known effects from this product.

**SECTION 13. Disposal considerations****Waste treatment methods**

: Must not be discharged to atmosphere.  
Do not discharge into areas where there is a risk of forming an explosive mixture with air.  
Waste gas should be flared through a suitable burner with flash back arrestor.  
Refer to the code of practice of EIGA (Doc. 30/10 "Disposal of Gases, downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods  
Contact supplier if guidance is required.

**Additional information**

: None.

**SECTION 14. Transport information**

UN number : 1016

Labelling ADR, IMDG, IATA



: 2.1 : flammable gas.  
2.3 : Toxic gas.

**Land transport (ADR/RID)**

H.I. nr : 263  
UN proper shipping name : CARBON MONOXIDE, COMPRESSED  
Transport hazard class(es) : 2  
Classification code : 1 TF  
Packing Instruction(s) : P200  
Tunnel Restriction : B/D Tank carriage: Passage forbidden through tunnels of category B, C, D  
Environmental hazards : None.

**Sea transport (IMDG)**

Proper shipping name : CARBON MONOXIDE, COMPRESSED  
Class : 2.3  
Packing group : P200  
Emergency Schedule (EmS) - Fire : F-D  
Emergency Schedule (EmS) - Spillage : S-U  
Packing instruction : P200

**Air transport (ICAO-TI / IATA-DGR)**

Proper shipping name (IATA) : CARBON MONOXIDE, COMPRESSED  
Class : 2.3  
Passenger and Cargo Aircraft : DO NOT LOAD IN PASSENGER AIRCRAFT.  
Cargo Aircraft only : FORBIDDEN.

**Special precautions for user**

**Carbon monoxide****ALSA019****SECTION 14. Transport information (continued)**

- : Avoid transport on vehicles where the load space is not separated from the driver's compartment.  
Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.  
Before transporting product containers :  
- Ensure that containers are firmly secured.  
- Ensure cylinder valve is closed and not leaking.  
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.  
- Ensure valve protection device (where provided) is correctly fitted.  
- Ensure there is adequate ventilation.

**SECTION 15. Regulatory information****Safety, health and environmental regulations/legislation specific for the substance or mixture****EU legislation**

- Restrictions on use** : Restricted to professional users (Annex XVII REACH).  
**Seveso directive 96/82/EC** : Covered

**National legislation**

- : Ensure all national/local regulations are observed.

**Chemical Safety Assessment**

- : A Chemical safety assessment (CSA) has been carried out for this product.

**SECTION 16. Other information**

- Indication of changes** : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010  
**Training advice** : Ensure operators understand the flammability hazard.  
Users of breathing apparatus must be trained.  
Ensure operators understand the toxicity hazard.
- List of full text of R-phrases in section 3.** : R12 : Extremely flammable.  
R23 : Toxic by inhalation.  
R48/23 : Toxic : danger of serious damage to health by prolonged exposure through inhalation.  
R61 : May cause harm to the unborn child.
- List of full text of H-statements in section 3.** : H220 - Extremely flammable gas.  
H280 - Contains gas under pressure; may explode if heated.  
H331 - Toxic if inhaled.  
H360D - May damage the unborn child.  
H372 - Causes damage to organs through prolonged or repeated exposure.
- Note** : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
- DISCLAIMER OF LIABILITY** : Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.  
Details given in this document are believed to be correct at the time of going to press. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

**End of document**