

Safety Data Sheet



Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name	Flammable Gas Mixture Containing Carbon Monoxide (29-34%), Hydrogen (56-68%)
Synonyms	Syngas; Synthesis Gas Mixture
Product Code	30009

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

Relevant identified use(s)	Aldehyde Production
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1.3 Details of the supplier of the safety data sheet

Manufacturer	Air Liquide 2398 Victoria Rd. Freeport, TX 77541 United States www.us.airliquide.com sds@airliquide.com
Telephone (Technical)	713-896-2896
Telephone (Technical)	800-819-1704

1.4 Emergency telephone number

Manufacturer	800-424-9300 - CHEMTREC
Manufacturer	+1 703-527-3887 - Outside United States

Section 2: Hazards Identification

EU/EEC

According to Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]

According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP	- Flammable Gases 1 - H220 - Compressed Gas - H280 - Acute Toxicity Inhalation 4 - H332 - Reproductive Toxicity 1A - H360D - Specific Target Organ Toxicity Repeated Exposure 1 - H372
DSD/DPD	- Extremely Flammable (F+) - Toxic (T) - Substances Toxic To Reproduction - Category 1 - R12, R23, R48/23, R61

2.2 Label Elements

CLP	DANGER
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- Hazard statements**
- H220 - Extremely flammable gas
 - H280 - Contains gas under pressure; may explode if heated
 - H332 - Harmful if inhaled
 - H360D - May damage the unborn child.
 - H372 - Causes damage to organs through prolonged or repeated exposure.

Precautionary statements

- Prevention**
- P201 - Obtain special instructions before use.
 - P202 - Do not handle until all safety precautions have been read and understood.
 - P210 - Keep away from heat, sparks, open flames and/or hot surfaces. - No smoking.
 - P261 - Avoid breathing dust, fume, gas, mist, vapours and/or spray.
 - P264 - Wash thoroughly after handling.
 - P270 - Do not eat, drink or smoke when using this product.
 - P271 - Use only outdoors or in a well-ventilated area.
 - P280 - Wear protective gloves/protective clothing/eye protection/face protection.
 - P281 - Use personal protective equipment as required.
- Response**
- P381 - Eliminate all ignition sources if safe to do so.
 - P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
 - P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 - P308+P313 - IF exposed or concerned: Get medical advice/attention.
 - P312 - Call a POISON CENTER or doctor/physician if you feel unwell.
 - P314 - Get medical advice/attention if you feel unwell.
- Storage/Disposal**
- P405 - Store locked up.
 - P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

DSD/DPD



- Risk phrases**
- R12 - Extremely flammable.
 - R23 - Toxic by inhalation.
 - R48/23 - Toxic: danger of serious damage to health by prolonged exposure through inhalation.
 - R61 - May cause harm to the unborn child.
- Safety phrases**
- S9 - Keep container in a well ventilated place
 - S16 - Keep away from sources of ignition - No Smoking.
 - S37 - Wear suitable gloves.
 - S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
 - S53 - Avoid exposure - obtain special instructions before use.

2.3 Other Hazards

- CLP**
- According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.
- DSD/DPD**
- According to European Directive 1999/45/EC this material is considered dangerous.

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

- OSHA HCS 2012**
- Flammable Gases 1 - H220
 - Compressed Gas - H280
 - Acute Toxicity Inhalation 4 - H332
 - Reproductive Toxicity 1A - H360

2.2 Label elements

OSHA HCS 2012

DANGER



- Hazard statements**
- Extremely flammable gas - H220
 - Contains gas under pressure; may explode if heated - H280
 - Harmful if inhaled - H332
 - May damage fertility or the unborn child. - H360

