



# Safety Data Sheet

25ppm Hydrogen Sulfide, 100ppm Carbon Monoxide, 100ppm Isobutylene, 50% LEL Methane, 12.0% VOL Oxygen; balance Nitrogen

**Ideal Calibrations, LLC**  
2750 Oakwood Blvd.  
Melvindale, MI 48122  
(734) 956-0539  
<http://www.idealcalibrations.com/>

## Section 1: Product and Company Identification

**Ideal Calibrations, LLC**  
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Melvindale, MI 48122  
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Product Code: 25ppm Hydrogen Sulfide, 100ppm Carbon Monoxide, 100ppm Isobutylene, 50% LEL Methane, 12.0% VOL Oxygen; balance Nitrogen  
Part Number: 0484

**Synonyms:**

**Recommended Use:** Calibration of gas detection devices

**Usage Restrictions:** Do not use if current date is past expiration date on cylinder

## Section 2: Hazards Identification



**Warning**

**Hazard Classification:**

Gases Under Pressure

**Hazard Statements:**

Contains gas under pressure; may explode if heated  
Toxic to aquatic life

**Precautionary Statements**

**Storage:**

Protect from sunlight.  
Store in well-ventilated place.

## Section 3: Composition/Information on Ingredients

	CAS #	Concentration
Hydrogen Sulfide	7783-06-4	0.0025
Carbon Monoxide	630-08-0	0.01
Isobutylene	115-11-7	0.01
Methane	74-82-8	2.5
Oxygen	7782-44-7	12
Nitrogen	7727-37-9	85.4775

	Chemical Substance	Chemical Family	Trade Names
Hydrogen Sulfide	HYDROGEN SULFIDE	Inorganic gases	HYDROGEN SULFIDE (H <sub>2</sub> S); DIHYDROGEN MONOSULFIDE; DIHYDROGEN SULFIDE; HYDROSULFURIC ACID; SULFUR DIHYDRIDE; SULFURETED HYDROGEN; SULFUR HYDRIDE; STINK DAMP; SEWER GAS; RCRA U135; UN 1053; H <sub>2</sub> S
Carbon Monoxide	CARBON MONOXIDE	Inorganic gases	CARBON OXIDE; CARBON OXIDE (CO); UN 1016; CO
Isobutylene	ISOBUTYLENE	Hydrocarbons, Aliphatic, Unsaturated	2-METHYLPROPENE; ISOBUTENE; LIQUIFIED PETROLEUM GAS; 2-METHYL-1-PROPENE; L.P.G.; GAMMA-BUTYLENE; ASYM-DIMETHYL ETHYLENE; UN 1055
Methane	METHANE, COMPRESSED GAS	Hydrocarbons, Aliphatic, Saturated	FIRE DAMP; MARSH GAS; METHYL HYDRIDE; NATURAL GAS; METHANE; UN 1971; R50; CH <sub>4</sub>
Oxygen	OXYGEN, COMPRESSED GAS	Inorganic gases	OXYGEN; DIOXYGEN; MOLECULAR OXYGEN; OXYGEN MOLECULE; PURE OXYGEN; UN 1072; O <sub>2</sub>
Nitrogen	NITROGEN, COMPRESSED GAS	Inorganic gases	DIATOMIC NITROGEN; DINITROGEN; NITROGEN; NITROGEN-14; NITROGEN GAS; UN 1066; N <sub>2</sub>

## Section 4: First Aid Measures

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Hydrogen Sulfide	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.	Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Carbon Monoxide	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.	Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Isobutylene	If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.	Contact with liquid: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.

	<b>Skin Contact</b>	<b>Eye Contact</b>	<b>Ingestion</b>	<b>Inhalation</b>	<b>Note to Physicians</b>
<b>Methane</b>	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
<b>Oxygen</b>	None expected	None expected	Not likely route of exposure	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.	None
<b>Nitrogen</b>	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.

