

### Danger



## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

Trade name	: Carbon monoxide
SDS no	: EIGA019-ALBNL
Other means of identification	: Carbon monoxide
	CAS-No. : 630-08-0
	EC-No. : 211-128-3
	EC Index-No. : 006-001-00-2
REACH registration No	: 01-2119480165-39
Chemical formula	: CO

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

Relevant identified uses	: See the list of identified uses and exposure scenarios in the annex of the safety data sheet. Perform risk assessment prior to use.
Uses advised against	: Consumer use. Uses other than those listed above are not supported, contact your supplier for more information on other uses.

### 1.3. Details of the supplier of the safety data sheet

#### THE NETHERLANDS:

AIR LIQUIDE BV  
De Witbogt 1  
5652 AG Eindhoven  
the Netherlands-Nederland  
Tel: +31 (0)40 250 35 03

#### BELGIUM:

L'AIR LIQUIDE BELGE S.A./N.V.  
Hermeslaan 11  
1932 Zaventem  
Belgium-Belgique-België  
Tel: +32 (0)2 540 86 60

#### LUXEMBURG:

L'AIR LIQUIDE LUXEMBOURG S.A.  
ZONE P.E.D.-B.P.20  
L-4801 RODANGE Luxemburg  
Tel: +352 26 30 29 03

[infosafetydatasheet.albv@airliquide.com](mailto:infosafetydatasheet.albv@airliquide.com)

[www.airliquide-benelux.com](http://www.airliquide-benelux.com)

### 1.4. Emergency telephone number

Country/Area	Organisation/Company	Address	Emergency number	Comment
Belgium	Centre Anti-Poisons/Antigifcentrum c/o Hôpital Militaire Reine Astrid	Rue Bruyn 1 1120 Bruxelles/Brussel	+32 70 245 245	Please dial: 070 245 245 for any urgent questions about intoxication (free of charge 24/7), if not accessible, dial: 02 264 96 30 (standard fee)
Luxembourg	Centre Anti-Poisons/Antigifcentrum c/o Hôpital Militaire Reine Astrid	Rue Bruyn 1 1120 Bruxelles/Brussel	+352 8002 5500	Free telephone number with a 24/7 access. Experts answer all urgency questions on dangerous products in French, Dutch and English
Netherlands	Nationaal Vergiftigingen Informatie Centrum	Huispostnummer Q03.2.315 Postbus 85500 3508 GA Utrecht	+31 88 755 80 00	Only for the purpose of informing medical personnel in cases of acute intoxications (24 hours a day, 7 days a week)

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards	Flammable gases, Category 1B	H221
	Gases under pressure : Compressed gas	H280
Health hazards	Acute toxicity (inhalation:gas) Category 3	H331
	Reproductive toxicity, Category 1A	H360D
	Specific target organ toxicity – Repeated exposure, Category 1	H372

### 2.2. Label elements

#### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



Signal word (CLP) :

: Danger

Hazard statements (CLP) :

- : H221 - 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 (CLP)

- Prevention : P202 - Do not handle until all safety precautions have been read and understood.  
P260 - Do not breathe gas, vapours.  
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.  
No smoking.
  - 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.  
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
P381 - In case of leakage, eliminate all ignition sources.
  - Storage : P405 - Store locked up.  
P403 - Store in a well-ventilated place.
- Supplemental information : Restricted to professional users.

### 2.3. Other hazards

Not classified as PBT or vPvB.  
The substance/mixture has no endocrine disrupting properties.  
Not classified as PMT or vPvM.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP] ATE, EUH-statements, M-Factors
Carbon monoxide	CAS-No.: 630-08-0 EC-No.: 211-128-3 EC Index-No.: 006-001-00-2 REACH registration No: 01-2119480165-39	100	Flam. Gas 1B, H221 Press. Gas (Comp.), H280 Acute Tox. 3 (Inhalation:gas), H331 (ATE=1300 ppmv/4h) Repr. 1A, H360D STOT RE 1, H372

Full text of H- and EUH-statements: see section 16

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

### 3.2. Mixtures

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- Inhalation : Provide oxygen.  
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation 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.  
See section 11.