Precautionary statements

- Prevention**
- Obtain special instructions before use. - P201
 - Do not handle until all safety precautions have been read and understood. - P202
 - Keep away from heat, sparks, open flames and/or hot surfaces. - No smoking. - P210
 - Avoid breathing gas. - P261
 - Use only outdoors or in a well-ventilated area. - P271
 - Wear protective gloves/protective clothing/eye protection/face protection. - P280
- Response**
- Eliminate all ignition sources if safe to do so. - P381
 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely. - P377
 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. - P304+P340
 - IF exposed or concerned: Get medical advice/attention. - P308+P313
 - Call a POISON CENTER or doctor/physician if you feel unwell. - P312
- Storage/Disposal**
- Store in a well-ventilated place. Keep container tightly closed. - P403+P233
 - Store locked up. - P405
 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations. - P501

2.3 Other hazards

OSHA HCS 2012

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to WHMIS

2.1 Classification of the substance or mixture

WHMIS

- Compressed Gas - A
- Flammable Gases - B1
- Very Toxic - D1A
- Other Toxic Effects - D2A

2.2 Label elements

WHMIS



- Compressed Gas - A
- Flammable Gases - B1
- Very Toxic - D1A
- Other Toxic Effects - D2A

2.3 Other hazards

WHMIS

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

3.1 Substances

- Material does not meet the criteria of a substance in accordance with Regulation (EC) No 1272/2008.

3.2 Mixtures

Composition				
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive
Hydrogen	CAS:1333-74-0 EINECS:215-605-7	56% TO 68%	NDA	EU DSD/DPD: Annex VI, Table 3.2: F+; R12 EU CLP: Annex VI, Table 3.1: Flam. Gas 1, H220; Press. Gas - Comp., H280 OSHA HCS 2012: Flam. Gas 1, Press. Gas - Comp.
Carbon monoxide	CAS:630-08-0 EINECS:211-128-3	29% TO 34%	Inhalation-Rat LC50 • 1900 mg/m ³ 4 Hour(s)	EU DSD/DPD: Annex VI, Table 3.2: F+; R12; Repr. Cat. 1; R61; T; R23-48/23 EU CLP: Annex VI, Table 3.1: Flam. Gas 1, H220; Press. Gas - Comp., H280; Repr. 1A, H360D; Acute Tox. 3 *, H331; STOT RE 1, H372 OSHA HCS 2012: Repr. 1A; Acute Tox. 3 (inhl); Flam. Gas 1; Press. Gas - Comp.

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation

- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

Skin

- Although exposure is unlikely, in case of contact immediately flush skin with running water. If skin irritation develops get medical advice/attention.

Eye

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. Get medical attention immediately if symptoms occur. First aid is not expected to be necessary if material is used under ordinary conditions and as recommended.

Ingestion

- Never give anything by mouth to an unconscious person. Do NOT induce vomiting. First aid is not expected to be necessary if material is used under ordinary conditions and as recommended.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

4.4 Other information

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over-

exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media • SMALL FIRES: Dry chemical or CO₂.
LARGE FIRES: Water spray or fog.

Unsuitable Extinguishing Media • No data available

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards • EXTREMELY FLAMMABLE
Will form explosive mixtures with air.
Vapors may travel to source of ignition and flash back.
Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
Containers may explode when heated.
Ruptured cylinders may rocket.

Hazardous Combustion Products • No data available

5.3 Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.
Wear positive pressure self-contained breathing apparatus (SCBA).
DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED
Move containers from fire area if you can do it without risk.
FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.
FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.
FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out.
FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur.
FIRE INVOLVING TANKS: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions • Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not touch or walk through spilled material. Ventilate the area before entry.

