

Carbon monoxide**CO_019-DK**

2.3 : Toxic gases



2.1 : Flammable gases

Danger**SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : Carbon monoxide , Kulmonoxide, Kulmonoxide N20
SDS Nr : CO_019-DK replaces CO 019-DK 25 / 7 / 2014
Chemical description : Carbon monoxide
CAS No :630-08-0
EC No :211-128-3
Index No :006-001-00-2
Registration-No. : 01-2119480165-39-0023
Chemical formula : CO

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Test gas/Calibration gas. Laboratory use. Chemical reaction / Synthesis. Use for metal treatment.
Use for manufacture of electronic/photovoltaic components.
Laser gas.
Contact supplier for more information on uses.

Uses advised against : Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE Denmark A/S
Høje Taastrupvej 42
DAN-2630 Taastrup DENMARK
Telefon: +45 76 25 25 25

E-Mail address (competent person) : Info.denmark@airliquide.com

1.4. Emergency telephone number

Emergency telephone number : 112

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SECTION 2. Hazards identification

2.1. 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

2.2. Label elements

Labelling Regulation EC 1272/2008 (CLP)

• **Hazard pictograms**



- **Hazard pictograms code** : GHS06 - GHS02 - GHS08 - GHS04
- **Signal word** : Danger
- **Hazard statements** : 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.
- **Precautionary statements**
 - **Prevention** : P260 - Do not breathe gas, vapours.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.
No smoking.
P202 - Do not handle until all safety precautions have been read and understood.
 - **Response** : P304+P340+P315 - IF INHALED : Remove person to fresh air and keep comfortable for breathing. Get immediate medical advice / attention.
P308+P313 - IF exposed or concerned: Get medical advice/attention.
P377 - Leaking gas fire : Do not extinguish, unless leak can be stopped safely.
P381 - Eliminate all ignition sources if safe to do so.
 - **Storage** : P403 - Store in a well-ventilated place.
P405 - Store locked up.

2.3. Other hazards

: None.

SECTION 3. Composition/information on ingredients

3.1. Substance / 3.2. Mixture

Substance.

Substance name	Content [Vol-%]	CAS No	EC No	Index No	Registration No.	Classification
Carbon monoxide	: 100 %	630-08-0	211-128-3	006-001-00-2	01-2119480165-39-0023	Flam. Gas 1 (H220) Repr. 1A (H360D) Acute Tox. 3 (H331) STOT RE 1 (H372) Press. Gas (Comp.) (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 < 1t/y.

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

Carbon monoxide**CO_019-DK****SECTION 3. Composition/information on ingredients)continued)****SECTION 4. First aid measures****4.1. 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.

4.2. Most important symptoms and effects, both acute and delayed

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

4.3. Indication of any immediate medical attention and special treatment needed

- : Obtain medical assistance.

SECTION 5. Fire-fighting measures**5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.
Dry powder.
- Unsuitable extinguishing media : Do not use water jet to extinguish.
Carbon dioxide.

5.2. Special hazards arising from the substance or mixture

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

5.3. Advice for fire-fighters

- Specific methods : If possible, stop flow of product.
Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
Use water spray or fog to knock down fire fumes if possible.
Move containers away from the fire area if this can be done without risk.

SECTION 6. Accidental release measures**6.1. 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.
Stay upwind.
Act in accordance with local emergency plan.

Carbon monoxide**CO_019-DK****SECTION 6. Accidental release measures)continued)****6.2. Environmental precautions**

: Try to stop release.

6.3. Methods and material for containment and cleaning up

: Ventilate area.

6.4. Reference to other sections

: See also sections 8 and 13.

SECTION 7. Handling and storage**7.1. Precautions for safe handling****Safe use of the product**

: Consider pressure relief device(s) in gas installations.
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 atmospheres and the need for explosion-proof equipment.
Consider the use of 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.
Do not breathe gas.
Avoid release of product into atmosphere.

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.

7.2. 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 them from falling over. 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. All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

Carbon monoxide**CO_019-DK****SECTION 7. Handling and storage)continued)**

Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion. Keep away from combustible materials.

7.3. Specific end use(s)

: None.

SECTION 8. Exposure controls/personal protection**8.1. Control parameters****Occupational Exposure Limits**

Carbon monoxide : TWA (DK) OEL 8h [mg/m³] : 29
: TWA (DK) OEL 8h [ppm] : 25

DNEL: Derived no effect level)Workers)

Carbon monoxide : Inhalation-short term (local) [ppm] : 100
: Inhalation-short term (systemic) [ppm] : 100
: Inhalation-long term (local) [ppm] : 20
: Inhalation-long term (systemic) [ppm] : 20

PNEC: Predicted no effect concentration

: No data available.
The product is a gas and is extremely unlikely to reside in the aquatic compartment.

8.2. Exposure controls

8.2.1. Appropriate engineering controls : 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.
Gas detectors should be used when toxic gases may be released.

8.2.2. Individual protection measures, e.g. personal protective equipment : 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:
PPE compliant to the recommended EN/ISO standards should be selected.

• **Eyeface protection** : Wear safety glasses with side shields.
Standard EN 166 - Personal eye-protection.

• **Skin protection**
- **Hand protection** : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.

