

NSN 6830-01-504-8230 Hudson Technologies, Inc  
CAGE: 4AJK6 SPE4A6-16-D-0226  
7DSQ0

## Safety Data Sheet



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

#### 1.1 Product identifier

**Product Name** • 0.0015 – 23.5% Oxygen; 0.0005% – 2.5% Methane; 0.0005 – 1.0% Carbon Monoxide; 0.001 – 0.025% Hydrogen Sulfide; Nitrogen Gas balance

**Product Code** • MSDS No. 50018

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

**Relevant identified use(s)** • Calibration of industrial gas devices

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

**Manufacturer** • Air Liquide  
2700 Post Oak Blvd.  
Houston, TX 77056  
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** • Compressed Gas - H280  
Reproductive Toxicity 1A - H360D  
Specific Target Organ Toxicity Repeated Exposure 2 - H373

**DSD/DPD** • Harmful (Xn)  
Substances Toxic To Reproduction - Category 1  
R8, R20, R61

#### 2.2 Label Elements

CLP

**DANGER**



- Hazard statements**
- H280 - Contains gas under pressure; may explode if heated
  - H360D - May damage the unborn child.
  - H373 - May cause 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.
  - P260 - Do not breathe dust, fume, gas, mist, vapours and/or spray.
  - P281 - Use personal protective equipment as required.
- Response**
- P309+P311 - IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
  - P308+P313 - IF exposed or concerned: Get medical advice/attention.
- Storage/Disposal**
- P410+P403 - Protect from sunlight. Store in a well-ventilated place.
  - 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**
- R20 - Harmful by inhalation.
  - R61 - May cause harm to the unborn child.
- Safety phrases**
- S9 - Keep container in a well ventilated place
  - S36 - Wear suitable protective clothing.
  - 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 preparation is considered dangerous.

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## UN GHS

According to Third Revised Edition

### 2.1 Classification of the substance or mixture

- UN GHS**
- Compressed Gas - H280
  - Reproductive Toxicity 1A - H360

### 2.2 Label elements

**UN GHS**

**DANGER**



- Hazard statements**
- H280 - Contains gas under pressure; may explode if heated
  - H360 - May damage fertility or the unborn child.

### Precautionary statements

- Prevention**
- P201 - Obtain special instructions before use.
  - P202 - Do not handle until all safety precautions have been read and understood.
  - P260 - Do not breathe dust, fume, gas, mist, vapours and/or spray.
  - P281 - Use personal protective equipment as required.

- Response** • P280 - Wear protective gloves/protective clothing/eye protection/face protection.  
• P308+P313 - IF exposed or concerned: Get medical advice/attention.  
• P309+P311 - IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
- Storage/Disposal** • P410+P403 - Protect from sunlight. Store in a well-ventilated place.  
• P405 - Store locked up.  
• P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

## 2.3 Other hazards

### UN GHS

- According to the Globally Harmonized System for Classification and Labeling (GHS) this product is considered hazardous.

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## United States (US)

### According to OSHA 29 CFR 1910.1200 HCS

## 2.1 Classification of the substance or mixture

### OSHA HCS 1994

- Compressed Gas

## 2.2 Label elements

### OSHA HCS 1994

- Not required

## 2.3 Other hazards

### OSHA HCS 1994

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

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## Canada

### According to WHMIS

## 2.1 Classification of the substance or mixture

### WHMIS

- Compressed Gas - A  
Very Toxic - D1A  
Other Toxic Effects - D2A

## 2.2 Label elements

### WHMIS



- Compressed Gas - A  
Very Toxic - D1A  
Other Toxic Effects - D2A

## 2.3 Other hazards

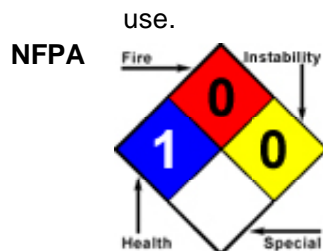
### WHMIS

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

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## 2.4 Other information

- Note: This SDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 3 (Composition/Information on Ingredients). All classifications provided are based on the highest end of the range provided for each component. Refer to the product label for information on the actual composition of the product.  
Due to the small size of the individual cylinder of this gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of



