Krypton (0.0001% - 10.00%), Carbon Dioxide (3.00% - 14.8%) in Carbon Monoxide

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 03/10/2015 Version: 2.0

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

1.1. Product identifier

Product form : Mixture

Product name : Krypton (0.0001% - 10.00%), Carbon Dioxide (3.00% - 14.8%) in Carbon Monoxide

Product code : SG-2003-02345

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

Use of the substance/mixture : Test gas/Calibration gas.

1.3. Details of the supplier of the safety data sheet

Air Liquide
2700 Post Oak Boulevard
Houston, TX 77056 - USA
T 1-800-819-1704
www.us.airliquide.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300

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

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS02 GHS04 GHS06 GHS08

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-HG03 - May increase respiration and heart rate
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, hot surfaces, open flames, sparks. - No smoking
P260 - Do not breathe gas
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear eye protection, face protection, protective gloves, protective clothing
P284 - Wear respiratory protection. Consult respiratory device supplier´s product information for the selection of the appropriate device.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P307+P311 - If exposed: Call a poison center/doctor
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
P403 - Store in a well-ventilated place
P405 - Store locked up

P501 - Dispose of contents/container in accordance with local/regional/national/international regulations
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug
CGA-PG21 - Open valve slowly

2.3. Other hazards

Other hazards not contributing to the classification : This product contains a chemical asphyxiant.

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%	Classification (GHS-US)
Carbon monoxide	(CAS No) 630-08-0	75.2 - 96.9999	Flam. Gas 1, H220 Compressed gas, H280 Acute Tox. 3 (Inhalation:gas), H331 Repr. 1A, H360 STOT RE 1, H372
Carbon dioxide	(CAS No) 124-38-9	3 - 14.8	Liquefied gas, H280
Krypton	(CAS No) 7439-90-9	0.0001 - 10	Compressed gas, H280

Full text of H-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. Apply artificial respiration with bag or mask if breathing stopped. Get immediate medical advice/attention.

First-aid measures after skin contact : Adverse effects not expected from this product.

First-aid measures after eye contact : Adverse effects not expected from this product.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Asphyxiating even with adequate oxygen. May increase respiration and heart rate. Toxic if inhaled.

Symptoms/injuries after skin contact : Adverse effects not expected from this product.

Symptoms/injuries after eye contact : Adverse effects not expected from this product.

Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/injuries upon intravenous administration : Not known.

Chronic symptoms : May damage fertility. May damage the unborn child. Causes damage to organs (central nervous system) through prolonged or repeated exposure.

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

If you feel unwell, seek medical advice. If breathing is difficult, give oxygen. Obtain medical attention if breathing difficulty persists.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Fire hazard : This product is flammable.

Explosion hazard	:	Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. May form flammable/explosive vapor-air mixture.
Reactivity	:	None known.

5.3. Advice for firefighters

Firefighting instructions	:	In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
Protection during firefighting	:	Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

6.1.1. For non-emergency personnel

Protective equipment	:	Wear protective equipment consistent with the site emergency plan.
Emergency procedures	:	Escape the danger area by the closest safe route. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

6.1.2. For emergency responders

Protective equipment	:	Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.
Emergency procedures	:	Evacuate and limit access. Ventilate area. Remove ignition sources. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering atmospheres of unknown contaminant concentration until proven to be safe.

6.2. Environmental precautions

Try to stop release if safe to do so.

6.3. Methods and material for containment and cleaning up

For containment	:	Try to stop release if safe to do so.
Methods for cleaning up	:	Dispose of this material and its container in accordance with local regulations.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed	:	Pressurized container: Do not pierce or burn, even after use. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Handle empty containers with care because residual vapors are flammable. In use, may form flammable vapor-air mixture.
Precautions for safe handling	:	Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Use only non-sparking tools.
Hygiene measures	:	Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed.
Storage conditions	:	Do not expose to temperatures exceeding 52°C (125°F). Keep container closed when not in use. Protect cylinder from physical damage. Store in well ventilated area. Store locked up.
Incompatible products	:	None known.
Incompatible materials	:	Oxidizing materials. Air.