- **Other** : Consider the use of flame resistant anti-static safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Standard EN ISO 1149-5 - Protective clothing: Electrostatic properties.
Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• **Respiratory protection** : Never use any kind of filtering respiratory protection equipment when working with this substance due to it having poor or no warning properties.
Keep self contained breathing apparatus readily available for emergency use.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

• **Thermal hazards** : None necessary.

8.2.3. Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

Carbon monoxide**CO_019-DK****SECTION 8. Exposure controls/personal protection)continued)****SECTION 9. Physical and chemical properties****9.1. Information on basic physical and chemical properties**

Appearance	
Physical state at 20°C / 101.3kPa	: Gas.
Colour	: Colourless.
Odour	: Odourless.
Odour threshold	: Odour threshold is subjective and inadequate to warn for overexposure.
pH value	: Not applicable for gases and gas-mixtures.
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 - 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 [log Kow]	: 1.78
Auto-ignition temperature [°C]	: 620
Viscosity at 20°C [mPa.s]	: Not applicable.
Explosive Properties	: Not applicable.
Oxidising Properties	: None.

9.2. Other information

Other data : None.

SECTION 10. Stability and reactivity**10.1. Reactivity**

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

10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions: Can form explosive mixture with air.
May react violently with oxidants.**10.4. Conditions to avoid**

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

10.5. Incompatible materials: Air, Oxidiser.
For additional information on compatibility refer to ISO 11114.

Carbon monoxide**CO_019-DK****SECTION 10. Stability and reactivity)continued)****10.6. Hazardous decomposition products**

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

SECTION 11. Toxicological information**11.1. Information on toxicological effects**

Acute toxicity	: Toxic if inhaled.
Rat inhalation LC50 [ppm/4h]	: 1300
LC50 [ppm/1h]	: 3760 (ADR P200 / ISO 10298)
Skin corrosion/irritation	: No known effects from this product.
Serious eye damage/irritation	: No known effects from this product.
Respiratory or skin sensitisation	: No known effects from this product.
Carcinogenicity	: No known effects from this product.
Germ cell mutagenicity	: No known effects from this product.
Reproductive toxicity	: May damage the unborn child.
STOT-single exposure	: Suppresses the oxygen uptake by red blood cells.
Target organ(s)	: Blood.
STOT-repeated exposure	: Causes damage to organs through prolonged or repeated exposure.
Target organ(s)	: Heart.
Aspiration hazard	: Not applicable for gases and gas-mixtures.

SECTION 12. Ecological information**12.1. Toxicity**

EC50 48h - Daphnia magna [mg/l]	: Study scientifically unjustified.
EC50 72h Algae [mg/l]	: Study scientifically unjustified.
LC50-96 h - fish [mg/l]	: Study scientifically unjustified.

12.2. Persistence and degradability

: Will not undergo hydrolysis.
Not readily biodegradable.

12.3. Bioaccumulative potential

: Not expected to bioaccumulate due to the low log Kow (log Kow < 4).
Refer to section 9.

12.4. Mobility in soil

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

12.5. Results of PBT and vPvB assessment

: Not classified as PBT or vPvB.

12.6. Other adverse effects

Effect on the ozone layer	: None.
Global warming potential [CO ₂ =1]	: 1.9
Effect on global warming	: When discharged in large quantities may contribute to the greenhouse effect.

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SECTION 12. Ecological information)continued)

SECTION 13. Disposal considerations

13.1. Waste treatment methods

: Must not be discharged to atmosphere.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.
Contact supplier if guidance is required.
Ensure that the emission levels from local regulations or operating permits are not exceeded.
List of hazardous waste codes)from Commission Decision 2001/118/EC) : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

SECTION 14. Transport information

UN number : 1016
Labelling ADR, IMDG, IATA



: 2.1 : Flammable gases
2.3 : Toxic gases

Transport by road/rail)ADR/RID)
Transport by air)ICAO-TI / IATA-DGR)
Transport by sea)IMDG)

Classification code : 1 TF
H.I. nr : 263

Tunnel Restriction : B/D Tank carriage: Passage forbidden through tunnels of category B, C, D E; Other carriage: Passage forbidden through tunnels of category D and E

Emergency Schedule)EmS) - Fire : F-D
Emergency Schedule)EmS) - Spillage : S-U

14.6 Special precautions for user

Packing Instruction(s) : P200
Passenger and Cargo Aircraft : FORBIDDEN.
Cargo Aircraft only : FORBIDDEN.
Special precautions for user : 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.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not applicable.

UN proper shipping name : CARBON MONOXIDE, COMPRESSED

Carbon monoxide**CO_019-DK****SECTION 14. Transport information)continued)**

Transport hazard class(es)	: 2
Environmental hazards	: None.
Proper shipping name	: CARBON MONOXIDE, COMPRESSED
Class	: 2.3
Packing instruction	: P200
IMDG-Marine pollutant	: -
Proper shipping name (IATA)	: CARBON MONOXIDE, COMPRESSED
Class	: 2.3

SECTION 15. Regulatory information**15.1. 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 2012/18/EC	: Covered.

National legislation

National legislation	: Ensure all national/local regulations are observed.
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15.2. Chemical safety assessment

: A CSA has been carried out.

SECTION 16. Other information

Indication of changes	: Revised safety data sheet in accordance with commission regulation (EU) No 2015/830.
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 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.
Further information	: 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.

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