## Section 3 - Composition/Information on Ingredients

### 3.1 Substances

- Material does not meet the criteria of a substance according to United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS)  
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	Comments
Nitrogen	CAS:7727-37-9 UN:UN1066 EINECS:231-783-9	72.975% TO 99.9965%	NDA	UN GHS: Press. Gas - Comp EU DSD/DPD: Not Classified EU CLP: Self Classified - Press. Gas - Comp, H280	NDA
Oxygen	CAS:7782-44-7 EC Number:231-956-9 UN:UN1072	0.0015% TO 23.5%	NDA	UN GHS: Ox. Gas 1 EU DSD/DPD: Annex I - O; R8 EU CLP: Annex VI - Ox. Gas 1, H270; Press. Gas - Comp, H280	NDA
Methane	CAS:74-82-8 EC Number:200-812-7 UN:UN1971	0.0005% TO 2.5%	NDA	UN GHS: Flam. Gas 1; Press. Gas - Comp EU DSD/DPD: Annex I - F+; R12 EU CLP: Annex VI - Flam. Gas 1, H220; Press. Gas - Comp, H280;	NDA
Carbon monoxide	CAS:630-08-0 EC Number:211-128-3 UN:UN1016 (compressed gas)	0.0005% TO 1%	Inhalation-Rat LC50 • 1807 ppm 4 Hour(s)	UN GHS: Acute Tox. 3 (Inhalation); Flam. Gas 1; Repr. 1A; Press. Gas - Comp; EU DSD/DPD: Annex I - F+; R12 T; R23 R48/23 Repr.Cat.1; R61 EU CLP: Annex VI - Flam. Gas 1, H220; Press. Gas - Comp, H280; Acute Tox. 3*, H331; Repr. 1A, H360D; STOT RE 1, H372;	NDA
Hydrogen sulfide	CAS:7783-06-4 EC Number:231-977-3 UN:UN1053	0.001% TO 0.025%	Inhalation-Rat LC50 • 444 ppm	UN GHS: Acute Tox. Inhal. 2; Flam. Gas 1; Press. Gas - Comp EU DSD/DPD: Annex I - F+; R12 T+; R26 N; R50 EU CLP: Annex VI - Flam. Gas 1, H220; Press. Gas - Comp; Acute Tox 2*, H300; Aquatic Acute 1, H400;	NDA

## Section 4 - First Aid Measures

### 4.1 Description of first aid measures

#### Inhalation

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

- Skin**
  - In case of contact, immediately flush with plenty of water for at least 15 minutes. Take off contaminated clothing. If irritation develops and persists, get medical attention.
- Eye**
  - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
- Ingestion**
  - Ingestion is not considered a potential route of exposure.

## 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**
- Treat symptoms and eliminate over-exposure. Hyperbaric oxygen is the most efficient antidote to Carbon Monoxide poisoning, the optimum range being 2-2.5 atm. A special mask, or, preferably, a compression chamber to utilize oxygen at these pressures is required. Avoid administering stimulant drugs. Be observant for initial signs of pulmonary edema in the event of severe inhalation over-exposures.

## 4.4 Other information

- RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE 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** • Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

- Unsuitable Extinguishing Media** • No data available

## 5.2 Special hazards arising from the substance or mixture

- Unusual Fire and Explosion Hazards** • This gas mixture contains toxic gases, Hydrogen Sulfide and Carbon Monoxide, and presents a health hazard to firefighters. This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

- Hazardous Combustion Products** • No data available

## 5.3 Advice for firefighters

- Structural firefighters' protective clothing will only provide limited protection. Wear positive pressure self-contained breathing apparatus (SCBA).

# Section 6 - Accidental Release Measures

## 6.1 Personal precautions, protective equipment and emergency procedures

- Personal Precautions** • Wear appropriate personal protective equipment. See section 8 for more information.

