



## Safety Data Sheet 50134MSA

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

#### 1.1 Product identifier

**Product Name** . Non-Flammable Gas Mixture containing Oxygen 0.0-23.5%, Methane 0.0- < 5%, Carbon Monoxide 0.0-1.5%, Hydrogen Sulfide 0.001-0.025%, Sulfur Dioxide 0.0-0.025% in Nitrogen Balance

**MSA P/N** . 10098855, 10117738

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

**Relevant identified use(s)** . Calibration of Monitoring and Research Equipment

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

|                     |                                             |                      |                                |
|---------------------|---------------------------------------------|----------------------|--------------------------------|
| <b>Manufacturer</b> | . Air Liquide                               | <b>U.S. Supplier</b> | Mine Safety Appliances Company |
|                     | 2700 Post Oak Blvd.                         |                      | 100 Cranberry Woods Drive      |
|                     | Houston, TX 77056                           |                      | Cranberry Township             |
|                     | United States                               |                      | Pennsylvania U.S.A. 16066      |
|                     | www.us.airliquide.com                       |                      | 1-800-MSA-2222                 |
|                     | sds@airliquide.com                          |                      | www.msanet.com/prism           |
|                     | <b>Telephone (Technical)</b> . 713-896-2896 |                      |                                |
|                     | <b>Telephone (Technical)</b> . 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

|                |                                                                                                                          |
|----------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>CLP</b>     | . Compressed Gas - H280<br>Reproductive Toxicity 1A - H360D<br>Specific Target Organ Toxicity Repeated Exposure 2 - H373 |
| <b>DSD/DPD</b> | . Harmful (Xn)<br>Substances Toxic To Reproduction - Category 1<br>R20, R48/20, 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 gas.
  - P281 - Use personal protective equipment as required.

- Response**
- P308+P313 - IF exposed or concerned: Get medical advice/attention.
  - P314 - Get medical advice/attention if you feel unwell.

- Storage/Disposal**
- P403 - 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.
  - R48/20 - Harmful: danger of serious damage to health by prolonged exposure through inhalation.
  - R61 - May cause harm to the unborn child.

- Safety phrases**
- S53 - Avoid exposure - obtain special instructions before use.

## 2.3 Other Hazards

- CLP**
- This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.
- According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

- DSD/DPD**
- This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.
- 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**
- Compressed Gas - H280
  - Reproductive Toxicity 1A - H360
  - Simple Asphyxiant

### 2.2 Label elements

OSHA HCS 2012

**DANGER**



- Hazard statements**
- Contains gas under pressure; may explode if heated - H280
  - May damage fertility or the unborn child. - H360
  - May displace oxygen and cause rapid suffocation.

## Precautionary statements

- Prevention** . Obtain special instructions before use. - P201  
 Do not handle until all safety precautions have been read and understood. - P202  
 Wear protective gloves/protective clothing/eye protection/face protection. - P280

- Response** . IF exposed or concerned: Get medical advice/attention. - P308+P313

- Storage/Disposal** . Store in a well-ventilated place. - P403  
 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  
 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

- . This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.  
 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                                                                                                               |
| Oxygen        | CAS:7782-44-7<br>EC Number:231-956-9<br>EU Index:008-001-00-8 | 0% TO 23.5% | NDA       | EU DSD/DPD: Annex VI, Table 3.2: O R8<br>EU CLP: Annex VI, Table 3.1: Ox. Gas 1, H270; Press. Gas - Comp., H280<br>OSHA HCS 2012: Ox. Gas 1; Press Gas. - Comp. |