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

Obtain medical assistance.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog.  
Dry powder.  
Carbon dioxide.  
Shutting off the source of the gas is the preferred method of control.  
Be aware of the risk of formation of static electricity with the use of CO2 extinguishers. Do not use them in places where a flammable atmosphere may be present.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

#### 5.2. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : The combustion products are not poisonous than the product itself.

#### 5.3. Advice for firefighters

- Specific methods : 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.  
If possible, stop flow of product.  
Use water spray or fog to knock down fire fumes if possible.  
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.  
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.  
Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel : Act in accordance with local emergency plan.  
Try to stop release.  
Evacuate area.  
Eliminate ignition sources.  
Ensure adequate air ventilation.  
Stay upwind.  
See section 8 of the SDS for more information on personal protective equipment.
- For emergency responders : Monitor concentration of released product.  
Consider the risk of potentially explosive atmospheres.  
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.  
See section 5.3 of the SDS for more information.

#### 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

- : Do not breathe gas.
- Avoid release of product into atmosphere.
- The product must be handled in accordance with good industrial hygiene and safety procedures.
- Only experienced and properly instructed persons should handle gases under pressure.
- Consider pressure relief device(s) in gas installations.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Do not smoke while handling product.
- Avoid exposure, obtain special instructions before use.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Installation of a cross purge assembly between the container and the regulator is recommended.
- Avoid suck back of water, acid and alkalis.
- Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
- Purge air from system before introducing gas.
- Take precautionary measures against static discharge.
- Keep away from ignition sources (including static discharges).
- Consider the use of only non-sparking tools.
- Ensure equipment is adequately earthed.
- Avoid using pure nickel. Corrosion of pure nickel in carbon monoxide atmospheres occurs even at room temperature.

##### Safe handling of the gas receptacle

- : Do not allow backfeed into the container.
- Protect containers 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, when provided, 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 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 content of the container.
- Suck back of water into the container must be prevented.
- Open valve slowly to avoid pressure shock.

#### 7.2. Conditions for safe storage, including any incompatibilities

- Store locked up.
- Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion.
- Container valve guards or caps, when provided, should be in place.
- 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.
- Keep container below 50°C in a well ventilated place.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible materials.
- Segregate from oxidant gases and other oxidants in store.
- All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

### 7.3. Specific end use(s)

None.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Carbon monoxide (630-08-0)	
<b>EU - Binding Occupational Exposure Limit (BOEL)</b>	
Local name	Carbon monoxide
BOEL TWA	23 mg/m <sup>3</sup>
	20 ppm
BOEL STEL	117 mg/m <sup>3</sup>
	100 ppm
Regulatory reference	DIRECTIVE (EU) 2022/431 (amending Directive 2004/37/EC)
<b>Belgium - Occupational Exposure Limits</b>	
Local name	Carbone (monoxyde de) # Koolstofmonoxide
OEL TWA	23 mg/m <sup>3</sup>
	20 ppm
OEL STEL	117 mg/m <sup>3</sup>
	100 ppm
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
<b>Luxembourg - Occupational Exposure Limits</b>	
Local name	Monoxyde de carbone
OEL TWA	23 mg/m <sup>3</sup>
	20 ppm
OEL STEL	117 mg/m <sup>3</sup>
	100 ppm
Regulatory reference	Mémorial A N° 226 de 2021 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
<b>Netherlands - Occupational Exposure Limits</b>	
Local name	Koolmonoxide
TGG-8u (OEL TWA)	23 mg/m <sup>3</sup>
	20 ppm
TGG-15min (OEL STEL)	117 mg/m <sup>3</sup>
	100 ppm
Remark	Reprotoxische stof
Regulatory reference	Arbeidsomstandighedenregeling 2024

Carbon monoxide (630-08-0)	
DNEL: Derived no effect level (Workers)	
Acute - local effects, inhalation	117 ppm
Acute - systemic effects, inhalation	117 mg/m <sup>3</sup>
Long-term - local effects, inhalation	23 ppm
Long-term - systemic effects, inhalation	23 mg/m <sup>3</sup>

PNEC (Predicted No-Effect Concentration) : None established.