## Section 5: Fire Fighting Measures

	<b>Suitable Extinguishing Media</b>	<b>Products of Combustion</b>	<b>Protection of Firefighters</b>
<b>Hydrogen Sulfide</b>	Let burn unless leak can be stopped immediately. Large fires: Use regular foam or flood with fine water spray.	Sulfur oxides	<ul style="list-style-type: none"> <li>▪ Any self-contained breathing apparatus with a full facepiece.</li> <li>▪ Protective material types: butyl rubber, polyvinyl chloride (PVC), neoprene</li> </ul>
<b>Carbon Monoxide</b>	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Carbon dioxide	<ul style="list-style-type: none"> <li>▪ Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.</li> <li>▪ Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.</li> </ul>
<b>Isobutylene</b>	Carbon dioxide, regular dry chemical Large fires: Flood with fine water spray.	Carbon monoxide, carbon dioxide, water and toxic and irritating fumes	<ul style="list-style-type: none"> <li>▪ Any self-contained breathing apparatus with a full facepiece.</li> <li>▪ Any self-contained breathing apparatus with a full facepiece.</li> </ul>
<b>Methane</b>	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Carbon monoxide, carbon dioxide, water	<ul style="list-style-type: none"> <li>▪ Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.</li> <li>▪ Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.</li> </ul>
<b>Oxygen</b>	Non-flammable. Use extinguishing agent appropriate for the material which is burning. Use water in large quantities for fires involving oxygen.	Oxides of burning material	<ul style="list-style-type: none"> <li>▪ Respiratory protection may be needed for frequent or heavy exposure.</li> <li>▪ None</li> </ul>
<b>Nitrogen</b>	Non-flammable. Use suitable extinguishing media for surrounding fire. Cylinders may rupture or explode if exposed to heat.	Non-flammable	<ul style="list-style-type: none"> <li>▪ Respiratory protection may be needed for frequent or heavy exposure.</li> </ul>

## Section 6: Accidental Release Measures

	<b>Personal Precautions</b>	<b>Environmental Precautions</b>	<b>Methods for Containment</b>
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	Personal Precautions	Environmental Precautions	Methods for Containment
<b>Hydrogen Sulfide</b>	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Ventilate closed spaces before entering. Evacuation radius: 150 feet. For tank, rail car or tank truck: 800 meters (1/2 mile). Do not touch spilled material.	Avoid heat, flames, sparks and other sources of ignition.	Stop leak if possible without personal risk. Remove sources of ignition. Reduce vapors with water spray. Do not get water directly on material.
<b>Carbon Monoxide</b>	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition. Keep out of water supplies and sewers.	Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition.
<b>Isobutylene</b>	Keep unnecessary people away, isolate hazard area and deny entry. Do not touch spilled material. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition.	Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition.
<b>Methane</b>	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition.	Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition.
<b>Oxygen</b>	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid contact with combustible materials.	Stop leak if possible without personal risk.
<b>Nitrogen</b>	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.	No significant effects from contamination expected.	Stop leak if possible without personal risk.

	Methods for Cleanup	Other Information
<b>Hydrogen Sulfide</b>	Collect runoff for disposal as potential hazardous waste. Dike for later disposal. Absorb with sand or other non-combustible material. Add an alkaline material (lime, crushed limestone, sodium bicarbonate, or soda ash).	Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).
<b>Carbon Monoxide</b>	Stop leak, evacuate area. Wear protective equipment.	Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).
<b>Isobutylene</b>	Evacuate and ventilate area.	None
<b>Methane</b>	Not available	Not available
<b>Oxygen</b>	Stop leak and ventilate	None
<b>Nitrogen</b>	N/A	N/A

## Section 7: Handling and Storage

	Handling	Storage
<b>Hydrogen Sulfide</b>	Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Store in a cool, dry place. Store in a well-ventilated area. Avoid contact with light. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). SARA Section 303 requires facilities storing a material with a TPQ to participate in local emergency response planning (U.S. EPA 40 CFR 355.30). Keep separated from incompatible substances.	Subject to handling regulations: U.S. OSHA 29 CFR 1910.119.
<b>Carbon Monoxide</b>	Keep separated from incompatible substances.	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.
<b>Isobutylene</b>	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.110. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
<b>Methane</b>	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
<b>Oxygen</b>	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
<b>Nitrogen</b>	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.

