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Chemical Datasheet

CARBON MONOXIDE, REFRIGERATED LIQUID (CRYOGENIC LIQUID)

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Chemical Identifiers

[What is this information?](#)

The [Chemical Identifier fields](#) include common identification numbers, the [NFPA diamond](#) U.S. Department of Transportation hazard labels, and a general description of the chemical. The information in CAMEO Chemicals comes from a variety of [data sources](#).

CAS Number UN/NA Number DOT Hazard Label USCG CHRIS Code

- 630-08-0
- [9202](#)
- Poison Gas
- Flammable Gas none

NIOSH Pocket Guide

International Chem Safety Card

[Carbon monoxide](#)

- [CARBON MONOXIDE](#)

NFPA 704

			Description	
Diamond	Hazard	Value	4	
		3	0	
	Health	3		Can cause serious or permanent injury.
	Flammability	4		Burns readily. Rapidly or completely vaporizes at atmospheric pressure and normal ambient temperature.
	Instability	0		Normally stable, even under fire conditions.
	Special			

(NFPA, 2010)

General Description

A colorless cryogenic liquid. Prolonged exposure to carbon monoxide rich atmospheres may be fatal. Contact with the liquid can cause severe frostbite. Less dense than air. Easily ignited and a flame can flash back to the source of a leak very easily. Burns with a violet flame. Under prolonged exposure to fire or intense heat the containers may rupture violently and rocket. It is used in organic synthesis, metallurgy, and a fuel.

Hazards

[What is this information?](#)

The [Hazard fields](#) include [special hazard alerts](#) air and water reactions, fire hazards, health hazards, a reactivity profile, and details about [reactive groups assignments](#) and [potentially incompatible absorbents](#). The information in CAMEO Chemicals comes from a variety of [data sources](#).

Reactivity Alerts

- Highly Flammable

Air & Water Reactions

Highly flammable.

Fire Hazard

Excerpt from [ERG Guide 168](#) [Carbon Monoxide (Refrigerated Liquid)]:

EXTREMELY FLAMMABLE. May be ignited by heat, sparks or flames. Flame may be invisible. Containers may explode when heated. Vapor explosion and poison hazard indoors, outdoors or in sewers. Vapors from liquefied gas are initially heavier than air and spread along ground. Vapors may travel to source of ignition and flash back. Runoff may create fire or explosion hazard. (ERG, 2016)

Health Hazard

Excerpt from [ERG Guide 168](#) [Carbon Monoxide (Refrigerated Liquid)]:

TOXIC; Extremely Hazardous. Inhalation extremely dangerous; may be fatal. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. Odorless, will not be detected by sense of smell. (ERG, 2016)

Reactivity Profile

Contact of very cold liquefied gas with water may result in vigorous or violent boiling and extremely rapid vaporization. If the water is hot, a liquid "superheat" explosion may occur. Pressures may build to dangerous levels if the liquid contacts water in a closed container [Handling Chemicals Safely 1980]. Reacts explosively with bromine trifluoride at high temperatures or concentrations [Mellor 2, Supp. 1:166 1956]. The same is true for various oxidizers such as: chlorine dioxide, oxygen (liquid), peroxodisulfonyl difluoride. Reacts with lithium to give lithium carbonyl, which detonates violently with water, igniting the gaseous products [Mellor 2, Supp 2:84 1961]. Potassium and sodium metals behave similarly. Cesium oxide, iron(III) oxide, and silver oxide all react, in the presence of moisture, at ambient temperatures with carbon monoxide causing ignition, [Mellor, 1941, vol. 2, 487].

Belongs to the Following Reactive Group(s)

- [Reducing Agents, Weak](#)

Potentially Incompatible Absorbents

No information available.

Response Recommendations

[What is this information?](#)

The [Response Recommendation fields](#) include isolation and evacuation distances, as well as recommendations for firefighting, non-fire response, protective clothing, and first aid. The information in CAMEO Chemicals comes from a variety of [data sources](#).

Isolation and Evacuation

Excerpt from [ERG Guide 168](#) [Carbon Monoxide (Refrigerated Liquid)]:

As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.