|                  |                                                               |                  |                                                       |                                                                                                                                                                                                                                                                                           |
|------------------|---------------------------------------------------------------|------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Methane          | CAS:74-82-8<br>EC Number:200-812-7<br>EU Index:601-001-00-4   | 0% TO 5%         | NDA                                                   | EU DSD/DPD: Annex VI, Table 3.2: F+ R12<br>EU CLP: Annex VI, Table 3.1: Flam. Gas 1, H220; Press. Gas - Comp., H280<br>OSHA HCS 2012: Flam. Gas 1; Press. Gas - Comp.; Simp. Asphyx.                                                                                                      |
| Carbon monoxide  | CAS:630-08-0<br>EC Number:211-128-3<br>EU Index:006-001-00-2  | 0% TO 1.5%       | Inhalation-Rat LC50 • 1807 ppm 4 Hour(s)              | EU DSD/DPD: Annex VI, Table 3.2: F+ R12; Repr. Cat. 1 R61 T R23-48/23<br>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<br>OSHA HCS 2012: Flam. Gas 1; Press Gas - Comp.; Repr. 1A; Acute Tox. 3 (inhl) |
| Sulfur dioxide   | CAS:7446-09-5<br>EC Number:231-195-2<br>EU Index:016-011-00-9 | 0% TO 0.025%     | Inhalation-Rat LC50 • 2168 mg/m <sup>3</sup>          | EU DSD/DPD: Annex VI, Table 3.2: T R23 C R34<br>EU CLP: Annex VI, Table 3.1: Press. Gas - Comp, H280; Acute Tox. 3 *, H331; Skin Corr. 1B, H314<br>OSHA HCS 2012: Press. Gas - Comp.; Muta. 2; Acute Tox. 3 (inh); Repr. 2; Skin Corr. 1B; Eye Dam. 1                                     |
| Hydrogen sulfide | CAS:7783-06-4<br>EC Number:231-977-3<br>EU Index:016-001-00-4 | 0.001% TO 0.025% | Inhalation-Rat LC50 • 700 mg/m <sup>3</sup> 4 Hour(s) | EU DSD/DPD: Annex VI, Table 3.2: F+ R12 T+ R26 N R50<br>EU CLP: Annex VI, Table 3.1: Flam. Gas 1, H220; Press. Gas - Comp, H280; Acute Tox. 2 *, H330; Aquatic Acute 1, H400<br>OSHA HCS 2012: Flam. Gas 1; Press. Gas - Comp.; Acute Tox 2 (inhl)                                        |
| Nitrogen         | CAS:7727-37-9<br>EINECS:231-783-9                             | Balance          | NDA                                                   | EU DSD/DPD: Not Classified<br>EU CLP: Self Classified: Press. Gas - Comp., H280<br>OSHA HCS 2012: Press. Gas - Comp.; Simp. Asphyx.                                                                                                                                                       |

See Section 16 for full text of H-statements and R-phrases.

## 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

- First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. If irritation develops and persists, get medical 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

- 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. A potential health hazard associated with this gas is anoxia.

### 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** • Use extinguishing agent suitable for type of surrounding fire.

**Unsuitable Extinguishing Media** • No data available

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

**Unusual Fire and Explosion Hazards** • 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.  
Wear positive pressure self-contained breathing apparatus (SCBA).  
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 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.  
FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.  
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: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.  
FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.

## Section 6 - Accidental Release Measures

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

**Personal Precautions** • Ventilate the area before entry. Do not walk through spilled material. Wear appropriate personal protective equipment, avoid direct contact. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

**Emergency Procedures** • Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. LARGE SPILL: Consider initial downwind evacuation for at least 500 meters (1/3 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** • Stop leak if you can do it without risk.  
Ventilate the area.  
Isolate area until gas has dispersed.  
Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.  
If possible, turn leaking containers so that gas escapes rather than liquid.

### 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 only with adequate ventilation. Ventilate closed spaces before entering. Wear appropriate personal protective equipment, avoid direct contact. Avoid breathing gas. 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. 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

- Store in a cool, dry, well-ventilated place. Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over. Do not allow area where cylinders are stored to exceed 52C (125F).

## 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<br>(630-08-0)       | Ceilings | Not established                                                         | Not established             | Not established                       | 20 mg/m3 Ceiling [MAC] (high altitude area, 2000-3000m); 15 mg/m3 Ceiling [MAC] (high altitude area, >3000m) | Not established                           |
|                                     | STELs    | Not established                                                         | Not established             | 200 ppm STEV; 230 mg/m3 STEV          | 30 mg/m3 STEL (not in high altitude area)                                                                    | 30 mg/m3 STEL (not in high altitude area) |
|                                     | TWAs     | 25 ppm TWA                                                              | 25 ppm TWA                  | 35 ppm TWA EV; 40 mg/m3 TWA EV        | 20 mg/m3 TWA (not in high altitude area)                                                                     | 20 mg/m3 TWA (not in high altitude area)  |
| Sulfur dioxide<br>(7446-09-5)       | STELs    | 0.25 ppm STEL                                                           | 5 ppm STEL; 10.4 mg/m3 STEL | 5 ppm STEV; 13 mg/m3 STEV             | 10 mg/m3 STEL                                                                                                | Not established                           |
|                                     | TWAs     | Not established                                                         | 2 ppm TWA; 5.2 mg/m3 TWA    | 2 ppm TWA EV; 5.2 mg/m3 TWA EV        | 5 mg/m3 TWA                                                                                                  | Not established                           |
| Methane<br>(74-82-8)                | TWAs     | 1000 ppm TWA<br>(listed under Aliphatic hydrocarbon gases: Alkane C1-4) | 1000 ppm TWA                | Not established                       | Not established                                                                                              | Not established                           |
| Hydrogen sulfide<br>(7783-06-4)     | Ceilings | Not established                                                         | Not established             | Not established                       | 10 mg/m3 Ceiling [MAC]                                                                                       | 10 mg/m3 Ceiling                          |
|                                     | STELs    | 5 ppm STEL                                                              | 15 ppm STEL                 | 15 ppm STEV; 21 mg/m3 STEV            | Not established                                                                                              | Not established                           |
|                                     | TWAs     | 1 ppm TWA                                                               | 10 ppm TWA                  | 10 ppm TWA EV; 14 mg/m3 TWA EV        | Not established                                                                                              | Not established                           |
| Exposure Limits/Guidelines (Con't.) |          |                                                                         |                             |                                       |                                                                                                              |                                           |
|                                     | Result   | France                                                                  | Germany DFG                 | Germany TRGS                          | Ireland                                                                                                      | Israel                                    |
|                                     |          |                                                                         |                             | 30 ppm TWA AGW<br>(The risk of damage |                                                                                                              |                                           |