Emergency Procedures • ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions. Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. LARGE SPILL: Consider initial downwind evacuation for at least 800 meters (1/2 mile)

6.2 Environmental precautions

- Prevent spreading of vapors through sewers, ventilation systems and confined areas.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures

- All equipment used when handling the product must be grounded. Stop leak if you can do it without risk. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container. Do not direct water at spill or source of leak. Isolate area until gas has dispersed.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Keep away from heat and ignition sources – No Smoking. Take precautionary measures against static charges. All equipment used when handling the product must be grounded. Use only non-sparking tools. Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked-over. Use explosion-proof - electrical, ventilating and/or lighting equipment. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Cylinders should be stored in dry, well-ventilated areas away from sources of heat, ignition and direct sunlight. Do not allow area where cylinders are stored to exceed 52C (125F). Cylinders must be protected from the environment, and preferably kept at room temperature approximately 21C (70F). Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over. Store locked up.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines						
	Result	ACGIH	Canada Ontario	Canada Quebec	China	China Highly Toxic Goods
Carbon monoxide (630-08-0)	Ceilings	Not established	Not established	Not established	20 mg/m ³ Ceiling [MAC] (high altitude area, 2000-3000m); 15 mg/m ³ Ceiling [MAC] (high altitude area, >3000m)	Not established
	STELs	Not established	Not established	200 ppm STEV; 230 mg/m ³ STEV	30 mg/m ³ STEL (not in high altitude area)	30 mg/m ³ STEL (not in high altitude area)
	TWAs	25 ppm TWA	25 ppm TWA	35 ppm TWA EV; 40 mg/m ³ TWA EV	20 mg/m ³ TWA (not in high altitude area)	20 mg/m ³ TWA (not in high altitude area)

Exposure Limits/Guidelines (Con't.)

	Result	France	Germany DFG	Germany TRGS	Ireland	Israel
Carbon monoxide (630-08-0)	TWAs	50 ppm TWA [VME]; 55 mg/m ³ TWA [VME]	Not established	30 ppm TWA AGW (The risk of damage to the embryo or fetus cannot be excluded even when AGW and BGW values are observed, exposure factor 2); 35 mg/m ³ TWA AGW (The risk of damage to the embryo or fetus cannot be excluded even when AGW and BGW values are observed, exposure factor 2)	20 ppm TWA; 23 mg/m ³ TWA	25 ppm TWA
	STELs	Not established	Not established	Not established	100 ppm STEL; 115 mg/m ³ STEL	Not established
	Ceilings	Not established	60 ppm Peak; 70 mg/m ³ Peak	Not established	Not established	Not established
	MAKs	Not established	30 ppm TWA MAK; 35 mg/m ³ TWA MAK	Not established	Not established	Not established

Exposure Limits/Guidelines (Con't.)

	Result	NIOSH	OSHA	OSHA Vacated	Portugal	Spain
Carbon monoxide (630-08-0)	TWAs	35 ppm TWA; 40 mg/m ³ TWA	50 ppm TWA; 55 mg/m ³ TWA	35 ppm TWA; 40 mg/m ³ TWA	25 ppm TWA [VLE- MP]	25 ppm TWA [VLA- ED]; 29 mg/m ³ TWA [VLA-ED]
	Biological Limit Values (BLV)	Not established	Not established	Not established	Not established	3.5 % of Carboxyhemoglobin in total hemoglobin blood end of shift Carboxyhemoglobin (2,F,I); 20 ppm alveolar air end of shift CO end-cut of exhaled air (2,F,I)
	Ceilings	200 ppm Ceiling; 229 mg/m ³ Ceiling	Not established	Not established	Not established	Not established

Exposure Limits/Guidelines (Con't.)

	Result	Sweden
Carbon monoxide (630-08-0)	STELs	100 ppm STV; 120 mg/m ³ STV
	TWAs	20 ppm LLV (regulated under exhaust fumes, listed under Exhaust fumes); 25 mg/m ³ LLV (regulated under exhaust fumes, listed under Exhaust fumes); 35 ppm LLV; 40 mg/m ³ LLV

Exposure Control Notations

Portugal

- Hydrogen (1333-74-0): **Simple Asphyxiants:** (Simple Asphyxiant)

France

- Carbon monoxide (630-08-0): **Reproductive Toxins:** (Reproductive Toxin category 1)

Ireland

- Carbon monoxide (630-08-0): **Substances with Potential Chronic Health Effects:** (Repr1A)