## Section 8: Exposure Controls/Personal Protection

	Exposure Guidelines
<b>Hydrogen Sulfide</b>	HYDROGEN SULFIDE: 20 ppm OSHA ceiling 50 ppm OSHA peak 10 minute(s) (once if no other measurable exposure occurs) 10 ppm (14 mg/m <sup>3</sup> ) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 15 ppm (21 mg/m <sup>3</sup> ) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 10 ppm ACGIH TWA 15 ppm ACGIH STEL 10 ppm (15 mg/m <sup>3</sup> ) NIOSH recommended ceiling 10 minute(s) TLV-TWA: 1ppm Upper respiratory irritation (ACGIH)
<b>Carbon Monoxide</b>	CARBON MONOXIDE: 50 ppm (55 mg/m <sup>3</sup> ) OSHA TWA 35 ppm (40 mg/m <sup>3</sup> ) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 200 ppm (229 mg/m <sup>3</sup> ) OSHA ceiling (vacated by 58 FR 35338, June 30, 1993) 25 ppm ACGIH TWA 35 ppm (40 mg/m <sup>3</sup> ) NIOSH recommended TWA 10 hour(s) 200 ppm (229 mg/m <sup>3</sup> ) NIOSH recommended ceiling
<b>Isobutylene</b>	TLV-TWA: 250 ppm Carcinogenicity (ACGIH)
<b>Methane</b>	METHANE, COMPRESSED GAS: ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA METHANE: No occupational exposure limits established. ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA
<b>Oxygen</b>	OXYGEN, COMPRESSED GAS: No occupational exposure limits established.
<b>Nitrogen</b>	NITROGEN, COMPRESSED GAS: NITROGEN: ACGIH (simple asphyxiant)

### Engineering Controls

Handle only in fully enclosed systems.

	Eye Protection	Skin Protection	Respiratory Protection
<b>Hydrogen Sulfide</b>	Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.	Wear appropriate chemical resistant clothing.	Any self-contained breathing apparatus with a full facepiece.
<b>Carbon Monoxide</b>	Eye protection not required, but recommended.	Protective clothing is not required.	Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
<b>Isobutylene</b>	For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.	For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.	Any self-contained breathing apparatus with a full facepiece.
<b>Methane</b>	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.
<b>Oxygen</b>	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.
<b>Nitrogen</b>	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.

### General Hygiene considerations

- Avoid breathing vapor or mist
- Avoid contact with eyes and skin
- Wash thoroughly after handling and before eating or drinking

## Section 9: Physical and Chemical Properties

	Physical State	Appearance	Color	Change in Appearance	Physical Form	Odor	Taste
<b>Hydrogen Sulfide</b>	Gas	Colorless	Colorless	N/A	Gas	Rotten egg odor	N/A
<b>Carbon Monoxide</b>	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
<b>Isobutylene</b>	Gas	Clear	Colorless	N/A	Liquefied gas	Petroleum odor	N/A
<b>Methane</b>	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
<b>Oxygen</b>	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless
<b>Nitrogen</b>	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless

	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
<b>Hydrogen Sulfide</b>	Flammable	Not available	Not available	500 F (260 C)	45.5%	3.9%

	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
<b>Carbon Monoxide</b>	Flammable	Not available	1479.11 (log = 3.17) (estimated from water solubility)	1128-1202 F (609-650 C)	0.74	12.0-12.5%
<b>Isobutylene</b>	-105 F (-76 C)	Not available	Not available	869 F (465 C)	0.096	0.018
<b>Methane</b>	-369 F (-223 C)	Not available	724.44 (log = 2.87) (estimated from water solubility)	999 F (537 C)	15%	5%
<b>Oxygen</b>	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable
<b>Nitrogen</b>	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable

	Boiling Point	Freezing Point	Vapor Pressure	Vapor Density	Specific Gravity	Water Solubility	pH	Odor Threshold	Evaporation Rate	Viscosity
<b>Hydrogen Sulfide</b>	-78 to -77 F (-61 to -60.3 C)	-123 F (-86 C)	15200 mmHg @ 25 C	1.2 (Air=1)	1.192	2.58-2.9% @ 20 C	4.5-<7 (saturated solution)	0.13 ppm	Not applicable	0.0128 cP @ 25 C
<b>Carbon Monoxide</b>	-312.7 F (-191.5 C)	-326 F (-199 C)	760 mmHg @ -191 C gas; cannot be liquefied at room temperature	0.968 (Air=1)	Not applicable	2.3% @ 20 C	Not applicable	Not available	Not applicable	0.01657 cP @ 0 C
<b>Isobutylene</b>	19 F (-7 C)	-220 F (-140 C)	3278 mmHg @ 37.7 C	1.9 (Air=1)	0.5879 @ 25 C	Almost insoluble	Not applicable	20 ppm (46 mg/m3) (unspecified)	Not applicable	Not available
<b>Methane</b>	-260 F (-162 C)	-297 F (-183 C)	760 mmHg @ -161 C	0.555 (Air=1)	Not applicable	3.5% @ 17 C	Not applicable	Not available	Not applicable	0.01118 cP @ 27 C
<b>Oxygen</b>	-297 F (-183 C)	-360 F (-218 C)	760 mmHg @ -183 C	1.1 (Air=1)	Not applicable	3.2% @ 25 C	Not applicable	Not available	Not applicable	0.02075 cP @ 25 C
<b>Nitrogen</b>	-321 F (-196 C)	-346 F (-210 C)	760 mmHg @ -196 C	0.967 (Air=1)	Not applicable	1.6% @ 20 C	Not applicable	Not available	Not applicable	0.01787 cP @ 27 C