7.3. Specific end use(s)

See Section 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Krypton (0.0001% - 10.00%), Carbon Dioxide (3.00% - 14.8%) in Carbon Monoxide	
ACGIH	Not applicable
OSHA	Not applicable

Carbon monoxide (630-08-0)		
ACGIH	ACGIH TWA (ppm)	25 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	55 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	50 ppm

Carbon dioxide (124-38-9)		
ACGIH	ACGIH TWA (ppm)	5000 ppm
ACGIH	ACGIH STEL (ppm)	30000 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	9000 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	5000 ppm

Krypton (7439-90-9)	
ACGIH	Not applicable
OSHA	Not applicable

8.2. Exposure controls

Appropriate engineering controls : Ensure exposure is below occupational exposure limits. Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Consider work permit system e.g. for maintenance activities. Alarm detectors should be used when toxic gases may be released.

Hand protection : Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand Protection.

Eye protection : Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection.

Skin and body protection : Wear suitable protective clothing, e.g. - lab coats, coveralls or flame resistant clothing.

Respiratory protection : Wear a respirator when performing non-routine tasks not limited to line breaking or sampling. Wear a respirator during routine operations if determined to be necessary during a process-specific review. Consult respirator suppliers' product information or their representatives for the selection of the appropriate respirator.

Thermal hazard protection : None necessary during normal and routine operations.

Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

Other information : Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Appearance : Clear, colorless gas.

Molecular mass : Not applicable for gas-mixtures.

Color : Colorless

Odor : Odorless

Odor threshold : No Data Available

pH : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Melting point : No Data Available

Freezing point : No data available

Boiling point : No Data Available

Flash point : No Data Available

Auto-ignition temperature : No data available

Decomposition temperature	:	No data available
Flammability (solid, gas)	:	See Section 2.1 and 2.2
Vapor pressure	:	No data available
Relative vapor density at 20 °C	:	No data available
Relative density	:	No data available
Relative gas density	:	Heavier than air
Solubility	:	Water: Solubility in water of component(s) of the mixture : • : Insoluble • : 221 mg/l • : 2000 mg/l
Log Pow	:	No data available
Log Kow	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosive properties	:	Without adequate ventilation formation of explosive mixtures may be possible.
Oxidizing properties	:	None.
Explosive limits	:	No data available

9.2. Other information

Additional information : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Can form explosive mixture with air.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

Oxidizing materials. Air.

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 toxicological effects

Acute toxicity : Inhalation:gas: Toxic if inhaled.

Krypton (0.0001% - 10.00%), Carbon Dioxide (3.00% - 14.8%) in Carbon Monoxide	
ATE US (gases)	1938.146 ppmV/4h
Carbon monoxide (630-08-0)	
LC50 inhalation rat (ppm)	1880 ppm/4h
ATE US (gases)	1880.000 ppmV/4h
Carbon dioxide (124-38-9)	
LC50 inhalation rat (ppm)	820000 ppm/4h
Krypton (7439-90-9)	
LC50 inhalation rat (ppm)	820000 ppm/4h

Skin corrosion/irritation	:	Not classified
Serious eye damage/irritation	:	Not classified
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
Symptoms/injuries after inhalation	:	Asphyxiating even with adequate oxygen. May increase respiration and heart rate. Toxic if inhaled.
Symptoms/injuries after skin contact	:	Adverse effects not expected from this product.
Symptoms/injuries after eye contact	:	Adverse effects not expected from this product.
Symptoms/injuries after ingestion	:	Ingestion is not considered a potential route of exposure.
Symptoms/injuries upon intravenous administration	:	Not known.
Chronic symptoms	:	May damage fertility. May damage the unborn child. Causes damage to organs (central nervous system) through prolonged or repeated exposure.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

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.