- Hydrogen (1333-74-0): **Simple Asphyxiants:** (Asphyxiant)

Spain

- Carbon monoxide (630-08-0): **Reproductive Toxins:** (known reproductive toxins with classification from human data)

- Hydrogen (1333-74-0): **Simple Asphyxiants:** (simple asphyxiant)

Sweden

- Carbon monoxide (630-08-0): **Reproductive Toxins:** (Causes reproductive disturbances)

Germany DFG

- Carbon monoxide (630-08-0): **Pregnancy:** (risk to embryo/fetus probable)

8.2 Exposure controls**Engineering Measures/Controls**

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof - electrical, ventilating and/or lighting equipment.

Personal Protective Equipment**Respiratory**

- Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face

- Wear safety glasses.

Skin/Body

- Wear leather gloves when handling cylinders.

Environmental Exposure Controls

- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

LLV = Limit Level Value is the exposure limit for 8-hour work day

MAK = Maximale Arbeitsplatz Konzentration is the maximum permissible concentration

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

STEL = Short Term Exposure Limits are based on 15-minute exposures

STEV = Short Term Exposure Value

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

TWAEV = Time-Weighted Average Exposure Value

Section 9 - Physical and Chemical Properties**9.1 Information on Physical and Chemical Properties**

Material Description			
Physical Form	Gas	Appearance/Description	Data lacking
Color	Data lacking	Odor	Data lacking
Odor Threshold	Data lacking		
General Properties			
Boiling Point	Data lacking	Melting Point	Data lacking
Decomposition Temperature	Data lacking	pH	Data lacking
Specific Gravity/Relative Density	Data lacking	Water Solubility	Data lacking
Viscosity	Data lacking	Explosive Properties	Data lacking
Oxidizing Properties:	Data lacking		

Volatility

Vapor Pressure	Data lacking	Vapor Density	Data lacking
Evaporation Rate	Data lacking		

Flammability

Flash Point	Data lacking	UEL	Data lacking
LEL	Data lacking	Autoignition	Data lacking
Flammability (solid, gas)	Data lacking		

Environmental

Half-Life	Data lacking	Octanol/Water Partition coefficient	Data lacking
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9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity**10.1 Reactivity**

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

10.4 Conditions to avoid

- No data available

10.5 Incompatible materials

- No data available

10.6 Hazardous decomposition products

- None

Section 11 - Toxicological Information**11.1 Information on toxicological effects**

Component Name	CAS	Data
Carbon monoxide (29% TO 34%)	630-08-0	Acute Toxicity: ihl-rat LC50:1807 ppm/4H; Reproductive: ihl-rat TCLo:150 ppm (0-20D preg)

GHS Properties	Classification
Acute toxicity	EU/CLP • Acute Toxicity - Inhalation 4 - ATEmix(inhl)=5314 ppm OSHA HCS 2012 • Acute Toxicity - Inhalation 4 - ATEmix(inhl)=5314 ppm
Aspiration Hazard	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Carcinogenicity	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Germ Cell Mutagenicity	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Skin corrosion/Irritation	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met

Skin sensitization	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
STOT-RE	EU/CLP • Specific Target Organ Toxicity Repeated Exposure 1 OSHA HCS 2012 • Classification criteria not met
STOT-SE	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Toxicity for Reproduction	EU/CLP • Toxic to Reproduction 1A OSHA HCS 2012 • Toxic to Reproduction 1A
Respiratory sensitization	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Serious eye damage/Irritation	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met

Potential Health Effects

Inhalation

Acute (Immediate)