- Emergency Procedures** • Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of over-exposure to Hydrogen Sulfide and Carbon Monoxide, the toxic components of this gas mixture, than a similar release from a larger cylinder. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel.

## 6.2 Environmental precautions

- Avoid release to the environment.

## 6.3 Methods and material for containment and cleaning up

### Containment/Clean-up Measures

- Allow the gas mixture to dissipate.  
If necessary, monitor the surrounding area (and the original area of the release) for concentrations of component gases.  
Concentrations of component gases must be below any exposure limits listed in Section 8 and Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area.

## 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

- Use good safety and industrial hygiene practices. Use only with adequate ventilation. 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. 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.

### 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 52°C (125°F). Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C (70°F)). Cylinders should be firmly secured to prevent falling or being knocked-over. Protect cylinders against physical damage. 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	Germany DFG
Carbon monoxide (630-08-0)	Ceilings	Not established	Not established	Not established	20 mg/m <sup>3</sup> MAC (high altitude area, 2000-3000m); 15 mg/m <sup>3</sup> MAC (high altitude area, >3000m)	30 ppm Peak; 35 mg/m <sup>3</sup> Peak
	STELs	Not established	100 ppm STEV; 115 mg/m <sup>3</sup> STEV	200 ppm STEV; 230 mg/m <sup>3</sup> STEV	30 mg/m <sup>3</sup> STEL (not in high altitude area)	Not established
	TWAs	25 ppm TWA	25 ppm TWAEV; 29 mg/m <sup>3</sup> TWAEV	35 ppm TWAEV; 40 mg/m <sup>3</sup> TWAEV	20 mg/m <sup>3</sup> TWA (not in high altitude area)	Not established
	MAKs	Not established	Not established	Not established	Not established	30 ppm MAK; 35 mg/m <sup>3</sup> MAK
Methane (74-82-8)	TWAs	1000 ppm TWA	1000 ppm TWAEV	Not established	Not established	Not established



Hydrogen sulfide (7783-06-4)	Ceilings	Not established	Not established	Not established	10 mg/m3 MAC	10 ppm Peak; 14.2 mg/m3 Peak
	STELs	5 ppm STEL	15 ppm STEV; 21 mg/m3 STEV	15 ppm STEV; 21 mg/m3 STEV	Not established	Not established
	TWAs	1 ppm TWA	10 ppm TWAEV; 14 mg/m3 TWAEV	10 ppm TWAEV; 14 mg/m3 TWAEV	Not established	Not established
	MAKs	Not established	Not established	Not established	Not established	5 ppm MAK; 7.1 mg/m3 MAK
Exposure Limits/Guidelines (Con't.)						
	Result	Germany TRGS	NIOSH	OSHA	Singapore	
Carbon monoxide (630-08-0)	TWAs	30 ppm TWA (exposure factor 1); 35 mg/m3 TWA (exposure factor 1)	35 ppm TWA; 40 mg/m3 TWA	50 ppm TWA; 55 mg/m3 TWA	25 ppm PEL; 29 mg/m3 PEL	
	Ceilings	Not established	200 ppm Ceiling; 229 mg/m3 Ceiling	Not established	Not established	
Hydrogen sulfide (7783-06-4)	STELs	Not established	Not established	Not established	15 ppm STEL; 21 mg/m3 STEL	
	TWAs	Not established	Not established	Not established	10 ppm PEL; 14 mg/m3 PEL	
	Ceilings	Not established	10 ppm Ceiling (10 min); 15 mg/m3 Ceiling (10 min)	20 ppm Ceiling	Not established	

## 8.2 Exposure controls

### Engineering Measures/Controls

- Adequate ventilation systems as needed to control concentrations of airborne contaminants below applicable threshold limit values. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of component gases.

### Personal Protective Equipment

#### Pictograms



#### Respiratory

- In case of insufficient ventilation, wear suitable respiratory equipment. 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 protective gloves leather gloves when handling cylinders; chemically resistant gloves when using this gas mixture and clothing .