	Molecular Weight	Molecular Formula	Density	Weight per Gallon	Volatility by Volume	Volatility	Solvent Solubility
<b>Hydrogen Sulfide</b>	34.08	H2-S	1.539 g/L @ 0 C	Not available	Not available	Not applicable	Soluble: Carbon disulfide, alcohol, ether, glycerol, gasolines, kerosene, crude oil, alkali solutions
<b>Carbon Monoxide</b>	28.01	C-O	1.250 g/L @ 0 C	Not available	100%	Not applicable	Soluble: Alcohol, benzene, acetic acid, ethyl acetate, chloroform, cuprous chloride solutions
<b>Isobutylene</b>	56.12	C4-H8	Not available	Not available	100%	Not applicable	Soluble: Organic solvents, alcohol, ether, sulfuric acid
<b>Methane</b>	16.04	C-H4	0.717 g/L @ 0 C	Not available	Not applicable	Not applicable	Soluble: Alcohol, ether, benzene, organic solvents
<b>Oxygen</b>	31.9988	O2	1.309 g/L @ 25 C	Not available	Not applicable	Not applicable	Soluble: Alcohol
<b>Nitrogen</b>	28.0134	N2	1.2506 g/L	Not available	100%	1	Soluble: Liquid ammonia

## Section 10: Stability and Reactivity

	Stability	Conditions to Avoid	Incompatible Materials
<b>Hydrogen Sulfide</b>	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, metals, oxidizing materials, halogens, metal oxides, metal salts, bases, rust, oxidants, oxygen, copper powder, acetaldehyde, silver fulminate

	Stability	Conditions to Avoid	Incompatible Materials
<b>Carbon Monoxide</b>	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium
<b>Isobutylene</b>	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials
<b>Methane</b>	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Halogens, oxidizing materials, combustible materials
<b>Oxygen</b>	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, halo carbons, metals, bases, reducing agents, amines, metal salts, oxidizing materials, alkaline earth and alkali metals
<b>Nitrogen</b>	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metals, oxidizing materials

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
<b>Hydrogen Sulfide</b>	Oxides of sulfur	Will not polymerize.
<b>Carbon Monoxide</b>	Oxides of carbon	Will not polymerize.
<b>Isobutylene</b>	Oxides of carbon	Can polymerize in the presence of catalysts.
<b>Methane</b>	Oxides of carbon	Will not polymerize.
<b>Oxygen</b>	Miscellaneous decomposition products	Will not polymerize.
<b>Nitrogen</b>	Oxides of nitrogen	Will not polymerize.

## Section 11: Toxicology Information

### Acute Effects

	Oral LD50	Dermal LD50	Inhalation
<b>Hydrogen Sulfide</b>	444 ppm inhalation-rat LC50	Irritation 0.000125 ppm/5 hour(s) eyes-human	Irritation, lack of sense of smell, sensitivity to light, nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, disorientation, tremors, visual disturbances, suffocation, lung congestion, internal bleeding, heart damage, nerve damage, brain damage, coma, death
<b>Carbon Monoxide</b>	LC50 Inhalation Gas. Rat 1807 ppm 4 hours	Not available	Changes in body temperature, changes in blood pressure, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, hallucinations, pain in extremities, tremors, loss of coordination, hearing loss, visual disturbances, eye damage, suffocation, blood disorders, convulsions, coma
<b>Isobutylene</b>	LC50 (rat, inhalation) = 620 g/m 3 /4 hours LC50 (mouse, inhalation) = 415 g/m 3 /2 hours	Not available	Irritation, nausea, vomiting, headache, symptoms of drunkenness, disorientation, tingling sensation, suffocation, convulsions, coma
<b>Methane</b>	Not available	Not available	Nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma
<b>Oxygen</b>	Not established	Not established	Irritation, changes in body temperature, nausea, difficulty breathing, irregular heartbeat, dizziness, disorientation, hallucinations, mood swings, pain in extremities, tremors, lung congestion, convulsions
<b>Nitrogen</b>	Not available	Not available	Nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma

	Eye Irritation	Skin Irritation	Sensitization
<b>Hydrogen Sulfide</b>	Irritation, sensitivity to light, visual disturbances	Irritation liquid: frostbite	Acute toxicity, Category 2, inhalation; H330: Fatal if inhaled. Specific Target Organ Toxicity (single exposure), Category 3; H335: May cause respiratory irritation. Hazardous to the aquatic environment, Acute Category 1; H400: Very toxic to aquatic life
<b>Carbon Monoxide</b>	No information on significant adverse effects	No information on significant adverse effects	Acute toxicity, Category 3, inhalation; H331: Toxic if inhaled. Reproductive toxicity, Category 1A; H360D: May damage the unborn child. Specific Target Organ Toxicity (repeated exposure), Category 1; H372: Causes damage to organs through prolonged or repeated exposure.
<b>Isobutylene</b>	Irritation, frostbite, blurred vision	Liquid: burns, frostbite	Central nervous system depression, difficulty breathing

	Eye Irritation	Skin Irritation	Sensitization
<b>Methane</b>	No information on significant adverse effects	No information on significant adverse effects	Difficulty breathing
<b>Oxygen</b>	No information on significant adverse effects	No information on significant adverse effects	No significant target effects reported.
<b>Nitrogen</b>	Contact with rapidly expanding gas may cause burns or frostbite	No information on significant adverse effects	Difficulty breathing

### Chronic Effects

	Carcinogenicity	Mutagenicity	Reproductive Effects	Developmental Effects
<b>Hydrogen Sulfide</b>	Not available	Not available	Available.	No data
<b>Carbon Monoxide</b>	Not available	Available.	Available.	No data
<b>Isobutylene</b>	Not listed.	Not established	Not established	No data
<b>Methane</b>	Not available	Not available	Not available	No data
<b>Oxygen</b>	Not known.	Available.	Available.	No data
<b>Nitrogen</b>	Not hazardous	Not available	Not available	No data

## Section 12: Ecological Information

### Fate and Transport

	Eco toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environment
<b>Hydrogen Sulfide</b>	Fish toxicity: Acute LC50 7 ug/L Fresh water Fish - Fathead minnow - Pimephales promelas - FRY 96 hours; 14.9 ug/L 96 hour(s) LC50 (Mortality) Fathead minnow (Pimeph) Invertebrate toxicity: 9730 ug/L 1.5 hour(s) (Mortality) Mediterranean mussel (Mytilus galloprovincialis) Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Highly toxic to aquatic life.	Not available	Not available
<b>Carbon Monoxide</b>	Fish toxicity: 75000 ug/L 1 day(s) LC100 (Mortality) Orangespotted sunfish (Lepomis humilis) Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Highly volatile from water.	Not available	Not expected to leach through the soil or the sediment.
<b>Isobutylene</b>	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not expected Phyto toxicity: Not expected Other toxicity: Not available	Not available	Not available	Dissipates rapidly.
<b>Methane</b>	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Moderately volatile from water.	Accumulates very little in the bodies of living organisms.	Not expected to leach through the soil or the sediment.
<b>Oxygen</b>	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Low bioaccumulation	Not available
<b>Nitrogen</b>	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available



## Section 13: Disposal Considerations

<b>Hydrogen Sulfide</b>	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U135.
<b>Carbon Monoxide</b>	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
<b>Isobutylene</b>	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
<b>Methane</b>	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
<b>Oxygen</b>	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
<b>Nitrogen</b>	Dispose in accordance with all applicable regulations.

## Section 14: Transportation Information

### U.S. DOT 49 CFR 172.101

#### DOT Information For This Mixture

<b>Shipping Name</b>	Compressed gas, n.o.s. (Nitrogen, Oxygen)
<b>UN Number</b>	UN1956
<b>Hazard Class</b>	2.2
<b>Hazard Information</b>	Non-Flammable Gas

#### Individual Component Information

	Proper Shipping Name	ID Number	Hazard Class or Division	Packing Group	Labeling Requirements	Passenger Aircraft or Railcar Quantity Limitations	Cargo Aircraft Only Quantity Limitations	Additional Shipping Description
<b>Hydrogen Sulfide</b>	Hydrogen sulfide	UN1053	2.3	Not applicable	2.3; 2.1	Forbidden	Forbidden	Toxic-Inhalation Hazard Zone B
<b>Carbon Monoxide</b>	Carbon monoxide, compressed	UN1016	2.3	Not applicable	2.3; 2.1	Forbidden	25 kg	Toxic-Inhalation Hazard Zone D
<b>Isobutylene</b>	ISOBUTYLENE see also PETROLEUM GASES, LIQUEFIED	UN1055	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
<b>Methane</b>	Methane, compressed	UN1971	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
<b>Oxygen</b>	Oxygen, compressed	UN1072	2.2	Not available	2.2; 5.1	75 kg or L	150 kg	N/A
<b>Nitrogen</b>	Nitrogen, compressed	UN1066	2.2	Not applicable	2.2	75 kg or L	150 kg	N/A