Carbon dioxide (124-38-9)	
Persistence and degradability	No ecological damage caused by this product.

Krypton (7439-90-9)	
Persistence and degradability	No ecological damage caused by this product.

12.3. Bioaccumulative potential

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

Carbon dioxide (124-38-9)	
BCF fish 1	(no bioaccumulation)
Log Pow	0.83
Bioaccumulative potential	No ecological damage caused by this product.

Krypton (7439-90-9)	
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Carbon monoxide (630-08-0)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

Carbon dioxide (124-38-9)	
Ecology - soil	No ecological damage caused by this product.

Krypton (7439-90-9)	
Ecology - soil	No ecological damage caused by this product.

12.5. Other adverse effects

Effect on ozone layer	:	No known effects from this product.
Effect on the global warming	:	Contains greenhouse gas(es) not covered by 842/2006/EC.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into areas where there is a risk of forming an explosive mixture with air.

Waste disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1953 Compressed gas, toxic, flammable, n.o.s. Inhalation Hazard Zone C/D, 2.2

UN-No.(DOT) : UN1953

Proper Shipping Name (DOT) : Compressed gas, toxic, flammable, n.o.s. Inhalation Hazard Zone C/D

Department of Transportation (DOT) Hazard Classes : 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115

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

DOT Symbols : G - Identifies PSN requiring a technical name

DOT Special Provisions (49 CFR 172.102) : 3 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone C (see 173.116(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
B14 - Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 C (60 F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet.

DOT Packaging Exceptions (49 CFR 173.xxx) : None

DOT Packaging Non Bulk (49 CFR 173.xxx) : 302;305

DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : Forbidden

DOT Vessel Stowage Location : D - The material must be stowed ‘‘on deck only’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.

DOT Vessel Stowage Other : 40 - Stow ‘‘clear of living quarters’’

Additional information

Other information : No supplementary information available.

ADR

Transport document description : UN 1953, 2.3 (2.1), (B/D)

Class (ADR) : 2 - Gases

Hazard identification number (Kemler No.) : 263

Classification code (ADR) : 1TF

Hazard labels (ADR)	:	2.3 - Toxic gases 2.1 - Flammable gases

Orange plates	:	263 1953
Tunnel restriction code (ADR)	:	B/D
LQ	:	0
Excepted quantities (ADR)	:	E0

Transport by sea

UN-No. (IMDG)	:	1953
Proper Shipping Name (IMDG)	:	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.
Class (IMDG)	:	2 - Gases

Air transport

UN-No.(IATA)	:	1953
Proper Shipping Name (IATA)	:	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.
Class (IATA)	:	2

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

Carbon dioxide (124-38-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Krypton (7439-90-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Carbon monoxide (630-08-0)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision A - Very toxic material causing other toxic effects

Carbon dioxide (124-38-9)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas

Krypton (7439-90-9)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas

EU-Regulations

Carbon monoxide (630-08-0)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Carbon dioxide (124-38-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Krypton (7439-90-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Classification according to Regulation (EC) No. 1272/2008 [CLP]
Not classified

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

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)

Carbon dioxide (124-38-9)
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)

Krypton (7439-90-9)
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 Korean ECL (Existing Chemicals List) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

15.3. US State regulations

Carbon monoxide (630-08-0)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
No	Yes	No	No	

Carbon monoxide (630-08-0)
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

Carbon dioxide (124-38-9)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with OSHA final rule on GHS implementation promulgated March 26, 2012.

Other information : This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases:

Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Compressed gas	Gases under pressure Compressed gas
Flam. Gas 1	Flammable gases Category 1
Liquefied gas	Gases under pressure Liquefied gas
Repr. 1A	Reproductive toxicity Category 1A
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
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 through prolonged or repeated exposure

SDS US (GHS HazCom 2012)

This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide America Corporation's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.