SPILL: See [ERG Table 1](#) - Initial Isolation and Protective Action Distances on the [UN/NA 9202 datasheet](#).

FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2016)

Firefighting

Excerpt from [ERG Guide 168](#) [Carbon Monoxide (Refrigerated Liquid)]:

DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.

SMALL FIRE: Dry chemical, CO2 or water spray.

LARGE FIRE: Water spray, fog or regular foam. Move containers from fire area if you can do it without risk.

FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. (ERG, 2016)

Non-Fire Response

Excerpt from [ERG Guide 168](#) [Carbon Monoxide (Refrigerated Liquid)]:

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Do not direct water at spill or source of leak. If possible, turn leaking containers so that gas escapes rather than liquid. Prevent entry into waterways, sewers, basements or confined areas. Isolate area until gas has dispersed. (ERG, 2016)

Protective Clothing

Skin: Wear appropriate personal protective clothing to prevent skin from becoming frozen from contact with the liquid or from contact with vessels containing the liquid.

Eyes: Wear appropriate eye protection to prevent eye contact with the liquid that could result in burns or tissue damage from frostbite.

Wash skin: No recommendation is made specifying the need for washing the substance from the skin (either immediately or at the end of the work shift).

Remove: Work clothing that becomes wet should be immediately removed due to its flammability hazard(i.e. for liquids with flash point < 100°F)

Change: No recommendation is made specifying the need for the worker to change clothing after the work shift.

Provide: Quick drench facilities and/or eyewash fountains should be provided within the immediate work area for emergency use where there is any possibility of exposure to liquids that are extremely cold or rapidly evaporating. (NIOSH, 2016)

DuPont Tychem® Suit Fabrics

[Fabric legend and testing details](#)



Tychem® Fabric Legend

QS = Tychem 2000 SFR

QC = Tychem 2000

SL = Tychem 4000

C3 = Tychem 5000

TF = Tychem 6000

TP = Tychem 6000 FR

BR = Tychem 9000

RC = Tychem RESPONDER® CSM

TK = Tychem 10000

RF = Tychem 10000 FR

Testing Details

The fabric permeation data was generated for DuPont by independent testing laboratories using ASTM F739, EN369, EN 374-3, EN ISO 6529 (method A and B) or ASTM D6978 test methods. Normalized breakthrough times (the time at which the permeation rate is equal to 0.1 µg/cm²/min) reported in minutes. All liquid chemicals have been tested between approximately 20°C and 27°C unless otherwise stated. A different temperature may have significant influence on the breakthrough time; permeation rates typically increase with temperature. All chemicals have been tested at a concentration of greater than 95% unless otherwise stated. Unless otherwise stated, permeation was measured for single chemicals. The permeation characteristics of mixtures can deviate considerably from the permeation behavior of the individual chemicals. Chemical warfare agents (Lewisite, Sarin, Soman, Sulfur Mustard, Tabun and VX Nerve Agent) have been tested at 22°C and 50% relative humidity per military standard MIL-STD-282.

Normalized Breakthrough Times (in Minutes)

Chemical	CAS Number	State	QS	QC	SL	C3	TF	TP	BR	RC	TK	RF
Carbon monoxide (>95%)	630-08-0	Vapor							330	330	330	330

A blank cell indicates the fabric has not been tested. The fabric may or may not offer barrier.

Special Warnings from DuPont

1. Serged and bound seams are degraded by some hazardous liquid chemicals, such as strong acids, and should not be worn when these chemicals are present.
2. CAUTION: This information is based upon technical data that DuPont believes to be reliable. It is subject to revision as additional knowledge and experience are gained. DuPont makes no guarantee of results and assumes no obligation or liability...