### Environmental Exposure Controls

- 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

MSHA = Mine Safety and Health Administration

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

MAK = Maximale Arbeitsplatz Konzentration is the maximum permissible concentration

PEL = Permissible Exposure Level determined by the Occupational Safety and Health Administration (OSHA)

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

STEV = Short Term Exposure Value

TWAEV = Time-Weighted Average Exposure Value

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

## Section 9 - Physical and Chemical Properties

### 9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Gas	Appearance/Description	Gas mixture, colorless gas, which has a rotten egg-like odor, due to the presence of Hydrogen Sulfide.
Color	Colorless	Odor	Rotten-egg
Taste	Data lacking	Particulate Type	Not relevant
Particulate Size	Not relevant	Aerosol Type	Not relevant
Odor Threshold	0.13 ppm Hydrogen sulfide	Physical and Chemical Properties	Data lacking
General Properties			
Boiling Point	-320.4 F(-195.7778 C) Nitrogen	Melting Point	-345.8 F(-209.8889 C) Nitrogen
Decomposition Temperature	Data lacking	Heat of Decomposition	Data lacking
pH	Data lacking	Specific Gravity/Relative Density	Data lacking
Density	0.072 lb(s)/ft <sup>3</sup> Nitrogen	Bulk Density	Data lacking
Water Solubility	0.023 (vol/vol) Nitrogen	Solvent Solubility	Data lacking
Viscosity	Not relevant	Explosive Properties	Data lacking
Oxidizing Properties:	Data lacking		
Volatility			
Vapor Pressure	Not relevant	Vapor Density	0.906 Air=1
Evaporation Rate	Not relevant	VOC (Wt.)	Data lacking
VOC (Vol.)	Data lacking	Volatiles (Wt.)	Data lacking
Volatiles (Vol.)	Data lacking		
Flammability			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	Not relevant
Burning Time	Data lacking	Flame Height	Data lacking
Flame Extension	Data lacking	Ignition Distance	Data lacking
Flame Duration	Data lacking	Self-Accelerating Decomposition Temperature (SADT)	Data lacking
Heat of Combustion ( $\Delta H_c$ )	Data lacking	Flammability (solid, gas)	Data lacking
Environmental			
Half-Life	Data lacking	Octanol/Water Partition coefficient	Data lacking
Coefficient of water/oil distribution	Not relevant	Bioaccumulation Factor	Data lacking
Bioconcentration Factor	Data lacking	Biochemical Oxygen Demand BOD/BOD <sub>5</sub>	Data lacking
Chemical Oxygen Demand	Data lacking	Persistence	Data lacking
Degradation	Data lacking		

### 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

- Excess heat. Incompatible materials.

## 10.5 Incompatible materials

- Oxidizers, Titanium, Lithium.

## 10.6 Hazardous decomposition products

- Sulfur oxide.