- Inhalation over-exposures to atmospheres containing more than the Threshold Limit Value of Carbon Monoxide (25 ppm), another component of this gas mixture, can result in serious health consequences. Carbon Monoxide is classified as a chemical asphyxiant, producing a toxic action by combining with the hemoglobin of the blood and replacing the available oxygen. Through this replacement, the body is deprived of the required oxygen, and asphyxiation occurs. Since the affinity of Carbon Monoxide for hemoglobin is about 200-300 times that of oxygen, only a small amount of Carbon Monoxide will cause a toxic reaction to occur. Carbon Monoxide exposures in excess of 50 ppm will produce symptoms of poisoning if breathed for a sufficiently long time. If this gas mixture is released in a small, poorly ventilated area (i.e. an enclosed or confined space), symptoms which may develop include the following: bright red lips and fingernails, headache progressing to heart palpitations, staggering, confusion, nausea, dizziness and unconsciousness with higher concentration exposures. For exposures greater than 2500 ppm there is potential for collapse and death before warning symptoms are experienced.

Chronic (Delayed)

- No data available

Skin

Acute (Immediate)

- Under normal conditions of use, no health effects are expected.

Chronic (Delayed)

- No data available

Eye

Acute (Immediate)

- Under normal conditions of use, no health effects are expected.

Chronic (Delayed)

- No data available

Ingestion

Acute (Immediate)

- Under normal conditions of use, no health effects are expected.

Chronic (Delayed)

- No data available

Reproductive Effects

- The Carbon Monoxide component of this gas mixture can cause teratogenic effects in humans. Severe exposure to Carbon Monoxide during pregnancy has caused adverse effects and the death of the fetus. In general, maternal symptoms are an indicator of the potential risk to the fetus since Carbon Monoxide is toxic to the mother before it is toxic to the fetus.

11.2 Other information

- The transport of oxygen in blood ensured by haemoglobin will be slowed down because carboxyhaemoglobin instead of oxyhaemoglobin will be formed in lungs. The affinity of haemoglobin for carbon monoxide is 200 to 300 higher than for oxygen. All related health hazards will be caused by slow respiration of cells which will damage the central nervous system, collapse the cardiovascular system, cause kidney insufficiency, coma, etc.

Key to abbreviations

LC = Lethal Concentration

TC = Toxic Concentration

Section 12 - Ecological Information**12.1 Toxicity**

- No data available

12.2 Persistence and degradability

- No data available

12.3 Bioaccumulative potential

- No data available

12.4 Mobility in Soil

- No data available

12.5 Results of PBT and vPvB assessment

- PBT and vPvB assessment has not been conducted for this material.

12.6 Other adverse effects

- No studies have been found.

Section 13 - Disposal Considerations**13.1 Waste treatment methods****Product waste**

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	UN1953	Compressed gas, toxic, flammable, n.o.s. (Carbon Monoxide, Hydrogen)	2.1,2.3	NDA	NDA
TDG	UN1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.(Carbon Monoxide, Hydrogen)	2.1,2.3	NDA	Potential Marine Pollutant
IMO/IMDG	UN1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (Carbon Monoxide, Hydrogen)	2.1,2.3	NDA	NDA
IATA/ICAO	UN1953	Compressed gas, toxic, flammable, n.o.s. (Carbon Monoxide, Hydrogen)	2.1,2.3	NDA	NDA

14.6 Special precautions for user

- No data available

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

- No data available

Section 15 - Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications • Acute, Chronic, Pressure(Sudden Release of), Fire

State Right To Know				
Component	CAS	MA	NJ	PA
Carbon monoxide	630-08-0	Yes	Yes	Yes
Hydrogen	1333-74-0	Yes	Yes	Yes

Inventory						
Component	CAS	Canada DSL	Canada NDSL	China	EU EINECS	EU ELNICS
Carbon monoxide	630-08-0	Yes	No	Yes	Yes	No
Hydrogen	1333-74-0	Yes	No	Yes	Yes	No

Inventory (Con't.)		
Component	CAS	TSCA
Carbon monoxide	630-08-0	Yes
Hydrogen	1333-74-0	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Carbon monoxide	630-08-0	A, B1, D1A, D2A
• Hydrogen	1333-74-0	A, B1