#### Canadian Transportation of Dangerous Goods

	Shipping Name	UN Number	Class	Packing Group / Risk Group
<b>Hydrogen Sulfide</b>	HYDROGEN SULFIDE; or HYDROGEN SULPHIDE	UN1053	2.3; 2.1	Not applicable
<b>Carbon Monoxide</b>	Carbon monoxide, compressed	UN1016	2.3; 2.1	Not applicable
<b>Isobutylene</b>	Isobutylene	UN1055	2.1	Not applicable
<b>Methane</b>	Methane, compressed	UN1971	2.1	Not applicable
<b>Oxygen</b>	Oxygen, compressed	UN1072	2.2; 5.1	Not applicable
<b>Nitrogen</b>	Nitrogen, compressed	UN1066	2.2	Not applicable

## Section 15: Regulatory Information

### U.S. Regulations

	CERCLA Sections	SARA 355.30	SARA 355.40
Hydrogen Sulfide	100 LBS RQ	500 LBS TPQ	100 LBS RQ
Carbon Monoxide	Not regulated.	Not regulated.	Not regulated.
Isobutylene	Not regulated.	Not regulated.	Not regulated.
Methane	Not regulated.	Not regulated.	Not regulated.
Oxygen	Not regulated.	Not regulated.	Not regulated.
Nitrogen	Not regulated.	Not regulated.	Not regulated.

### SARA 370.21

	Acute	Chronic	Fire	Reactive	Sudden Release
Hydrogen Sulfide	Yes	No	Yes	No	Yes
Carbon Monoxide	Yes	No	Yes	No	Yes
Isobutylene	Yes	No	Yes	No	Yes
Methane	Yes	No	Yes	No	Yes
Oxygen	No	No	Yes	No	Yes
Nitrogen	Yes	No	No	No	Yes

### SARA 372.65

Hydrogen Sulfide	HYDROGEN SULFIDE: Administrative stay issued Aug. 22, 1994
Carbon Monoxide	Not regulated.
Isobutylene	Not regulated.
Methane	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

### OSHA Process Safety

Hydrogen Sulfide	1500 LBS TQ
Carbon Monoxide	Not regulated.
Isobutylene	Not regulated.
Methane	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

### State Regulations

	CA Proposition 65
Hydrogen Sulfide	Not regulated.
Carbon Monoxide	WARNING: This product can expose you to chemicals including Carbon Monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a> .
Isobutylene	Not regulated.
Methane	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

### Canadian Regulations

	WHMIS Classification
Hydrogen Sulfide	A, B1, D1A, D2B.
Carbon Monoxide	A, B1, D1A, D2A.
Isobutylene	A,B1
Methane	A, B1
Oxygen	A,C
Nitrogen	A

### National Inventory Status

	US Inventory (TSCA)	TSCA 12b Export Notification	Canada Inventory (DSL/NDL)
Hydrogen Sulfide	Listed on inventory.	Not listed.	Listed on inventory.
Carbon Monoxide	Listed on inventory.	Not listed.	Listed on inventory.
Isobutylene	Listed on inventory.	Not listed.	Listed on inventory.

<b>Methane</b>	Listed on inventory.	Not listed.	Listed on inventory.
<b>Oxygen</b>	Listed on inventory.	Not listed.	Not determined.
<b>Nitrogen</b>	Listed on inventory.	Not listed.	Listed on inventory.

## Section 16: Other Information

	<b>NFPA Rating</b>
<b>Hydrogen Sulfide</b>	HEALTH=4 FIRE=4 REACTIVITY=0
<b>Carbon Monoxide</b>	HEALTH=2 FIRE=4 REACTIVITY=0
<b>Isobutylene</b>	HEALTH=1 FIRE=4 REACTIVITY=0
<b>Methane</b>	HEALTH=0 FIRE=4 REACTIVITY=0
<b>Oxygen</b>	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=OX
<b>Nitrogen</b>	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard