

Section 1: Product and Company Identification

Absolute Accuracy
4591 S Wayside Dr
Houston, TX 77087
(832) 571-2387

Product Code: 2804

Synonyms: n/a

Recommended Use: calibration gas

Usage Restrictions: use for industrial calibration only

Section 2: Hazards Identification



Danger

Hazard Classification:

Gases Under Pressure
Reproductive Toxicity (Category 1.A)
Specific target organ toxicity (Repeated Exposure) (Category 1)

Hazard Statements:

Causes damage to organs through prolonged or repeated exposure
Contains gas under pressure; may explode if heated
May damage fertility or the unborn child

Precautionary Statements

Prevention:

Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust/fume/gas/mist/ vapors/spray..
Wear protective gloves, protective clothing, eye protection and face protection.
Obtain special instructions before use.

Response:

Call a poison center or doctor if you feel unwell.
If exposed or concerned: Get medical advice/attention.

Storage:

Protect from sunlight.
Store in well-ventilated place.
Store locked up.

Disposal:Dispose of contents and/or container in accordance with applicable regulations.

Section 3: Composition/Information on Ingredients

	CAS #	Concentration
Nitric Oxide	10102-43-9	ppm 1600
Sulfur Dioxide	7446-09-5	ppm 1600
Carbon Monoxide	630-08-0	ppm 2400
Methane	74-82-8	ppm 2400
Carbon Dioxide	124-38-9	% 12
Nitrogen	7727-37-9	BALANCE

	Chemical Substance	Chemical Family	Trade Names
Nitric Oxide	NITRIC OXIDE	Inorganic gases	NITROGEN OXIDE (NO); NITRIC OXIDE (NO); NITRIC OXIDE TRIMER; NITROGEN MONOXIDE; NITROGEN MONOOXIDE; NITROGEN OXIDE (N4O4); NITROSYL RADICAL; RCRA P076; STCC 4920330; UN 1660; NO
Sulfur Dioxide	SULFUR DIOXIDE	Inorganic gases	SULFUROUS ACID ANHYDRIDE; SULFUROUS OXIDE; SULPHUR DIOXIDE; SULFUROUS ANHYDRIDE; FERMENTICIDE LIQUID; SULFUR DIOXIDE(SO2); SULFUR OXIDE; SULFUR OXIDE(SO2); STCC 4904290; UN 1079; O2S
Carbon Monoxide	CARBON MONOXIDE	Inorganic gases	CARBON OXIDE; CARBON OXIDE (CO); UN 1016; CO
Methane	METHANE, COMPRESSED GAS	Hydrocarbons, Aliphatic, Saturated	FIRE DAMP; MARSH GAS; METHYL HYDRIDE; NATURAL GAS; METHANE; UN 1971; R50; CH4
Carbon Dioxide	CARBON DIOXIDE, GAS	Inorganic gases	CARBONIC ACID GAS; CARBONIC ANHYDRIDE; CARBON DIOXIDE; CARBON OXIDE; UN 1013; CO2
Nitrogen	NITROGEN, COMPRESSED GAS	Inorganic gases	DIATOMIC NITROGEN; DINITROGEN; NITROGEN; NITROGEN-14; NITROGEN GAS; UN 1066; N2

Section 4: First Aid Measures

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Nitric Oxide	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. Get immediate medical attention.	None
Sulfur Dioxide	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing before reuse. Destroy contaminated shoes.	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.

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
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.
Methane	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.
Carbon Dioxide	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.	Do not induce vomiting.	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.
Nitrogen	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

	Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters
Nitric Oxide	Water Do not use dry chemicals, carbon dioxide or halogenated extinguishing agents. Large fires: Flood with fine water spray.	Nitrogen oxides	<ul style="list-style-type: none"> ▪ Any self-contained breathing apparatus with a full facepiece. ▪ Any self-contained breathing apparatus with a full facepiece.
Sulfur Dioxide	Non-flammable. Use suitable extinguishing media for surrounding fire.	None known	<ul style="list-style-type: none"> ▪ Non-flammable ▪ Non-flammable

	Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters
Carbon Monoxide	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Carbon dioxide	<ul style="list-style-type: none"> 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. 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.
Methane	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"> Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece. Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.
Carbon Dioxide	Non-flammable	Non-flammable	<ul style="list-style-type: none"> Any appropriate escape-type, self-contained breathing apparatus. Non-flammable
Nitrogen	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"> Respiratory protection may be needed for frequent or heavy exposure.

Section 6: Accidental Release Measures

	Personal Precautions	Environmental Precautions	Methods for Containment
Nitric Oxide	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Avoid contact with combustible materials.	Avoid contamination of water, soil, drains, and sewers.	Stop leak if possible without personal risk.
Sulfur Dioxide	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.	Avoid contamination of environment.	Stop leak if possible without personal risk. Reduce vapors with water spray. Do not get water directly on material.
Carbon Monoxide	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.
Methane	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.
Carbon Dioxide	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Do not touch spilled material.	Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.	Stop leak if possible without personal risk.
Nitrogen	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
Nitric Oxide	Contact emergency personnel.	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).