[More Info...](#)

... in connection with this information. It is the user's responsibility to determine the level of toxicity and the proper personal protective equipment needed. The information set forth herein reflects laboratory performance of fabrics, not complete garments, under controlled conditions. It is intended for informational use by persons having technical skill for evaluation under their specific end-use conditions, at their own discretion and risk. Anyone intending to use this information should first verify that the garment selected is suitable for the intended use. In many cases, seams and closures have shorter breakthrough times and higher permeation rates than the fabric. Please contact DuPont

for specific data. If fabric becomes torn, abraded or punctured, or if seams or closures fail, or if attached gloves, visors, etc. are damaged, end user should discontinue use of garment to avoid potential exposure to chemical. Since conditions of use are outside our control, we make no warranties, express or implied, including, without limitation, no warranties of merchantability or fitness for a particular use and assume no liability in connection with any use of this information. This information is not intended as a license to operate under or a recommendation to infringe any patent or technical information of DuPont or others covering any material or its use.

(DuPont, 2018)

First Aid

Eye: If eye tissue is frozen, seek medical attention immediately; if tissue is not frozen, immediately and thoroughly flush the eyes with large amounts of water for at least 15 minutes, occasionally lifting the lower and upper eyelids. If irritation, pain, swelling, lacrimation, or photophobia persist, get medical attention as soon as possible.

Skin: If frostbite has occurred, seek medical attention immediately; do NOT rub the affected areas or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas. If frostbite has NOT occurred, immediately and thoroughly wash contaminated skin with soap and water.

Breathing: If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible. (NIOSH, 2016)

Physical Properties

[What is this information?](#) 

The [Physical Property fields](#) include properties such as vapor pressure and boiling point, as well as explosive limits and [toxic exposure thresholds](#). The information in CAMEO Chemicals comes from a variety of [data sources](#).

Chemical Formula: • CO

Flash Point: data unavailable

Lower Explosive Limit (LEL): 12.5 % (NIOSH, 2016)

Upper Explosive Limit (UEL): 74 % (NIOSH, 2016)

Autoignition Temperature: data unavailable

Melting Point: -337 ° F (NIOSH, 2016)

Vapor Pressure: greater than 35 atm (NIOSH, 2016)

Vapor Density (Relative to Air): data unavailable

Specific Gravity: data unavailable

Boiling Point: -313 ° F at 760 mm Hg (NIOSH, 2016)

Molecular Weight: 28 (NIOSH, 2016)

Water Solubility: 2 % (NIOSH, 2016)

Ionization Potential: 14.01 eV (NIOSH, 2016)

IDLH: 1200 ppm (NIOSH, 2016)

AEGLs (Acute Exposure Guideline Levels)

Final AEGLs for Carbon monoxide (630-08-0)

Exposure Period AEGL-1 AEGL-2 AEGL-3

10 minutes	NR	420 ppm	1700 ppm
30 minutes	NR	150 ppm	600 ppm
60 minutes	NR	83 ppm	330 ppm
4 hours	NR	33 ppm	150 ppm
8 hours	NR	27 ppm	130 ppm

NR = Not recommended due to insufficient data
(NAC/NRC, 2017)

ERPGs (Emergency Response Planning Guidelines)

Chemical	ERPG-1	ERPG-2	ERPG-3
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Carbon Monoxide (630-08-0)	200 ppm	350 ppm	500 ppm
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(AIHA, 2016)

PACs (Protective Action Criteria)

Chemical	PAC-1	PAC-2	PAC-3
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Carbon monoxide (630-08-0)	75 ppm	83 ppm	330 ppm	LEL = 125000 ppm
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(DOE, 2016)

Regulatory Information

[What is this information?](#)

The [Regulatory Information fields](#) include information from the U.S. Environmental Protection Agency's Title III Consolidated List of Lists, the U.S. Department of Homeland Security's Chemical Facility Anti-Terrorism Standards, and the U.S. Occupational Safety and Health Administration's Process Safety Management of Highly Hazardous Chemicals Standard List (see more about these [data sources](#)).

EPA Consolidated List of Lists

No regulatory information available.

DHS Chemical Facility Anti-Terrorism Standards (CFATS)

No regulatory information available.

OSHA Process Safety Management (PSM) Standard List

No regulatory information available.

Alternate Chemical Names

[What is this information?](#)

This section provides a listing of alternate names for this chemical, including trade names and synonyms.

- CARBON MONOXIDE, REFRIGERATED LIQUID (CRYOGENIC LIQUID)
- CARBON MONOXIDE, [CRYOGENIC]

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