



# Carbon monoxide

## Safety Data Sheet TYHJ-016

according to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/2016

### SECTION 1: Product and company identification

#### 1.1. Product identifier

Product form : Substance  
Name : Carbon monoxide  
CAS No : 630-08-0  
Formula : CO

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

Use of the substance/mixture : Industrial use. Use as directed.

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

Chengdu Taiyu Industrial Gases Co.,Ltd  
No.2375,Chengluo Avenue, Longquan District, Chengdu City, China  
TELEPHONE NUMBER: (86)28 88455212

#### 1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

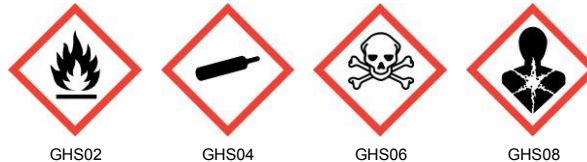
##### Classification (GHS-US)

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

#### 2.2. Label elements

##### GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

DANGER

Hazard statements (GHS-US) :

H220 - EXTREMELY FLAMMABLE GAS  
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED  
H331 - TOXIC IF INHALED  
H360 - MAY DAMAGE FERTILITY OR THE UNBORN CHILD  
H372 - CAUSES DAMAGE TO ORGANS (CENTRAL NERVOUS SYSTEM) THROUGH PROLONGED OR REPEATED EXPOSURE  
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR  
CGA-HG10 - ASPHYXIATING EVEN WITH ADEQUATE OXYGEN.

Precautionary statements (GHS-US) :

P202 - Do not handle until all safety precautions have been read and understood  
P210 - Keep away from heat, Open flames, sparks, hot surfaces. - No smoking  
P260 - Do not breathe gas  
P271+P403 - Use and store only outdoors or in a well-ventilated place.  
P280 - Wear protective clothing, protective gloves, eye protection, face protection  
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely  
P381 - Eliminate all ignition sources if safe to do so



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P405 - Store locked up  
P501 - Dispose of contents/container in accordance with container supplier/owner instructions  
CGA-PG05 - Use a back flow preventive device in the piping.  
CGA-PG12 - Do not open valve until connected to equipment prepared for use.  
CGA-PG06 - Close valve after each use and when empty.  
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

### 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-US)

No data available

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Name	Product identifier	%
Carbon monoxide (Main constituent)	(CAS No) 630-08-0	100

### 3.2. Mixture

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, 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, both 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. Indication of any immediate medical attention and special treatment needed

No additional information available

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

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

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

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.

### 5.3. Advice for firefighters

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 OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.



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- 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 DOT.).

### SECTION 6: Accidental release measures

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

- General measures : Cannot be detected by odor. Forms explosive mixtures with air. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if safe to do so. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

##### 6.1.1. For non-emergency personnel

No additional information available

##### 6.1.2. For emergency responders

No additional information available

#### 6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

#### 6.3. Methods and material for containment and cleaning up

No additional information available

#### 6.4. Reference to other sections

See also sections 8 and 13.

### 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.



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### 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 or 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.

### 7.3. Specific end use(s)

None.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Carbon monoxide (630-08-0)		
ACGIH	ACGIH TLV-TWA (ppm)	25 ppm
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	55 mg/m <sup>3</sup>
USA OSHA	OSHA PEL (TWA) (ppm)	50 ppm

### 8.2. Exposure 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.

Hand protection : Wear working gloves when handling gas containers.

Eye protection : Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection : Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear neoprene gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.

Respiratory protection : When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). 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 : 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

Color : Colorless

Odor : No data available



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Odor threshold	: No data available
pH	: Not applicable.
Relative evaporation rate (butyl acetate=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.
Auto-ignition temperature	: 605 °C
Decomposition temperature	: 400 °C
Flammability (solid, gas)	: 12.5 - 74 vol %
Vapor pressure	: Not applicable.
Critical pressure	: 3499 kPa
Relative vapor density at 20 °C	: No data available
Relative density	: No data available
Specific gravity / density	: 1.2501 kg/m <sup>3</sup> (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.
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Explosive limits	: No data available

### 9.2. Other information

Gas group	: Compressed gas
Additional information	: 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 occur. Can form explosive mixture with air. Oxidizing agents.

### 10.4. Conditions to avoid

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

### 10.5. Incompatible materials

Oxidizing agents, Oxygen, Flammables, Metal oxides, halogenated fluorides, metals in the presence of moisture and/or sulfur compounds.

### 10.6. 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	: Inhalation:gas: TOXIC IF INHALED.
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### Carbon monoxide ( 1f )630-08-0

LC50 inhalation rat (ppm)	1880 ppm/4h
ATE US (gases)	1880.000 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.
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.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

### 12.5. Other adverse effects

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

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

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

## SECTION 14: Transport information

In accordance with DOT	
Transport document description	: UN1016 Carbon monoxide, compressed, 2.3
UN-No.(DOT)	: UN1016
Proper Shipping Name (DOT)	: Carbon monoxide, compressed
Department of Transportation (DOT) Hazard Classes	: 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115



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Hazard labels (DOT) : 2.3 - Poison gas  
2.1 - Flammable gas



DOT Special Provisions (49 CFR 172.102) : 4 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone D (see 173.116(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.

### Additional information

Emergency Response Guide (ERG) Number : 119 (UN1016);168 (NA9202)

Other information : No supplementary information available.

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 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.

### Transport by sea

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

### Air transport

UN-No.(IATA) : 1016  
Proper Shipping Name (IATA) : Carbon monoxide, compressed  
Class (IATA) : 2  
Civil Aeronautics Law : Gases under pressure/Gases toxic under pressure

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

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

Listed on the United States TSCA (Toxic Substances Control Act) inventory

SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard Sudden release of pressure hazard Fire hazard
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### 15.2. International regulations

#### CANADA

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

Listed on the Canadian DSL (Domestic Substances List)

### EU-Regulations

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

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)



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### 15.2.2. National 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 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 Canadian IDL (Ingredient Disclosure List)

### 15.3. US State regulations

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

U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

## SECTION 16: Other information

Revision date : 2/20/2015 12:00:00 AM  
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.

Praxair 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 Praxair, 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 Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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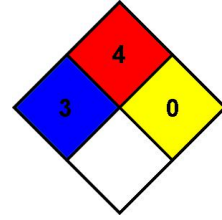
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NFPA health hazard	: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
NFPA fire hazard	: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed 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
Physical	: 3 Serious Hazard

SDS US (GHS HazCom 2012) - Praxair

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*