|                               |          |                                             |                                                                                                                                                    |                                                                                                                                                                                                                                                                          |                              |                                                                           |
|-------------------------------|----------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------|
| Carbon monoxide<br>(630-08-0) | TWAs     | 50 ppm TWA [VME];<br>55 mg/m3 TWA [VME]     | Not established                                                                                                                                    | to the embryo or fetus cannot be excluded even when AGW and BGW values are observed, exposure factor 2);<br>35 mg/m3 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/m3 TWA     | 25 ppm TWA                                                                |
|                               | STELs    | Not established                             | Not established                                                                                                                                    | Not established                                                                                                                                                                                                                                                          | 100 ppm STEL; 115 mg/m3 STEL | Not established                                                           |
|                               | Ceilings | Not established                             | 60 ppm Peak; 70 mg/m3 Peak                                                                                                                         | Not established                                                                                                                                                                                                                                                          | Not established              | Not established                                                           |
|                               | MAKs     | Not established                             | 30 ppm TWA MAK;<br>35 mg/m3 TWA MAK                                                                                                                | Not established                                                                                                                                                                                                                                                          | Not established              | Not established                                                           |
| Sulfur dioxide<br>(7446-09-5) | STELs    | 5 ppm STEL [VLCT];<br>10 mg/m3 STEL [VLCT]  | Not established                                                                                                                                    | Not established                                                                                                                                                                                                                                                          | 1 ppm STEL; 2.6 mg/m3 STEL   | 0.25 ppm STEL                                                             |
|                               | TWAs     | 2 ppm TWA [VME]; 5 mg/m3 TWA [VME]          | Not established                                                                                                                                    | 1 ppm TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 1); 2.5 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 1) | 0.5 ppm TWA; 1.3 mg/m3 TWA   | Not established                                                           |
|                               | Ceilings | Not established                             | 1 ppm Peak (a ceiling value 1 mL/m3 or 2.7 mg/m3 must not be exceeded); 2.7 mg/m3 Peak (a ceiling value 1 mL/m3 or 2.7 mg/m3 must not be exceeded) | Not established                                                                                                                                                                                                                                                          | Not established              | Not established                                                           |
|                               | MAKs     | Not established                             | 1 ppm TWA MAK; 2.7 mg/m3 TWA MAK                                                                                                                   | Not established                                                                                                                                                                                                                                                          | Not established              | Not established                                                           |
| Methane<br>(74-82-8)          | TWAs     | Not established                             | Not established                                                                                                                                    | Not established                                                                                                                                                                                                                                                          | 1000 ppm TWA                 | 1000 ppm TWA (gas, listed under Aliphatic hydrocarbon gases: Alkane C1-4) |
|                               | STELs    | 10 ppm STEL [VLCT];<br>14 mg/m3 STEL [VLCT] | Not established                                                                                                                                    | Not established                                                                                                                                                                                                                                                          | 10 ppm STEL; 14 mg/m3 STEL   | 5 ppm STEL                                                                |
|                               |          |                                             |                                                                                                                                                    | 5 ppm TWA AGW (The risk of damage                                                                                                                                                                                                                                        |                              |                                                                           |