### 8.2. Exposure controls

#### 8.2.1. Appropriate engineering controls

Product to be handled in a closed system and under strictly controlled conditions.  
Provide adequate general and local exhaust ventilation.  
Preferably use permanent leak-tight installations (e.g. welded pipes).  
Systems under pressure should be regularly checked for leakages.  
Ensure exposure is below occupational exposure limits (where available).  
Gas detectors should be used when toxic gases may be released.  
Consider the use of a work permit system e.g. for maintenance activities.

#### 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:

- Eye/face protection : Wear safety glasses with side shields.  
Standard EN 166 - Personal eye-protection - specifications.
- Skin protection : Wear working gloves when handling gas containers.  
Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher. Recommended types include wrist gloves from leather or synthetic material with equivalent performance, fabric gloves, fabric gloves with leather palms.
- Hand protection : Consider the use of flame resistant anti-static safety clothing.  
Standard EN ISO 14116 - Limited flame spread materials.  
Standard EN 1149-5 - Protective clothing: Electrostatic properties.  
Wear safety shoes while handling containers.  
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
- Other : Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.  
Consult respiratory device supplier's product information for the selection of the appropriate device.  
Never use any kind of filtering respiratory protection equipment when working with this substance due to it having poor or no warning properties.  
Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.  
Keep self contained breathing apparatus readily available for emergency use.  
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
- Respiratory protection : None in addition to the above sections.
- Thermal hazards : None in addition to the above sections.

#### 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.

### 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.
Melting point / Freezing point	: -205 °C
Boiling point	: -191,5 °C
Flammability	: Flammable gas.
Lower explosion limit	: 10,9 vol %
Upper explosion limit	: 76 vol %
Flash point	: Not applicable for gases and gas mixtures.
Auto-ignition temperature	: 620 °C
Decomposition temperature	: Not applicable.
pH	: Not applicable for gases and gas mixtures.
Viscosity, kinematic	: No reliable data available.
Water solubility [20°C]	: 30 mg/l
Partition coefficient n-octanol/water (Log Kow)	: 1,78
Vapour pressure [20°C]	: Not applicable.
Vapour pressure [50°C]	: Not applicable.
Density and/or relative density	: Not applicable for gases and gas mixtures.
Relative vapour density (air=1)	: 1
Particle characteristics	: Not applicable for gases and gas mixtures. Nanoforms are not relevant for gases and gas mixtures.

#### 9.2. Other information

##### 9.2.1. Information with regard to physical hazard classes

Tci	: 15,2 %
Oxidising properties	: No oxidising properties.
Critical temperature [°C]	: -140 °C

##### 9.2.2. Other safety characteristics

Molar mass	: 28 g/mol
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### 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.  
Avoid moisture in installation systems.

#### 10.5. Incompatible materials

Air, Oxidisers.  
For additional information on compatibility refer to ISO 11114.  
See also 'EIGA Doc.95: Avoidance of Failure of CO and of CO/CO2 Mixtures Cylinders' at [www.eiga.eu](http://www.eiga.eu).

### 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 hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity : Toxic if inhaled.

#### Carbon monoxide (630-08-0)

LC50 Inhalation - Rat [ppm]	3760 ppm/1h (ADR) 1300 ppm/4h (CLP)
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**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.  
**Germ cell mutagenicity** : No known effects from this product.  
**Carcinogenicity** : No known effects from this product.  
**Toxic for reproduction : Fertility** : No known effects from this product.  
**Toxic for reproduction : unborn child** : 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.