# Section 11 - Toxicological Information

## 11.1 Information on toxicological effects

Component Name	CAS	Data
Oxygen (0.0015% TO 23.5%)	7782-44-7	<b>Multi-dose Toxicity:</b> ihl-rat TClO:95 pph/7D-C; <b>Reproductive:</b> ihl-rat TClO:10 pph/9H (22D preg)
Methane (0.0005% TO 2.5%)	74-82-8	<b>Acute Toxicity:</b> ihl-mus LC50:326 gm/m3/2H
Carbon monoxide (0.0005% TO 1%)	630-08-0	<b>Acute Toxicity:</b> ihl-rat LC50:1807 ppm/4H; <b>Reproductive:</b> ihl-rat TClO:103 mg/m3 (1-22D preg)
Hydrogen sulfide (0.001% TO 0.025%)	7783-06-4	<b>Acute Toxicity:</b> ihl-rat LC50:444 ppm; skn-rbt TDLo:1000 mg/m3/2H; <b>Irritation:</b> eye-hmn 0.000125 ppm/5H; <b>Reproductive:</b> ihl-rat TClO:10 mg/m3 (48D pre/1-22D preg)
GHS Properties		Classification
<b>Acute toxicity</b>		EU/CLP • Classification criteria not met UN GHS • Classification criteria not met
<b>Aspiration Hazard</b>		EU/CLP • Not relevant UN GHS • Not relevant
<b>Carcinogenicity</b>		EU/CLP • Classification criteria not met UN GHS • Classification criteria not met
<b>Germ Cell Mutagenicity</b>		EU/CLP • Classification criteria not met UN GHS • Classification criteria not met
<b>Skin corrosion/Irritation</b>		EU/CLP • Classification criteria not met UN GHS • Classification criteria not met
<b>Skin sensitization</b>		EU/CLP • Classification criteria not met UN GHS • Classification criteria not met
<b>STOT-RE</b>		EU/CLP • Specific Target Organ Toxicity Repeated Exposure 2 UN GHS • Classification criteria not met
<b>STOT-SE</b>		EU/CLP • Classification criteria not met UN GHS • Classification criteria not met
<b>Toxicity for Reproduction</b>		EU/CLP • Toxic to Reproduction 1A UN GHS • Toxic to Reproduction 1A

<b>Respiratory sensitization</b>	<b>EU/CLP</b> • Classification criteria not met <b>UN GHS</b> • Classification criteria not met
<b>Serious eye damage/Irritation</b>	<b>EU/CLP</b> • Classification criteria not met <b>UN GHS</b> • Classification criteria not met

**Route(s) of entry/exposure** • Inhalation, Skin, Eye, Ingestion

## Potential Health Effects

### Inhalation

#### Acute (Immediate)

- A potential health hazard associated with this gas mixture is the inhalation of Hydrogen Sulfide, a component of this gas mixture. Such over-exposures may occur if this gas mixture is used in a confined space or other poorly-ventilated area. Over-exposures to Hydrogen Sulfide can cause dizziness, headache, nausea, respiratory arrest, coma, or unconsciousness. Continuous inhalation of low concentrations of Hydrogen Sulfide may cause olfactory fatigue, so that the odor is no longer an effective warning of the presence of this gas. 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. If the gas mixture being used contains less than 19.5% Oxygen and is released in a small, poorly ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with decreased levels of oxygen: increase in breathing and pulse rate, emotional upset, abnormal fatigue, nausea, vomiting, collapse, loss of consciousness, convulsive movements, respiratory collapse and death.

#### Chronic (Delayed)

- Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

### Skin

#### Acute (Immediate)

- Hydrogen Sulfide, a component of this gas mixture, may be irritating to the skin.

#### Chronic (Delayed)

- No data available

### Eye

#### Acute (Immediate)

- May cause mild irritation. Inflammation and irritation of the eyes can occur at very low airborne concentration of Hydrogen Sulfide (less than 10 ppm). Exposure over several hours may result in "gas eyes" or "sore eyes" with symptoms of scratchiness, irritation, tearing and burning. Above 50 ppm of Hydrogen Sulfide, there is an intense tearing, blurring of vision, and pain when looking at light. Over-exposed individuals may see rings around bright lights. Most symptoms disappear when exposure ceases. However, in serious cases, the eye can be permanently damaged.

#### Chronic (Delayed)

- No data available

### Ingestion

#### Acute (Immediate)

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

#### Chronic (Delayed)

- No data available

### Mutagenic Effects

- The components of this gas mixture are not reported to cause mutagenic effects in humans.

**Carcinogenic Effects**

- The components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

**Reproductive Effects**

- The Carbon Monoxide component of this gas mixture which exists up to 1%, 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.