| Hydrogen sulfide<br>(7783-06-4)     | TWAs                          | 5 ppm TWA [VME]; 7 mg/m <sup>3</sup> TWA [VME] | Not established                              | to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 2); 7.1 mg/m <sup>3</sup> TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 2) | 5 ppm TWA; 7 mg/m <sup>3</sup> TWA | 1 ppm TWA                                                                                                                                                                                                                                                                                                         |
|-------------------------------------|-------------------------------|------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | Ceilings                      | Not established                                | 10 ppm Peak; 14.2 mg/m <sup>3</sup> Peak     | Not established                                                                                                                                                                                                                                    | Not established                    | Not established                                                                                                                                                                                                                                                                                                   |
|                                     | MAKs                          | Not established                                | 5 ppm TWA MAK; 7.1 mg/m <sup>3</sup> TWA MAK | Not established                                                                                                                                                                                                                                    | Not established                    | Not established                                                                                                                                                                                                                                                                                                   |
| Exposure Limits/Guidelines (Con't.) |                               |                                                |                                              |                                                                                                                                                                                                                                                    |                                    |                                                                                                                                                                                                                                                                                                                   |
|                                     | Result                        | NIOSH                                          | OSHA                                         | OSHA Vacated                                                                                                                                                                                                                                       | Portugal                           | Spain                                                                                                                                                                                                                                                                                                             |
| Carbon monoxide<br>(630-08-0)       | TWAs                          | 35 ppm TWA; 40 mg/m <sup>3</sup> TWA           | 50 ppm TWA; 55 mg/m <sup>3</sup> TWA         | 35 ppm TWA; 40 mg/m <sup>3</sup> TWA                                                                                                                                                                                                               | 25 ppm TWA [VLE-MP]                | 25 ppm TWA [VLA-ED]; 29 mg/m <sup>3</sup> 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<br>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 <sup>3</sup> Ceiling | Not established                              | 200 ppm Ceiling; 229 mg/m <sup>3</sup> Ceiling                                                                                                                                                                                                     | Not established                    | Not established                                                                                                                                                                                                                                                                                                   |
| Sulfur dioxide<br>(7446-09-5)       | STELs                         | 5 ppm STEL; 13 mg/m <sup>3</sup> STEL          | Not established                              | 5 ppm STEL; 15 mg/m <sup>3</sup> STEL                                                                                                                                                                                                              | 5 ppm STEL [VLE-CD]                | 2 ppm STEL [VLA-EC]; 5.28 mg/m <sup>3</sup> STEL [VLA-EC]                                                                                                                                                                                                                                                         |
|                                     | TWAs                          | 2 ppm TWA; 5 mg/m <sup>3</sup> TWA             | 5 ppm TWA; 13 mg/m <sup>3</sup> TWA          | 2 ppm TWA; 5 mg/m <sup>3</sup> TWA                                                                                                                                                                                                                 | 2 ppm TWA [VLE-MP]                 | 1 ppm TWA [VLA-ED] (it is prohibited the partial or complete commercialization or use of this substance as a phytosanitary or biocide compound); 2.64 mg/m <sup>3</sup> TWA [VLA-ED] (it is prohibited the partial or complete commercialization or use of this substance as a phytosanitary or biocide compound) |
| Methane<br>(74-82-8)                | TWAs                          | Not established                                | Not established                              | Not established                                                                                                                                                                                                                                    | 1000 ppm TWA [VLE-MP]              | 1000 ppm TWA [VLA-ED]                                                                                                                                                                                                                                                                                             |
|                                     | STELs                         | Not established                                | Not established                              | 15 ppm STEL; 21 mg/m <sup>3</sup> STEL                                                                                                                                                                                                             | 15 ppm STEL [VLE-CD]               | 10 ppm STEL [VLA-EC]; 14 mg/m <sup>3</sup> STEL [VLA-EC]                                                                                                                                                                                                                                                          |

|                                            |          |                                                    |                 |                                                                                                                                                                            |                     |                                          |
|--------------------------------------------|----------|----------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------|
| Hydrogen sulfide<br>(7783-06-4)            | TWAs     | Not established                                    | Not established | 10 ppm TWA; 14 mg/m3 TWA                                                                                                                                                   | 10 ppm TWA [VLE-MP] | 5 ppm TWA [VLA-ED]; 7 mg/m3 TWA [VLA-ED] |
|                                            | Ceilings | 10 ppm Ceiling (10 min); 15 mg/m3 Ceiling (10 min) | 20 ppm Ceiling  | Not established                                                                                                                                                            | Not established     | Not established                          |
| <b>Exposure Limits/Guidelines (Con't.)</b> |          |                                                    |                 |                                                                                                                                                                            |                     |                                          |
|                                            |          |                                                    | <b>Result</b>   | <b>Sweden</b>                                                                                                                                                              |                     |                                          |
| Carbon monoxide<br>(630-08-0)              |          |                                                    | STELs           | 100 ppm STV; 120 mg/m3 STV                                                                                                                                                 |                     |                                          |
|                                            |          |                                                    | TWAs            | 20 ppm LLV (regulated under exhaust fumes, listed under Exhaust fumes); 25 mg/m3 LLV (regulated under exhaust fumes, listed under Exhaust fumes); 35 ppm LLV; 40 mg/m3 LLV |                     |                                          |
| Sulfur dioxide<br>(7446-09-5)              |          |                                                    | Ceilings        | 5 ppm CLV; 13 mg/m3 CLV                                                                                                                                                    |                     |                                          |
|                                            |          |                                                    | TWAs            | 2 ppm LLV; 5 mg/m3 LLV                                                                                                                                                     |                     |                                          |
| Hydrogen sulfide<br>(7783-06-4)            |          |                                                    | Ceilings        | 15 ppm CLV; 20 mg/m3 CLV                                                                                                                                                   |                     |                                          |
|                                            |          |                                                    | TWAs            | 10 ppm LLV; 14 mg/m3 LLV                                                                                                                                                   |                     |                                          |