### 11.2. Information on other hazards

Other information : The substance/mixture has no endocrine disrupting properties.

## SECTION 12: Ecological information

### 12.1. Toxicity

Assessment : No ecological damage caused by this product.  
EC50 48h - Daphnia magna [mg/l] : No data available.  
EC50 72h - Algae [mg/l] : No data available.  
LC50 96 h - Fish [mg/l] : No data available.

### 12.2. Persistence and degradability

Assessment : Will not undergo hydrolysis. Not readily biodegradable.

### 12.3. Bioaccumulative potential

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

### 12.4. Mobility in soil

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

### 12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

### 12.6. Endocrine disrupting properties

Assessment : The substance/mixture has no endocrine disrupting properties.

### 12.7. Other adverse effects

Other adverse effects : Not classified as PMT or vPvM.  
Effect on the ozone layer : No effect on the ozone layer.

Effect on global warming : No known effects from this product.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Contact supplier if guidance is required.  
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.  
Must not be discharged to atmosphere.  
Ensure that the emission levels from local regulations or operating permits are not exceeded.  
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.  
Return unused product in original container to supplier.

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 16 05 04 \*: Gases in pressure containers (including halons) containing hazardous substances.

#### 13.2. Additional information

External treatment and disposal of waste should comply with applicable local and/or national regulations.

### SECTION 14: Transport information

#### 14.1. UN number or ID number

In accordance with ADR / RID / IMDG / IATA / ADN  
UN-No. : 1016

#### 14.2. UN proper shipping name

Transport by road/rail/inland waterways (ADR/RID/ADN) : CARBON MONOXIDE, COMPRESSED  
Transport by air (ICAO-TI / IATA-DGR) : Carbon monoxide, compressed  
Transport by sea (IMDG) : CARBON MONOXIDE, COMPRESSED

#### 14.3. Transport hazard class(es)

Labelling :



2.3 : Toxic gases.  
2.1 : Flammable gases.

#### Transport by road/rail/inland waterways (ADR/RID/ADN)

Class : 2  
Classification code : 1TF  
Hazard identification number : 263  
Tunnel Restriction : B/D - Tank carriage: Passage forbidden through tunnels of category B, C, D and E. Other carriage: Passage forbidden through tunnels of category D and E

#### Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.3 (2.1)  
Emergency Schedule (EmS) - Fire : F-D  
Emergency Schedule (EmS) - Spillage : S-U

#### 14.4. Packing group

Transport by road/rail/inland waterways (ADR/RID/ADN) : Not applicable.  
Transport by air (ICAO-TI / IATA-DGR) : Not applicable.  
Transport by sea (IMDG) : Not applicable.

### 14.5. Environmental hazards

Transport by road/rail/inland waterways (ADR/RID/ADN) : None.  
Transport by air (ICAO-TI / IATA-DGR) : None.  
Transport by sea (IMDG) : None.

### 14.6. Special precautions for user

#### Packing Instruction(s)

Transport by road/rail/inland waterways (ADR/RID/ADN) : P200.  
Transport by air (ICAO-TI / IATA-DGR)  
Passenger and Cargo Aircraft : Forbidden.  
Cargo Aircraft only : Forbidden.  
Transport by sea (IMDG) : P200.

Special transport precautions : 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 there is adequate ventilation.  
- Ensure that containers are firmly secured.  
- Ensure 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.

### 14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

## SECTION 15: Regulatory information

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

#### EU-Regulations

Restrictions on use : Restricted to professional users (Annex XVII REACH).  
Other information, restriction and prohibition regulations : Not listed on the PIC list (Regulation EU 649/2012).  
Not listed on the POP list (Regulation EU 2019/1021).  
Seveso Directive : 2012/18/EU (Seveso III) : Covered.

