

SECTION 1: Identification

1.1. Product identifier

Product form : Substance
 Name : Carbon monoxide
 CAS No : 630-08-0
 Formula : CO
 Other means of identification : Carbon monoxide, compressed Compressed carbon monoxide Carbon oxide (CO)
 Product group : Core Products

1.2. Recommended use and restrictions on use

Recommended uses and restrictions : Industrial use
 Use as directed

1.3. Supplier

: Airtec Group of Companies.
 : Refrigeration and Oxygen Company.
 : P.O box Safat **13006**,
 : Kuwait
 : www.airtecqulf.com

1.4. Emergency telephone number

Emergency number : Onsite Emergency: +965-1844-844
 Fax no : +965-2484-3020
 Email : info@rocq8.com

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-CA classification

Flam. Gas 1 H220
 Compressed gas H280
 Acute Tox. 3 (Inhalation:gas) H331
 Repr. 1A H360
 STOT RE 1 H372

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms :



Signal word : DANGER

Hazard statements :

EXTREMELY FLAMMABLE GAS
 CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
 TOXIC IF INHALED
 May damage fertility or the unborn child
 CAUSES DAMAGE TO ORGANS (CENTRAL NERVOUS SYSTEM) THROUGH
 PROLONGED OR REPEATED EXPOSURE (Inhalation)
 MAY FORM EXPLOSIVE MIXTURES WITH AIR
 ASPHYXIATING EVEN WITH ADEQUATE OXYGEN

Precautionary statements : Do not handle until all safety precautions have been read and understood
 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
 Do not breathe gas
 Use and store only outdoors or in a well-ventilated area
 Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection
 Leaking gas fire: Do not extinguish, unless leak can be stopped safely
 In case of leakage, eliminate all ignition sources
 Store locked up
 Dispose of contents/container in accordance with container Supplier/owner instructions
 Protect from sunlight when ambient temperature exceeds 52°C (125°F)
 Use a back flow preventive device in the piping
 Close valve after each use and when empty
 Do not open valve until connected to equipment prepared for use

2.3. Other hazards

Other hazards not contributing to the classification : Chemical asphyxiant. Exposure to low concentrations for extended periods may result in dizziness or unconsciousness, and may lead to death.

2.4. Unknown acute toxicity (GHS-CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	CAS No.	% (Vol.)	Common Name (synonyms)
Carbon monoxide (Main constituent)	(CAS No) 630-08-0	100	Carbon monoxide, compressed / Compressed carbon monoxide / Carbon oxide (CO) / Carbonmonoxide / Carbon(II) oxide

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Immediately remove to fresh air. If not breathing, clear airways of any slurry or caked material and give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

First-aid measures after skin contact : Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.. If eye irritation persists: Get immediate medical attention.

First-aid measures after ingestion : Not expected to be a primary route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/injuries : Effects are due to lack of oxygen. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Prolonged exposure to low concentrations of carbon monoxide can kill.

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog.

5.2. Unsuitable extinguishing media

No additional information available

5.3. Specific hazards arising from the hazardous product

- Fire hazard : **EXTREMELY FLAMMABLE GAS.** Carbon monoxide cannot be detected by odor. May form explosive mixtures with air. Toxic, flammable gas may spread. Before entering area, especially a confined area, check atmosphere with an appropriate gas-specific device. Reduce gas with fog or fine water spray. Shut off source of gas flow if safe to do so. Ventilate area or move container to a well-ventilated area.
- Explosion hazard : **EXTREMELY FLAMMABLE GAS.** Forms explosive mixtures with air and oxidizing agents.
- Reactivity : No reactivity hazard other than the effects described in sub-sections below.
- Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.

5.4. Special protective equipment and precautions for fire-fighters

- Firefighting instructions : Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with their provincial and local fire code regulations.
- Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.
- Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
- Specific methods : If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.
- Other information : Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by TC.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : **Toxic, flammable high-pressure gas..** Cannot be detected by odor. FORMS EXPLOSIVE MIXTURES WITH AIR. Immediately evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. If cylinders are leaking, reduce toxic vapors with water spray or fog. Reverse flow into cylinder may cause rupture. (See section 16.) Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area.

6.2. Methods and materials for containment and cleaning up

- For containment : Prevent runoff from contaminating the surrounding environment.