## Exposure Control Notations

### Portugal

- Sulfur dioxide (7446-09-5): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)
- Nitrogen (7727-37-9): **Simple Asphyxiants:** (Simple Asphyxiant)

### France

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

### Ireland

- Methane (74-82-8): **Simple Asphyxiants:** (Asphyxiant)
- Carbon monoxide (630-08-0): **Substances with Potential Chronic Health Effects:** (Repr1A)
- Nitrogen (7727-37-9): **Simple Asphyxiants:** (Asphyxiant)

### Spain

- Carbon monoxide (630-08-0): **Reproductive Toxins:** (known reproductive toxins with classification from human data)
- Nitrogen (7727-37-9): **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)
- Hydrogen sulfide (7783-06-4): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to)
- Sulfur dioxide (7446-09-5): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to)

## Exposure Limits Supplemental

### Spain

- Sulfur dioxide (7446-09-5): **Under Review:** (0.5 ppm VLA-ED; 1 ppm VLA-EC; it is prohibited the partial or complete commercialization or use of this substance as a phytosanitary or biocide compound)

## 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.

**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  
 Maximale Arbeitsplatz Konzentration is the maximum permissible  
 = concentration

MAK = concentration

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

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

STEL = Short Term Exposure Value

TWA EV = Time-Weighted Average Exposure Value

= 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 | Colorless gas with rotten egg odor.       |
| Color                               | Colorless                         | Odor                   | Rotten-egg                                |
| Odor Threshold                      | 0.13 ppm<br>(Hydrogen Sulfide)    |                        |                                           |
| General Properties                  |                                   |                        |                                           |
| Boiling Point                       | -195.8 C(-320.44 F)<br>(Nitrogen) | Melting Point          | -210 C(-346 F)<br>(Nitrogen)              |
| Decomposition Temperature           | Data lacking                      | pH                     | Not relevant                              |
| Specific Gravity/Relative Density   | 0.906 Water=1<br>(Nitrogen)       | Density                | 0.072 lb(s)/ft³ @ 0 C(32 F)<br>(Nitrogen) |
| 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                         | Not relevant                      | UEL                    | Not relevant                              |
| LEL                                 | Not relevant                      | Autoignition           | Data lacking                              |
| Flammability (solid, gas)           | Nonflammable Gas.                 |                        |                                           |
| Environmental                       |                                   |                        |                                           |
| Octanol/Water Partition coefficient | 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.

### 10.5 Incompatible materials

- Titanium will burn in Nitrogen (the main component of this gas mixture). Lithium reacts slowly with Nitrogen at ambient temperatures. Due to the presence of Hydrogen Sulfide, this gas mixture may be incompatible with strong oxidizers. Hydrogen Sulfide is corrosive to most metals due to reaction with metals to form metal sulfides. The Carbon Monoxide component is mildly corrosive to nickel and iron (especially at high temperature and pressure). The trace Sulfur Dioxide component is incompatible with the following materials: chlorates, fluorine, interhalogens, sodium hydride, sodium, bases, silver azide, barium peroxide, diethyl zinc, nitril chloride, powdered metals, potassium, acrolein, lithium nitrate and propene, monolithium acetylide-ammonia (lithium acetylene carbide diammino), cesium azide, metal oxides, metal acetylides, and carbide. Although the Sulfur Dioxide component is in low concentration and significant reaction is not expected, caution should be used if contact with this gas mixture and these materials can occur.

### 10.6 Hazardous decomposition products

- Combustion: Sulfur oxides, carbon oxides. Hydrolysis: None known.