**Key to abbreviations**

TC = Toxic Concentration

TD = Toxic Dose

LC = Lethal Concentration

**Section 12 - Ecological Information****12.1 Toxicity**

0.0015 – 23.5% Oxygen; 0.0005% – 2.5% Methane; 0.0005 – 1.0% Carbon Monoxide; 0.001 – 0.025% Hydrogen Sulfide; Nitrogen Gas balance					
Dosage	Species	Duration	Results	Exposure Conditions	Comments
0.0071 to 0.55 mg/L	<b>Fish:</b> fathead minnow	96 Hour(s)	LC50	NDA	Hydrogen Sulfide component
0.009 to 0.014 mg/L	<b>Fish:</b> Bluegill	96 Hour(s)	LC50	NDA	Hydrogen Sulfide component

**12.2 Persistence and degradability**

- Material data lacking.

**12.3 Bioaccumulative potential**

- Material data lacking.

**12.4 Mobility in Soil**

- Material data lacking.

**12.5 Results of PBT and vPvB assessment**

- PBT and vPvB assessment has not been conducted.

**12.6 Other adverse effects**

- No evidence is currently available on this gas mixture's effects on plant, animal or aquatic life. Hydrogen Sulfide and Carbon Monoxide, components of this gas mixture, can be deadly to exposed animal life, producing symptoms similar to those experienced by humans. This gas mixture may also be harmful to plant life. The presence of more than a trace of the Carbon Monoxide component of this gas mixture is a hazard to fish.

**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	UN1956	Compressed gas, n.o.s. (Oxygen, Nitrogen)	2.2	NDA	NDA
TDG	UN1956	COMPRESSED GAS, N.O.S. (Oxygen, Nitrogen)	2.2	NDA	NDA
IMO/IMDG	UN1956	COMPRESSED GAS, N.O.S. (OXYGEN, NITROGEN)	2.2	NDA	NDA
IATA/ICAO	UN1956	Compressed Gas, n.o.s. (Oxygen, Nitrogen)	2.2	NDA	NDA

### 14.6 Special precautions for user

- Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

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

- This product is provided only in non-bulk containers.

## Section 15 - Regulatory Information

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

State Right To Know				
Component	CAS	MA	NJ	PA
Carbon monoxide	630-08-0	Yes	Yes	Yes
Hydrogen sulfide	7783-06-4	Yes	Yes	Yes
Methane	74-82-8	Yes	Yes	Yes
Nitrogen	7727-37-9	Yes	Yes	Yes
Oxygen	7782-44-7	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 sulfide	7783-06-4	Yes	No	Yes	Yes	No
Methane	74-82-8	Yes	No	Yes	Yes	No
Nitrogen	7727-37-9	Yes	No	Yes	Yes	No
Oxygen	7782-44-7	Yes	No	Yes	Yes	No

Inventory (Con't.)				
Component	CAS	Japan ENCS	Korea KECL	TSCA
Carbon monoxide	630-08-0	Yes	Yes	Yes
Hydrogen sulfide	7783-06-4	Yes	Yes	Yes
Methane	74-82-8	Yes	Yes	Yes

Nitrogen	7727-37-9	No	Yes	Yes
Oxygen	7782-44-7	No	Yes	Yes

## Australia

### Labor

#### Australia - Hazardous Substances - Substances Requiring Health Surveillance

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

#### Australia - High Volume Industrial Chemicals List

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	
• Nitrogen	7727-37-9	
• Methane	74-82-8	Not Listed

#### Australia - List of Designated Hazardous Substances - Classification

• Hydrogen sulfide	7783-06-4	F+, T+, N R12, R26, R50
• Carbon monoxide	630-08-0	F+, T Repr.Cat.1 R12, R61, R23, R48/23
• Oxygen	7782-44-7	O R8
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	F+ R12

### Environment

#### Australia - National Pollutant Inventory (NPI) Substance List

• Hydrogen sulfide	7783-06-4	10 tonnes/year Threshold category 1
• Carbon monoxide	630-08-0	10 tonnes/year Threshold category 1; 400 tonnes/year Threshold category 2a; 1 tonne/hour Threshold category 2a; 2000 tonnes/year Threshold category 2b; 60000 MWH Threshold category 2b; 20 MW Threshold category 2b
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	15 tonnes/year Threshold category 3 (total)
• Methane	74-82-8	Not Listed