Canada - WHMIS - Ingredient Disclosure List

• Carbon monoxide	630-08-0	0.1 %
• Hydrogen	1333-74-0	Not Listed

Environment

Canada - 2004 NPRI (National Pollutant Release Inventory)

• Carbon monoxide	630-08-0	Part 4 Substance
• Hydrogen	1333-74-0	Not Listed

Canada - 2005 NPRI (National Pollutant Release Inventory)

• Carbon monoxide	630-08-0	Part 4 Substance
• Hydrogen	1333-74-0	Not Listed

Canada - CEPA - Greenhouse Gases Subject to Mandatory Reporting

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Canada - CEPA - Priority Substances List

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Canada - DWQ (Drinking Water Quality) - IMACs

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Other**Canada - Accelerated Reduction/Elimination of Toxics (ARET)**

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Canada New Brunswick**Environment****Canada - New Brunswick - Ozone Depleting Substances - Schedule A**

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Canada - New Brunswick - Ozone Depleting Substances - Schedule B

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

China**Environment****China - Ozone Depleting Substances - First Schedule**

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

China - Ozone Depleting Substances - Second Schedule

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

China - Ozone Depleting Substances - Third Schedule

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Other**China - Annex I & II - Controlled Chemicals Lists**

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

China - Dangerous Goods List

• Carbon monoxide	630-08-0	
• Hydrogen	1333-74-0	(compressed or refrigerated liquid)

China - Export Control List - Part I Chemicals

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Europe**Other****EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification**

• Carbon monoxide	630-08-0	F+; R12 T; R23-48/23 Repr.Cat.1; R61
• Hydrogen	1333-74-0	F+; R12

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits

• Carbon monoxide	630-08-0	Not Listed
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• Hydrogen	1333-74-0	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling		
• Carbon monoxide	630-08-0	F+ T R:61-12-23-48/23 S:53-45
• Hydrogen	1333-74-0	F+ R:12 S:(2)-9-16-33
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Notes - Substances and Preparations		
• Carbon monoxide	630-08-0	E
• Hydrogen	1333-74-0	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Safety Phrases		
• Carbon monoxide	630-08-0	S:53-45
• Hydrogen	1333-74-0	S:(2)-9-16-33

Germany

Environment

Germany - TA Luft - Types and Classes

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Germany - Water Classification (VwVwS) - Annex 1

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	ID Number 741, not considered hazardous to water

Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes

• Carbon monoxide	630-08-0	ID Number 257, hazard class 1 - low hazard to waters
• Hydrogen	1333-74-0	Not Listed

Germany - Water Classification (VwVwS) - Annex 3

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Other

Germany - Specifically Regulated Chemicals in TRGS

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Portugal

Other

Portugal - Prohibited Substances

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

United Kingdom

Environment

United Kingdom - Pollution Inventory - Schedule 1 - Thresholds for Releases to Air

• Carbon monoxide	630-08-0	100000 kg
• Hydrogen	1333-74-0	Not Listed

United Kingdom - Substances Contained in Dangerous Substances or Preparations

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Other**United Kingdom - Workplace Exposure Limits (WELs) - Substances in Review**

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

United Kingdom - List of Dangerous Substances in Water

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

United States**Labor****U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals**

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

Environment**U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants**

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

United States - California

Environment**U.S. - California - Proposition 65 - Carcinogens List**

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Carbon monoxide	630-08-0	developmental toxicity, initial date 7/1/89
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

United States - Pennsylvania**Labor****U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List**

• Carbon monoxide	630-08-0	
• Hydrogen	1333-74-0	Not Listed

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

• Carbon monoxide	630-08-0	Not Listed
• Hydrogen	1333-74-0	Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

15.3 Other Information

- WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Section 16 - Other Information**Last Revision Date**

- 07/April/2014

Preparation Date

- 07/April/2014

Disclaimer/Statement of Liability

- To the best of Air Liquide'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 gas mixture 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.

Key to abbreviations

NDA = No Data Available