## Section 11 - Toxicological Information

### 11.1 Information on toxicological effects

| Components                          |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oxygen (0% TO 23.5%)                | 7782-44-7 | <b>Reproductive:</b> Inhalation-Rat TCLo • 10 pph 9 Hour(s)(22D preg); <i>Reproductive Effects:Specific Developmental Abnormalities:Respiratory system</i> ; <i>Reproductive Effects:Effects on Newborn:Physical</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Carbon monoxide (0% TO 1.5%)        | 630-08-0  | <b>Acute Toxicity:</b> Inhalation-Rat LC50 • 1807 ppm 4 Hour(s);<br><b>Reproductive:</b> Inhalation-Rat TCLo • 150 ppm (0-20D preg); <i>Reproductive Effects:Maternal Effects:Other effects</i> ; <i>Reproductive Effects:Effects on Newborn:Biochemical and metabolic</i> ; <i>Reproductive Effects:Effects on Newborn:Physical</i>                                                                                                                                                                                                                                                                                                                                                         |
| Hydrogen sulfide (0.001% TO 0.025%) | 7783-06-4 | <b>Acute Toxicity:</b> Inhalation-Rat LC50 • 700 mg/m <sup>3</sup> 4 Hour(s);<br><b>Irritation:</b> Eye-Human • .000125 ppm 5 Hour(s);<br><b>Reproductive:</b> Inhalation-Rat TCLo • 10 mg/m <sup>3</sup> (48D pre/1-22D preg); <i>Reproductive Effects:Effects on Fertility:Pre-implantation mortality</i> ; <i>Reproductive Effects:Effects on Fertility:Post-implantation mortality</i> ; <i>Reproductive Effects:Specific Developmental Abnormalities:Urogenital system</i>                                                                                                                                                                                                              |
| Sulfur dioxide (0% TO 0.025%)       | 7446-09-5 | <b>Acute Toxicity:</b> Inhalation-Rat LC50 • 2520 ppm 1 Hour(s);<br><b>Irritation:</b> Eye-Rabbit • 6 ppm 32 Day(s) • Mild irritation;<br><b>Mutagen:</b> Cytogenetic analysis • Inhalation-Mouse • 14 µg/L 4 Hour(s) 7 Day(s); Micronucleus test • Inhalation-Mouse • 28 µg/L 5 Day(s)-Intermittent; DNA adduct • Inhalation-Rat • 72 mg/kg 300 Day(s)-Intermittent;<br><b>Reproductive:</b> Inhalation-Mouse TCLo • 25 ppm 7 Hour(s)(6-15D preg); <i>Reproductive Effects:Specific Developmental Abnormalities:Musculoskeletal system</i> ; Inhalation-Rabbit TCLo • 70 ppm 7 Hour(s)(6-18D preg); <i>Reproductive Effects:Specific Developmental Abnormalities:Musculoskeletal system</i> |

| GHS Properties                | Classification                                                                              |
|-------------------------------|---------------------------------------------------------------------------------------------|
| Acute toxicity                | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                       |
| Aspiration Hazard             | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                       |
| Carcinogenicity               | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                       |
| Germ Cell Mutagenicity        | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                       |
| Skin corrosion/Irritation     | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                       |
| Skin sensitization            | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                       |
| STOT-RE                       | EU/CLP • Specific Target Organ Toxicity Repeated Exposure 2<br>OSHA HCS 2012 • Data lacking |
| STOT-SE                       | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                       |
| Toxicity for Reproduction     | EU/CLP • Toxic to Reproduction 1A<br>OSHA HCS 2012 • Toxic to Reproduction 1A               |
| Respiratory sensitization     | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                       |
| Serious eye damage/Irritation | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                       |

## Potential Health Effects

### Inhalation

#### Acute (Immediate)

- This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces. If this material 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)

- No data available

### Skin

#### Acute (Immediate)

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

#### Chronic (Delayed)

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

### Eye

#### Acute (Immediate)

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

#### Chronic (Delayed)

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

### Ingestion

#### Acute (Immediate)

- Ingestion is not anticipated to be a likely route of exposure to this product.

#### Chronic (Delayed)

- Ingestion is not anticipated to be a likely route of exposure to this product.

### Other

**Chronic (Delayed)**

- 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.

**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. Based on studies in mice and rabbits, sulfur dioxide may cause developmental effects.

**Key to abbreviations**

LC = Lethal Concentration

TC = Toxic Concentration

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

- Material data lacking.

**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 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**

|            | <b>14.1 UN number</b> | <b>14.2 UN proper shipping name</b>                  | <b>14.3 Transport hazard class(es)</b> | <b>14.4 Packing group</b> | <b>14.5 Environmental hazards</b> |
|------------|-----------------------|------------------------------------------------------|----------------------------------------|---------------------------|-----------------------------------|
| <b>DOT</b> | UN1956                | Compressed gases, n.o.s. (Nitrogen, Oxygen, Methane) | 2.2                                    | NDA                       | NDA                               |
| <b>TDG</b> | UN1956                | COMPRESSED GASES, N.O.S. (Nitrogen, Oxygen, Methane) | 2.2                                    | NDA                       | NDA                               |

|           |        |                                                         |     |     |     |
|-----------|--------|---------------------------------------------------------|-----|-----|-----|
| IMO/IMDG  | UN1956 | COMPRESSED GASES, N.O.S.<br>(Nitrogen, Oxygen, Methane) | 2.2 | NDA | NDA |
| IATA/ICAO | UN1956 | Compressed gases, n.o.s. (Nitrogen,<br>Oxygen, Methane) | 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**

- Data lacking.

