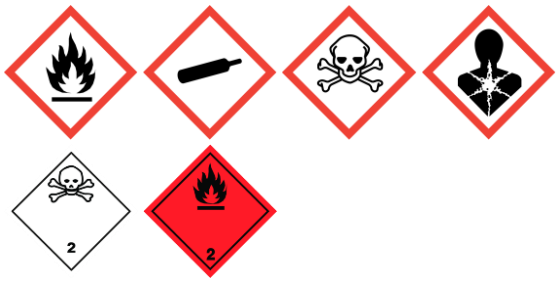
Safety Data Sheet

Carbon monoxide

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878
Reference number: 019
Revision date: 19-02-2024
Supersedes version of: 01-04-2021
Version: 6.0

Danger



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

1.1. Product identifier

Trade name	:	Carbon monoxide
SDS no	:	019
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	:	Industrial and professional uses. Perform risk assessment prior to use. Test gas/Calibration gas. Laboratory use. Chemical reaction / Synthesis. Use for manufacture of electronic/photovoltaic components. Use for metal treatment. 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	:	BHORUKA SPECIALTY GASES PVT LTD Whitefield Road, Mahadevapura Post 560048 Bangalore - India T +917760976505, 28524239/240/245 & 41818200 http://www.sol.it/msds2/msds.asp msds@sol.it

1.4. Emergency telephone number

Emergency telephone number	:	+917760976505, 28524239/240/245 & 41818200

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 1A	H220
	Gases under pressure : Compressed gas	H280
Health hazards	Acute toxicity (inhal.), Category 3	H331
	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) :

GHS02 GHS04 GHS06 GHS08

Signal word (CLP) : Danger

Hazard statements (CLP) : 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 (CLP)

- Prevention : P280 - Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P271 - Use only outdoors or in a well-ventilated area.
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

- Response : P308+P313 - IF exposed or concerned: Get medical advice/attention.
P311 - Call a POISON CENTER or doctor.
P321 - Specific treatment (see supplemental first aid instruction on this label).
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - In case of leakage, eliminate all ignition sources.

- Storage : P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.
P403 - Store in a well-ventilated place.
P410+P403 - Protect from sunlight. Store in a well-ventilated place.

- Disposal considerations : P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

2.3. Other hazards

None.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	%	Product identifier	Classification according to Regulation (EC) No. 1272/2008 [CLP]
carbon monoxide	100	CAS-No.: 630-08-0 EC-No.: 211-128-3 EC Index-No.: 006-001-00-2 REACH registration No: 01-2119480165-39	Flam. Gas 1A, H220 Press. Gas (Comp.), H280 Acute Tox. 3 (Inhalation), H331 Acute Tox. 3 (Inhalation:gas), H331 Repr. 1A, H360D STOT RE 1, H372

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 : 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

Provide oxygen.
Obtain medical assistance.

SECTION 5: Firefighting 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 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.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Try to stop release.
Evacuate area.
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.
Eliminate ignition sources.
Ensure adequate air ventilation.
Act in accordance with local emergency plan.
Stay upwind.

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 : 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 regularily) 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.
Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
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.
Do not breathe gas.
Avoid release of product into work area.

Safe handling of the gas receptacle : Refer to supplier's container handling instructions.
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 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.

7.2. Conditions for safe storage, including any incompatibilities

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 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)	
DNEL: Derived no effect level (Workers)	
Acute - local effects, inhalation	100 ppm
Acute - systemic effects, inhalation	100 ppm
Long-term - local effects, inhalation	20 ppm
Long-term - systemic effects, inhalation	20 ppm

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:
PPE compliant to the recommended EN/ISO standards should be selected.

• Eye/face protection : Wear safety glasses with side shields.
Standard EN 166 - Personal eye-protection - specifications.

• Skin protection

- Hand protection : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher.

- Other : 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.

• Respiratory protection	:	Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask. 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. 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.

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 is subjective and inadequate to warn of overexposure.
Melting point / Freezing point	:	-205 °C -205 °C
Boiling point	:	-192 °C
Flammability	:	Not available
Lower explosion limit	:	Not available
Upper explosion limit	:	Not available
Flash point	:	Not applicable for gases and gas mixtures.
Auto-ignition temperature	:	605 °C
Decomposition temperature	:	Not available
pH	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Water solubility [20°C]	:	30 mg/l
Partition coefficient n-octanol/water (Log Kow)	:	Not available
Vapour pressure [20°C]	:	Not applicable.
Vapour pressure [50°C]	:	Not applicable.
Density and/or relative density	:	Not applicable.
Relative vapour density (air=1)	:	1
Particle characteristics	:	Not applicable.

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosive properties	:	Not applicable.
Explosion limits	:	10.9 – 76 vol %
Oxidising properties	:	None.
Tci	:	15.2 %
Critical temperature [°C]	:	-140 °C

9.2.2. Other safety characteristics

Molar mass	:	28 g/mol
Evaporation rate	:	Not applicable for gases and gas mixtures.
Gas group	:	Compressed gas.
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

May react violently with oxidants.
Can form explosive mixture with air.

10.4. Conditions to avoid

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

10.5. Incompatible materials

Air, Oxidisers.
For additional information on compatibility refer to ISO 11114.

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 by inhalation.

LC50 Inhalation - Rat [ppm]	3760 ppm/1h (P200) 1300 ppm/4h

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 : May impair fertility.

Toxic for reproduction : unborn child : May cause harm to 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

No additional information available

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

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.

12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

12.6. Endocrine disrupting properties

Assessment :

12.7. Other adverse effects

Effect on the ozone layer : None.
Global warming potential [CO2=1] : 1.9
Effect on global warming : When discharged in large quantities may contribute to the greenhouse effect.
Contains greenhouse gas(es).

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.
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.

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

None.

SECTION 14: Transport information

14.1. UN number or ID number

In accordance with DOT/ TDG/ Mexico/ IMDG / IATA
UN-No. : 1016

14.2. UN proper shipping name

Transport by road/rail (DOT/TDG/Mexico) : CARBON MONOXIDE, COMPRESSED
Transport by air (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 (DOT/TDG/Mexico)
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 air (IATA-DGR)
Class / Div. (Sub. risk(s)) : 2.3 (2.1)

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 (DOT/TDG/Mexico) : Not applicable.
Transport by air (IATA-DGR) : Not applicable.
Transport by sea (IMDG) : Not applicable.

14.5. Environmental hazards

Transport by road/rail (DOT/TDG/Mexico) : None.
Transport by air (IATA-DGR) : None.
Transport by sea (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (DOT/TDG/Mexico) : P200.
Transport by air (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 : Ensure all national/local regulations are observed.
Not listed on the PIC list (Regulation EU 649/2012).
Seveso Directive : 2012/18/EU (Seveso III) : Covered.

National regulations

No additional information available

15.2. Chemical safety assessment

A CSA has been carried out.

SECTION 16: Other information

Indication of changes : Safety data sheet in accordance with commission regulation (EU) No 2020/878.

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

Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Full text of H- and EUH-statements	
Acute Tox. 3 (Inhalation)	Acute toxicity (inhal.), Category 3
Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Flam. Gas 1A	Flammable gases, Category 1A
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.
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

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.

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