6.3. Reference to other sections

For further information refer to section 8: Exposure controls/personal protection

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment

Use in a closed system

Avoid using pure nickel. Corrosion of pure nickel in carbon monoxide atmospheres exceeds 50 mil/yr (1.27 mm/yr) at room temperature

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g. wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 125°F (52°C). Post "No Smoking/No Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g. NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Carbon monoxide (630-08-0)		
USA - ACGIH	ACGIH TLV-TWA (ppm)	25 ppm
USA - OSHA	OSHA PEL (TWA) (mg/m ³)	55 mg/m ³
USA - OSHA	OSHA PEL (TWA) (ppm)	50 ppm
Canada (Quebec)	VECD (mg/m ³)	230 mg/m ³
Canada (Quebec)	VECD (ppm)	200 ppm
Canada (Quebec)	VEMP (mg/m ³)	40 mg/m ³
Canada (Quebec)	VEMP (ppm)	35 ppm
Alberta	OEL TWA (mg/m ³)	29 mg/m ³
Alberta	OEL TWA (ppm)	25 ppm
British Columbia	OEL STEL (ppm)	100 ppm
British Columbia	OEL TWA (ppm)	25 ppm
Manitoba	OEL TWA (ppm)	25 ppm
New Brunswick	OEL TWA (mg/m ³)	29 mg/m ³

Carbon monoxide (630-08-0)		
New Brunswick	OEL TWA (ppm)	25 ppm
New Foundland & Labrador	OEL TWA (ppm)	25 ppm
Nova Scotia	OEL TWA (ppm)	25 ppm
Nunavut	OEL STEL (mg/m ³)	460 mg/m ³
Nunavut	OEL STEL (ppm)	400 ppm
Nunavut	OEL TWA (mg/m ³)	57 mg/m ³
Nunavut	OEL TWA (ppm)	50 ppm
Northwest Territories	OEL STEL (ppm)	190 ppm
Northwest Territories	OEL TWA (ppm)	25 ppm
Ontario	OEL TWA (ppm)	25 ppm
Prince Edward Island	OEL TWA (ppm)	25 ppm
Québec	VECD (mg/m ³)	230 mg/m ³
Québec	VECD (ppm)	200 ppm
Québec	VEMP (mg/m ³)	40 mg/m ³
Québec	VEMP (ppm)	35 ppm
Saskatchewan	OEL STEL (ppm)	190 ppm
Saskatchewan	OEL TWA (ppm)	25 ppm
Yukon	OEL STEL (mg/m ³)	440 mg/m ³
Yukon	OEL STEL (ppm)	400 ppm
Yukon	OEL TWA (mg/m ³)	55 mg/m ³
Yukon	OEL TWA (ppm)	50 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Use an explosion-proof local exhaust system with sufficient flow velocity to maintain an adequate supply of air in the worker's breathing zone. Mechanical/General measures: Use in a closed system.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment : Safety glasses. Face shield. Gloves.



Hand protection : Wear working gloves when handling gas containers.

Eye protection : Safety eye wear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

Skin and body protection : Wear chemically resistant protective gloves.

Respiratory protection : **Respiratory protection:** Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with provincial regulations, local bylaws or guidelines. Selection should be based on the current CSA standard Z94.4, "Selection, Care, and Use of Respirators." Respirators should also be approved by NIOSH and MSHA. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere.

Other information : **Other protection :** Safety shoes for general handling at customer sites. Metatarsal shoes and cuffed trousers for cylinder handling at packaging and filling plants. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines. For working with flammable and oxidizing materials, consider the use of flame resistant anti-static safety clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Colorless, odorless gas.
Molecular mass	: 28 g/mol
Colour	: Colourless.
Odour	: Odourless.
Odour threshold	: No data available
pH	: Not applicable.
pH solution	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: -205.1 °C
Freezing point	: No data available
Boiling point	: -191.5 °C
Flash point	: Not applicable.
Critical temperature	: -139.8 °C
Auto-ignition temperature	: 605 °C
Decomposition temperature	: 400 °C
Vapour pressure	: Not applicable.
Vapour pressure at 50 °C	: No data available
Critical pressure	: 3499 kPa
Relative vapour density at 20 °C	: No data available
Relative density	: No data available
Relative density of saturated gas/air mixture	: No data available
Density	: 1.2501 kg/m ³ (at 0 °C)
Relative gas density	: 1
Solubility	: Water: 41 g/l (at 20 °C)
Log Pow	: 1.78
Log Kow	: Not applicable.
Viscosity, kinematic	: Not applicable.
Viscosity, dynamic	: Not applicable.
Viscosity, kinematic (calculated value) (40 °C)	: No data available
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Flammability (solid, gas)	: 12.5 - 74 vol %

9.2. Other information

Gas group	: Compressed gas
Additional information	: None

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	: No reactivity hazard other than the effects described in sub-sections below.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: May occur. Can form explosive mixture with air. Oxidizing agents.
Conditions to avoid	: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Incompatible materials	: Oxidizing agents, Oxygen, Flammables, Metal oxides, halogenated fluorides, metals in the presence of moisture and/or sulfur compounds.
Hazardous decomposition products	: Carbon monoxide will decompose above 752°F (400°C) to form carbon dioxide and carbon.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified
 Acute toxicity (dermal) : Not classified
 Acute toxicity (inhalation) : Inhalation:gas: TOXIC IF INHALED.

Carbon monoxide (630-08-0)	
LC50 inhalation rat (ppm)	1880 ppm/4h
ATE CA (gases)	1880.00000000 ppmv/4h

Skin corrosion/irritation : Not classified
 pH: Not applicable.
 Serious eye damage/irritation : Not classified
 pH: Not applicable.
 Respiratory or skin sensitization : Not classified
 Germ cell mutagenicity : Not classified
 Carcinogenicity : Not classified
 Reproductive toxicity : May damage fertility or the unborn child.
 Specific target organ toxicity (single exposure) : Not classified
 Specific target organ toxicity (repeated exposure) : CAUSES DAMAGE TO ORGANS (CENTRAL NERVOUS SYSTEM) THROUGH PROLONGED OR REPEATED EXPOSURE (Inhalation).
 Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Classification criteria are not met. No ecological damage caused by this product.

12.2. Persistence and degradability

Carbon monoxide (630-08-0)	
Persistence and degradability	Will not undergo hydrolysis. Not readily biodegradable. Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Carbon monoxide (630-08-0)	
Log Pow	1.78
Log Kow	Not applicable.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

12.4. Mobility in soil

Carbon monoxide (630-08-0)	
Mobility in soil	No data available.
Log Pow	1.78
Log Kow	Not applicable.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on the ozone layer : None
 Global warming potential [CO2=1] : 1.9

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG) : UN1016
 TDG Primary Hazard Classes : 2.3 - Class 2.3 - Toxic Gas.
 TDG Subsidiary Classes : 2.1
 Proper shipping name : CARBON MONOXIDE, COMPRESSED

ERAP Index : 500
 Explosive Limit and Limited Quantity Index : 0
 Passenger Carrying Ship Index : Forbidden
 Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : Forbidden

14.3. Air and sea transport

IMDG

UN-No. (IMDG) : 1016
 Proper Shipping Name (IMDG) : CARBON MONOXIDE, COMPRESSED
 Class (IMDG) : 2 - Gases
 MFAG-No : 119

IATA

UN-No. (IATA) : 1016
 Proper Shipping Name (IATA) : Carbon monoxide, compressed
 Class (IATA) : 2

SECTION 15: Regulatory information

15.1. National regulations

Carbon monoxide (630-08-0)

Listed on the Canadian DSL (Domestic Substances List)

15.2. International regulations

Carbon monoxide (630-08-0)

Listed on the AICS (Australian Inventory of Chemical Substances)
 Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
 Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
 Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
 Listed on the Korean ECL (Existing Chemicals List)
 Listed on NZIoC (New Zealand Inventory of Chemicals)
 Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
 Listed on the United States TSCA (Toxic Substances Control Act) inventory
 Listed on INSQ (Mexican national Inventory of Chemical Substances)

SECTION 16: Other information

Other information

: Prior to using any plastics, confirm their compatibility with this chemical

When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product

Airtec asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information

The opinions expressed herein are those of qualified experts within Airtec Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Airtec Inc, it is the user's obligation to determine the conditions of safe use of the product.

Airtec SDSs are furnished on sale or delivery by Airtec or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Airtec sales representative.

NFPA health hazard

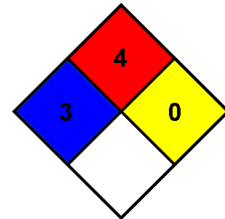
: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard

: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity

: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health

: 1 Slight Hazard - Irritation or minor reversible injury possible

Flammability

: 4 Severe Hazard - Flammable gases, or very volatile flammable liquids with flash points below 73 F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class IA)

Physical

: 3 Serious Hazard - Materials that may form explosive mixtures with water and are capable of detonation or explosive reaction in the presence of a strong initiating source. Materials may polymerize, decompose, self-react, or undergo other chemical change at normal temperature and pressure with moderate risk of explosion