**Section 15 - Regulatory Information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****SARA Hazard Classifications** • Pressure(Sudden Release of), Acute, Chronic

| 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 |
| Sulfur dioxide      | 7446-09-5 | 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        |
| Sulfur dioxide   | 7446-09-5 | Yes        | No          | Yes   | Yes       | No        |

| Inventory (Con't.) |           |      |
|--------------------|-----------|------|
| Component          | CAS       | TSCA |
| Carbon monoxide    | 630-08-0  | Yes  |
| Hydrogen sulfide   | 7783-06-4 | Yes  |
| Methane            | 74-82-8   | Yes  |
| Nitrogen           | 7727-37-9 | Yes  |
| Oxygen             | 7782-44-7 | Yes  |
| Sulfur dioxide     | 7446-09-5 | Yes  |

## 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            |
| • Sulfur dioxide   | 7446-09-5 | A, D1A, D2B, E  |
| • 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 |
| • Sulfur dioxide   | 7446-09-5 | 1 %        |
| • 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 |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

## China

### Environment

#### China - Ozone Depleting Substances - First Schedule

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | Not Listed |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

#### China - Ozone Depleting Substances - Second Schedule

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | Not Listed |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

#### China - Ozone Depleting Substances - Third Schedule

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | Not Listed |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

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

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | Not Listed |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

**China - Dangerous Goods List**

|                    |           |                                     |
|--------------------|-----------|-------------------------------------|
| • Hydrogen sulfide | 7783-06-4 |                                     |
| • Carbon monoxide  | 630-08-0  |                                     |
| • Oxygen           | 7782-44-7 | (compressed or refrigerated liquid) |
| • Sulfur dioxide   | 7446-09-5 |                                     |
| • Nitrogen         | 7727-37-9 | (compressed or refrigerated liquid) |
| • Methane          | 74-82-8   | (compressed or refrigerated liquid) |

**China - Export Control List - Part I Chemicals**

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | Not Listed |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

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

|                    |           |                                      |
|--------------------|-----------|--------------------------------------|
| • Hydrogen sulfide | 7783-06-4 | F+; R12 T+; R26 N; R50               |
| • Carbon monoxide  | 630-08-0  | F+; R12 T; R23-48/23 Repr.Cat.1; R61 |
| • Oxygen           | 7782-44-7 | O; R8                                |
| • Sulfur dioxide   | 7446-09-5 | T; R23 C; R34                        |
| • Nitrogen         | 7727-37-9 | Not Listed                           |
| • Methane          | 74-82-8   | F+; R12                              |

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

|                    |           |                                       |
|--------------------|-----------|---------------------------------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed                            |
| • Carbon monoxide  | 630-08-0  | Not Listed                            |
| • Oxygen           | 7782-44-7 | Not Listed                            |
| • Sulfur dioxide   | 7446-09-5 | 20%≤C: T; R:23 5%<br>≤C<20%: Xn; R:20 |
| • Nitrogen         | 7727-37-9 | Not Listed                            |
| • Methane          | 74-82-8   | Not Listed                            |

**EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling**

|                    |           |                                             |
|--------------------|-----------|---------------------------------------------|
| • Hydrogen sulfide | 7783-06-4 | F+ T+ N R:12-26-50 S:(1/2)-9-16-36-38-45-61 |
| • Carbon monoxide  | 630-08-0  | F+ T R:61-12-23-48/23 S:53-45               |
| • Oxygen           | 7782-44-7 | O R:8 S:(2)-17                              |

|                  |           |                                    |
|------------------|-----------|------------------------------------|
| • Sulfur dioxide | 7446-09-5 | T R:23-34 S:(1/2)-9-26-36/37/39-45 |
| • Nitrogen       | 7727-37-9 | Not Listed                         |
| • Methane        | 74-82-8   | F+ R:12 S:(2)-9-16-33              |

**EU - CLP (1272/2008) - Annex VI - Table 3.2 - Notes - Substances and Preparations**

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | E          |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | 5          |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

**EU - CLP (1272/2008) - Annex VI - Table 3.2 - Safety Phrases**

|                    |           |                          |
|--------------------|-----------|--------------------------|
| • Hydrogen sulfide | 7783-06-4 | S:(1/2)-9-16-36-38-45-61 |
| • Carbon monoxide  | 630-08-0  | S:53-45                  |
| • Oxygen           | 7782-44-7 | S:(2)-17                 |
| • Sulfur dioxide   | 7446-09-5 | S:(1/2)-9-26-36/37/39-45 |
| • Nitrogen         | 7727-37-9 | Not Listed               |
| • Methane          | 74-82-8   | S:(2)-9-16-33            |

## Germany

**Environment****Germany - TA Luft - Types and Classes**

|                    |           |                                          |
|--------------------|-----------|------------------------------------------|
| • Hydrogen sulfide | 7783-06-4 | inorganic gas Substance: 5.2.4, Class II |
| • Carbon monoxide  | 630-08-0  | Not Listed                               |
| • Oxygen           | 7782-44-7 | Not Listed                               |
| • Sulfur dioxide   | 7446-09-5 | inorganic gas Substance: 5.2.4, Class IV |
| • Nitrogen         | 7727-37-9 | Not Listed                               |
| • Methane          | 74-82-8   | Not Listed                               |