Seveso III Part I (Categories of dangerous substances)	Qualifying quantity (tonnes)	
	Lower-tier	Upper-tier
H2 ACUTE TOXIC — Category 2, all exposure routes — Category 3, inhalation exposure route	50	200
P2 FLAMMABLE GASES Flammable gases, Category 1 or 2	10	50

#### National regulations

Regulatory reference : Ensure all national/local regulations are observed.

### 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 453/2010.

Section	Changed item	Comments
	Endocrine disrupting properties	<b>Added</b>
	Supersedes version of	<b>Modified</b>
	Revision date	<b>Modified</b>
2.3	Other hazards which do not result in classification	<b>Modified</b>
7	Conditions for safe storage, including any incompatibilities	<b>Modified</b>
7	Safe handling of the gas receptacle	<b>Modified</b>
8	Remark	<b>Removed</b>
8	Regulatory reference	<b>Modified</b>
8	Regulatory reference	<b>Modified</b>
8	Remark	<b>Added</b>
9	Partition coefficient n-octanol/water (Log Pow)	<b>Added</b>
9	Particle characteristics	<b>Added</b>
9	Tci	<b>Modified</b>
11.1	LC50 Inhalation - Rat [ppm]	<b>Modified</b>
12.3	Bioaccumulative potential	<b>Added</b>
12.7	Other adverse effects	<b>Modified</b>
14	Transport category (RID)	<b>Added</b>
14	UN-No. (RID)	<b>Modified</b>
14	Number of blue cones/lights (ADN)	<b>Added</b>
14	Classification code (ADN)	<b>Added</b>
14	Equipment required (ADN)	<b>Added</b>
14	Excepted quantities (ADN)	<b>Added</b>
14	Danger labels (ADN)	<b>Added</b>
14	Limited quantities (ADN)	<b>Added</b>
14	Ventilation (ADN)	<b>Added</b>
14	Classification code (RID)	<b>Added</b>
14	Excepted quantities (RID)	<b>Added</b>
14	Hazard identification number (RID)	<b>Added</b>
14	Limited quantities (RID)	<b>Added</b>
14	Mixed packing provisions (RID)	<b>Added</b>
14	Packing instructions (RID)	<b>Added</b>
14	Special provisions for carriage - Loading, unloading and handling (RID)	<b>Added</b>
14	Proper Shipping Name (RID)	<b>Added</b>
14	Portable tank and bulk container instructions (RID)	<b>Added</b>
14	Tank codes for RID tanks (RID)	<b>Added</b>

14	Special provisions for RID tanks (RID)	<b>Added</b>
14.1	UN-No. (ADN)	<b>Added</b>
14.2	Proper Shipping Name (ADN)	<b>Added</b>
14.3	Danger labels (RID)	<b>Modified</b>
16	Abbreviations and acronyms	<b>Modified</b>

### Abbreviations and acronyms

: ATE - Acute Toxicity Estimate.  
 CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008.  
 REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.  
 EINECS - European Inventory of Existing Commercial Chemical Substances.  
 CAS# - Chemical Abstract Service number.  
 PPE - Personal Protection Equipment.  
 LC50 - Lethal Concentration to 50 % of a test population.  
 RMM - Risk Management Measures.  
 PBT - Persistent, Bioaccumulative and Toxic.  
 vPvB - Very Persistent and Very Bioaccumulative.  
 STOT- SE : Specific Target Organ Toxicity - Single Exposure.  
 CSA - Chemical Safety Assessment.  
 EN - European Standard.  
 UN - United Nations.  
 ADR - Agreement concerning the International Carriage of Dangerous Goods by Road.  
 IATA - International Air Transport Association.  
 IMDG code - International Maritime Dangerous Goods.  
 RID - Regulations concerning the International Carriage of Dangerous Goods by Rail.  
 WGK - Water Hazard Class.  
 STOT - RE : Specific Target Organ Toxicity - Repeated Exposure.  
 UFI : Unique Formula Identifier.  
 ADN -International Carriage of Dangerous Goods by Inland Waterways.  
 PROC -Process category  
 .  
 ERC – Environmental release category.  
 PMT - Persistent, Mobile and Toxic.  
 vPvM – very Persistent and very Mobile.