#### Australia - Ozone Protection Act - Scheduled Substances

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

#### Australia - Priority Existing Chemical Program

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed

• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

## Canada

### Labor

#### Canada - WHMIS - Classifications of Substances

• Hydrogen sulfide	7783-06-4	A, B1, D1A, D2B
• Carbon monoxide	630-08-0	A, B1, D1A, D2A
• Oxygen	7782-44-7	A, C
• Nitrogen	7727-37-9	A
• Methane	74-82-8	A, B1

#### Canada - WHMIS - Ingredient Disclosure List

• Hydrogen sulfide	7783-06-4	1 %
• Carbon monoxide	630-08-0	0.1 %
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

### Environment

#### Canada - CEPA - Priority Substances List

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

## Mexico

### Other

#### Mexico - Hazard Classifications

• Hydrogen sulfide	7783-06-4	Class = 2.3, 2.1
• Carbon monoxide	630-08-0	Class = 2.3, 2.1
• Oxygen	7782-44-7	Class = 2.2, 5.1 UN1072, UN1073
• Nitrogen	7727-37-9	Class = 2.2 UN1066, UN1977
• Methane	74-82-8	Class = 2.1 UN1971, UN1972

#### Mexico - Regulated Substances

• Hydrogen sulfide	7783-06-4	UN1053
• Carbon monoxide	630-08-0	UN1016
• Oxygen	7782-44-7	UN1073 (refrigerated liquid); UN1072 (compressed)
• Nitrogen	7727-37-9	UN1977 (refrigerated liquid); UN1066 (compressed)
• Methane	74-82-8	UN1972 (refrigerated liquid); UN1971 (compressed)

## United States

### Labor

#### U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Hydrogen sulfide	7783-06-4	1500 lb TQ
• Carbon monoxide	630-08-0	Not Listed

• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

**U.S. - OSHA - Specifically Regulated Chemicals**

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	100 lb final RQ; 45.4 kg final RQ
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	100 lb EPCRA RQ
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	500 lb TPQ
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed



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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

**U.S. - RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261**

• Hydrogen sulfide	7783-06-4	waste number U135
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

**U.S. - RCRA (Resource Conservation & Recovery Act) - U Series Wastes - Acutely Toxic Wastes & Other Hazardous Characteristics**

• Hydrogen sulfide	7783-06-4	waste number U135
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	developmental toxicity, initial date 7/1/89
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	
• Carbon monoxide	630-08-0	
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

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

• Hydrogen sulfide	7783-06-4	Not Listed
• Carbon monoxide	630-08-0	Not Listed
• Oxygen	7782-44-7	Not Listed
• Nitrogen	7727-37-9	Not Listed
• Methane	74-82-8	Not Listed

**United States - Rhode Island****Labor****U.S. - Rhode Island - Hazardous Substance List**

• Hydrogen sulfide	7783-06-4	Toxic; Flammable
• Carbon monoxide	630-08-0	Toxic
• Oxygen	7782-44-7	Flammable
• Nitrogen	7727-37-9	Flammable
• Methane	74-82-8	Toxic

**15.2 Chemical Safety Assessment**

- No Chemical Safety Assessment has been carried out.

**Section 16 - Other Information****Relevant Phrases (code & full text)**

- H220 - Extremely flammable gas
- H270 - May cause or intensify fire; oxidizer
- H300 - Fatal if swallowed
- H331 - Toxic if inhaled
- H372 - Causes damage to organs through prolonged or repeated exposure.
- H400 - Very toxic to aquatic life
- R8 - Contact with combustible material may cause fire.

R12 - Extremely flammable.  
R23 - Toxic by inhalation.  
R26 - Very toxic by inhalation.  
R48/23 - Toxic: danger of serious damage to health by prolonged exposure through inhalation.  
R50 - Very toxic to aquatic organisms.

**Last Revision Date**

- 22/August/2012

**Preparation Date**

- 10/August/2012

**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