**Germany - Water Classification (VwVwS) - Annex 1**

|                    |           |                                                   |
|--------------------|-----------|---------------------------------------------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed                                        |
| • Carbon monoxide  | 630-08-0  | Not Listed                                        |
| • Oxygen           | 7782-44-7 | ID Number 743, not considered hazardous to water  |
| • Sulfur dioxide   | 7446-09-5 | Not Listed                                        |
| • Nitrogen         | 7727-37-9 | ID Number 1351, not considered hazardous to water |
| • Methane          | 74-82-8   | ID Number 1343, not considered hazardous to water |

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

|                    |           |                                                                   |
|--------------------|-----------|-------------------------------------------------------------------|
| • Hydrogen sulfide | 7783-06-4 | ID Number 283, hazard class 2 - hazard to waters                  |
| • Carbon monoxide  | 630-08-0  | ID Number 257, hazard class 1 - low hazard to waters              |
| • Oxygen           | 7782-44-7 | Not Listed                                                        |
| • Sulfur dioxide   | 7446-09-5 | ID Number 416, hazard class 1 - low hazard to waters (footnote 8) |

|            |           |            |
|------------|-----------|------------|
| • Nitrogen | 7727-37-9 | Not Listed |
| • Methane  | 74-82-8   | Not Listed |

**Germany - Water Classification (VwVwS) - Annex 3**

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | Not Listed |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

**Other****Germany - Specifically Regulated Chemicals in TRGS**

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | Not Listed |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

**Portugal****Other****Portugal - Prohibited Substances**

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | Not Listed |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

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

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | 100000 kg  |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | 10000 kg   |

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

|                    |           |            |
|--------------------|-----------|------------|
| • Hydrogen sulfide | 7783-06-4 | Not Listed |
| • Carbon monoxide  | 630-08-0  | Not Listed |
| • Oxygen           | 7782-44-7 | Not Listed |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | Not Listed |

**United Kingdom - List of Dangerous Substances in Water**

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

|                  |           |            |
|------------------|-----------|------------|
| • Oxygen         | 7782-44-7 | Not Listed |
| • Sulfur dioxide | 7446-09-5 | Not Listed |
| • Nitrogen       | 7727-37-9 | Not Listed |
| • Methane        | 74-82-8   | Not Listed |

## 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          |
| • Sulfur dioxide   | 7446-09-5 | 1000 lb TQ (liquid) |
| • 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 |
| • Sulfur dioxide   | 7446-09-5 | 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 |
| • Sulfur dioxide   | 7446-09-5 | 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                        |
| • Sulfur dioxide   | 7446-09-5 | 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 |
| • Sulfur dioxide   | 7446-09-5 | 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      |
| • Sulfur dioxide   | 7446-09-5 | 500 lb EPCRA RQ |

|            |           |            |
|------------|-----------|------------|
| • 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 |
| • Sulfur dioxide   | 7446-09-5 | 500 lb TPQ |
| • 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 | 1.0 % de minimis concentration |
| • Carbon monoxide  | 630-08-0  | Not Listed                     |
| • Oxygen           | 7782-44-7 | Not Listed                     |
| • Sulfur dioxide   | 7446-09-5 | 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 |
| • Sulfur dioxide   | 7446-09-5 | 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        |
| • Sulfur dioxide   | 7446-09-5 | 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 |
| • Sulfur dioxide   | 7446-09-5 | 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                                   |
| • Sulfur dioxide   | 7446-09-5 | developmental toxicity, initial date 7/29/11 |
| • 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 |
| • Sulfur dioxide   | 7446-09-5 | 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 |
| • Sulfur dioxide   | 7446-09-5 | 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 |
| • Sulfur dioxide   | 7446-09-5 | 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 |
| • Sulfur dioxide   | 7446-09-5 | 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 |
| • Sulfur dioxide   | 7446-09-5 |            |
| • 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 |
| • Sulfur dioxide   | 7446-09-5 | Not Listed |
| • Nitrogen         | 7727-37-9 | Not Listed |
| • Methane          | 74-82-8   | 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

### Relevant Phrases (code & full text)

- H220 - Extremely flammable gas  
H270 - May cause or intensify fire; oxidizer  
H314 - Causes severe skin burns and eye damage.  
H330 - Fatal if inhaled  
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.  
R34 - Causes burns.  
R48/23 - Toxic: danger of serious damage to health by prolonged exposure through inhalation.  
R50 - Very toxic to aquatic organisms.

### Last Revision Date

- 05/September/2014

### Preparation Date

- 05/September/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