### Training advice

: Ensure operators understand the flammability hazard.  
 Users of breathing apparatus must be trained.  
 Ensure operators understand the toxicity hazard.

### Further information

: Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP).  
 Key literature references and sources of data are maintained in EIGA doc 169 :  
 'Classification and Labelling Guide', downloadable at <http://www.Eiga.eu> .

Full text of H- and EUH-statements	
Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Flam. Gas 1B	Flammable gases, Category 1B
Press. Gas (Comp.)	Gases under pressure : Compressed gas
Repr. 1A	Reproductive toxicity, Category 1A
STOT RE 1	Specific target organ toxicity – Repeated exposure, Category 1
H221	Flammable gas.
H280	Contains gas under pressure; may explode if heated.
H331	Toxic if inhaled.
H360D	May damage the unborn child.

# Safety Data Sheet

## Carbon monoxide

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878  
SDS Reference Number: EIGA019-ALBNL

H372	Causes damage to organs through prolonged or repeated exposure.
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### DISCLAIMER OF LIABILITY

: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.  
Details given in this document are believed to be correct at the time of going to press.  
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.

### Annex to the safety data sheet

This Annex documents the Exposure Scenarios (ESs) related to the identified uses of the registered substance. The ESs detail protective measures for workers and the environment in addition to those described in sections 7, 8, 11, 12 and 13 of the SDS that are required to ensure that the potential exposure to workers and the environment remains within acceptable levels for each of the identified uses.

#### Table of contents of the Annex

Identified Uses	Es N°	Short title	ERC	PROC	Page
Formulation of mixtures in pressure receptacles	EIGA019-1	Industrial uses, closed contained conditions	ERC2	PROC1 PROC9	16
Metal treatment	EIGA019-1	Industrial uses, closed contained conditions	ERC6b	PROC4	16
Electronic component manufacture	EIGA019-1	Industrial uses, closed contained conditions	ERC6a	PROC1	16
Manufacture of pharmaceutical products	EIGA019-1	Industrial uses, closed contained conditions	ERC6a	PROC2 PROC3	16
Intermediate (transported, on-site isolated)	EIGA019-1	Industrial uses, closed contained conditions	ERC6a	PROC2 PROC3	16
Transfilling in pressure receptacles	EIGA019-1	Industrial uses, closed contained conditions	ERC2	PROC1 PROC9	16
Feedstock in chemical processes	EIGA019-1	Industrial uses, closed contained conditions	ERC6a	PROC1	16
Controlling agent in catalytic reaction	EIGA019-1	Industrial uses, closed contained conditions	ERC6b	PROC4	16
Monomer in polymer production	EIGA019-1	Industrial uses, closed contained conditions	ERC6c	PROC1 PROC8b	16
Calibration of analysis equipment	EIGA019-1	Industrial uses, closed contained conditions	ERC8d	PROC1	16

### 1. EIGA019-1 - Industrial uses, closed contained conditions

#### 1.1. Title section

##### Industrial uses, closed contained conditions

ES Ref.: EIGA019-1  
 ES Type: Worker - EIGA  
 Revision date: 1-9-2016

Processes, tasks, activities covered	Industrial uses, including product transfers and associated laboratory activities within different closed or contained systems
Assessment method	ECETOC TRA 2.0

#### 1.2. Conditions of use affecting exposure

##### 1.2.1. Control of environmental exposure: Formulation into mixture, Use of intermediate, Use of reactive processing aid at industrial site (no inclusion into or onto article), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC2, ERC6a, ERC6b, ERC8d)

ERC2	Formulation into mixture
ERC6a	Use of intermediate
ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)

#### Product (article) characteristics

Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

#### Amount used, frequency and duration of use (or from service life)

The actual tonnage handled per site is not considered to influence the immissions as such for this scenario as there is practically no release	
Covers frequency up to:	5 days/week
Emission Days (days/year)	220

#### Technical and organisational conditions and measures

Wastewater emission controls are not applicable as there is no direct release to wastewater	
Soil emission controls are not applicable as there is no direct release to soil	
Ensure operatives are trained to minimise releases	

#### Conditions and measures related to sewage treatment plant

Not applicable as there is no release to wastewater	
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### Conditions and measures related to treatment of waste (including article waste)

External treatment and disposal of waste should comply with applicable local and/or national regulations

See section 13 of the SDS

### Other conditions affecting environmental exposure

No additional information

### 1.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

PROC1

Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

### Product (article) characteristics

Physical form of product

See section 9 of the SDS, No additional information

Concentration of substance in product

≤ 100 %

### Amount used (or contained in articles), frequency and duration of use/exposure

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.

Exposure duration

≤ 8 h/day

Covers frequency up to:

5 days/week

### Technical and organisational conditions and measures

Handle product within a closed system

Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

See sections 2 and 7 of the SDS.

Ensure operatives are trained to minimise exposure

Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

### Conditions and measures related to personal protection, hygiene and health evaluation

Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

See section 8 of the SDS.

### Other conditions affecting workers exposure

Indoor or outdoor use

### 1.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
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#### Product (article) characteristics

Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

#### Amount used (or contained in articles), frequency and duration of use/exposure

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

#### Technical and organisational conditions and measures

Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points where emissions could occur. Outdoor, LEV is not generally required.	
Ensure samples are obtained under containment or extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
See sections 2 and 7 of the SDS.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

#### Conditions and measures related to personal protection, hygiene and health evaluation

Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.	
See section 8 of the SDS.	

#### Other conditions affecting workers exposure

Indoor or outdoor use	
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### 1.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises (PROC3, PROC4)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
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PROC4	Chemical production where opportunity for exposure arises
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### Product (article) characteristics

Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

### Amount used (or contained in articles), frequency and duration of use/exposure

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

### Technical and organisational conditions and measures

Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points where emissions could occur. Outdoor, LEV is not generally required.	
Ensure samples are obtained under containment or extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
See sections 2 and 7 of the SDS.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

### Conditions and measures related to personal protection, hygiene and health evaluation

Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.	
See section 8 of the SDS.	

### Other conditions affecting workers exposure

Indoor or outdoor use	
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### 1.2.5. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
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### Product (article) characteristics

Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

### Amount used (or contained in articles), frequency and duration of use/exposure

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

### Technical and organisational conditions and measures

Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points where emissions could occur. Outdoor, LEV is not generally required.	
Fill containers at dedicated fill points supplied with local extract ventilation.	
Ensure samples are obtained under containment or extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
See sections 2 and 7 of the SDS.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

### Conditions and measures related to personal protection, hygiene and health evaluation

Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.	
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### Other conditions affecting workers exposure

Indoor or outdoor use	
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#### 1.2.6. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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### Product (article) characteristics

Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

### Amount used (or contained in articles), frequency and duration of use/exposure

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

### Technical and organisational conditions and measures

Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points where emissions could occur. Outdoor, LEV is not generally required.	
Fill containers at dedicated fill points supplied with local extract ventilation.	
Ensure samples are obtained under containment or extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
See sections 2 and 7 of the SDS.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

### Conditions and measures related to personal protection, hygiene and health evaluation

Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.	
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### Other conditions affecting workers exposure

Indoor or outdoor use	
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### 1.3. Exposure estimation and reference to its source

No data available

### 1.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 1.4.1. Environment

Guidance - Environment	Check that RMMs and OCs are as described above or of equivalent efficiency
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#### 1.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see : <a href="http://www.ecetoc.org/tra">http://www.ecetoc.org/tra</a>
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