	Methods for Cleanup	Other Information
Sulfur Dioxide	Stop leak, evacuate area. Contact emergency personnel.	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).
Carbon Monoxide	Stop leak, evacuate area. Wear protective equipment.	Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).
Methane	Not available	Not available
Carbon Dioxide	Stop leak, evacuate, remove source of ignition.	None
Nitrogen	N/A	N/A

Section 7: Handling and Storage

	Handling	Storage
Nitric Oxide	Store and handle in accordance with all current regulations and standards. NFPA 430 Code for the Storage of Liquid and Solid Oxidizing Materials. 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.
Sulfur Dioxide	Store and use with adequate ventilation. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will not exceed 125F (52C). Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.	Do not get liquid in eyes, on skin, or clothing. Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Open valve slowly. Close cylinder valve after each use; keep closed even when empty. If valve is hard to open, discontinue use and contact your supplier.
Carbon Monoxide	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.
Methane	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.
Carbon Dioxide	Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.	Store and handle in accordance with all current regulations and standards
Nitrogen	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
Nitric Oxide	NITRIC OXIDE: 25 ppm (30 mg/m ³) OSHA TWA 25 ppm ACGIH TWA 25 ppm (30 mg/m ³) NIOSH recommended TWA 10 hour(s)
Sulfur Dioxide	SULFUR DIOXIDE: 2 ppm (5 mg/m ³) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 5 ppm (13 mg/m ³) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 5 ppm (13 mg/m ³) OSHA TWA 2 ppm ACGIH TWA 5 ppm ACGIH STEL 2 ppm (5 mg/m ³) NIOSH recommended TWA 10 hour(s) 5 ppm (13 mg/m ³) NIOSH recommended STEL
Carbon Monoxide	CARBON MONOXIDE: 50 ppm (55 mg/m ³) OSHA TWA 35 ppm (40 mg/m ³) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 200 ppm (229 mg/m ³) OSHA ceiling (vacated by 58 FR 35338, June 30, 1993) 25 ppm ACGIH TWA 35 ppm (40 mg/m ³) NIOSH recommended TWA 10 hour(s) 200 ppm (229 mg/m ³) NIOSH recommended ceiling
Methane	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
Carbon Dioxide	CARBON DIOXIDE, GAS: CARBON DIOXIDE: 5000 ppm (9000 mg/m ³) OSHA TWA 10000 ppm (18000 mg/m ³) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 30000 ppm (54000 mg/m ³) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 5000 ppm ACGIH TWA 30000 ppm ACGIH STEL 5000 ppm (9000 mg/m ³) NIOSH recommended TWA 10 hour(s) 30000 ppm (54000 mg/m ³) NIOSH recommended STEL
Nitrogen	NITROGEN, COMPRESSED GAS: NITROGEN: ACGIH (simple asphyxiant)

Engineering Controls

Handle only in fully enclosed systems.

	Eye Protection	Skin Protection	Respiratory Protection
Nitric Oxide	Wear splash resistant safety goggles. 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.
Sulfur Dioxide	Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.	For the gas: Wear appropriate chemical resistant clothing. For the liquid: Wear appropriate protective, cold insulating clothing.	Non-flammable
Carbon Monoxide	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.
Methane	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.
Carbon Dioxide	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 appropriate escape-type, self-contained breathing apparatus.
Nitrogen	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
Nitric Oxide	Gas	Clear	Colorless	N/A	Gas	Not available	N/A
Sulfur Dioxide	Gas	Clear	Colorless	N/A	Gas	Irritating odor	N/A
Carbon Monoxide	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
Methane	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
Carbon Dioxide	Gas	Colorless	Colorless	N/A	Gas	Odorless	Acid taste
Nitrogen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless

	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
Nitric Oxide	Not applicable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable
Sulfur Dioxide	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable
Carbon Monoxide	Flammable	Not available	1479.11 (log = 3.17) (estimated from water solubility)	1128-1202 F (609-650 C)	0.74	12.0-12.5%
Methane	-369 F (-223 C)	Not available	724.44 (log = 2.87) (estimated from water solubility)	999 F (537 C)	15%	5%
Carbon Dioxide	Not flammable	Not available	N/A	Nonflammable	Nonflammable	Nonflammable
Nitrogen	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
Nitric Oxide	-242 F (-152 C)	-263 F (-164 C)	26000 mmHg @ 20 C	1.036 (Air=1)	Not applicable	7.3% @ 0 C	Not applicable	0.3-1.0 ppm	Not applicable	0.0188 cP @ 25 C
Sulfur Dioxide	14 F (-10 C)	-99 F (-73 C)	2432 mmHg @ 20 C	2.26 (Air=1)	1.462 @ -10 C	22.8% @ 0 C	Acidic in solution	3-5 ppm	>1 (butyl acetate=1)	Not available
Carbon Monoxide	-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
Methane	-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

	Boiling Point	Freezing Point	Vapor Pressure	Vapor Density	Specific Gravity	Water Solubility	pH	Odor Threshold	Evaporation Rate	Viscosity
Carbon Dioxide	Not available	-71 F (-57 C) @ 4000 mmHg	43700 mmHg @ 21 C	1.5 (Air=1)	1.522 @ 21 C	Soluble	3.7 (saturated aqueous solution) @ 101.3 kPa (carbonic acid)	Not available	Not applicable	0.01657 cP @ 0 C
Nitrogen	-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
Nitric Oxide	30.01	N-O	1.3402 g/L	Not available	Not available	Not applicable	Soluble: Sulfuric acid, alcohol, ferrous sulfate solutions, carbon disulfide
Sulfur Dioxide	64.06	S-O2	0.169	Not available	Not available	Not applicable	Soluble: Alcohol, acetic acid, sulfuric acid, ether, chloroform, benzene, sulfuryl chloride, nitrobenzenes, toluene, acetone
Carbon Monoxide	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
Methane	16.04	C-H4	0.717 g/L @ 0 C	Not available	Not applicable	Not applicable	Soluble: Alcohol, ether, benzene, organic solvents
Carbon Dioxide	44.01	C-O2	0.114	Not available	Not applicable	Not applicable	Soluble: Alcohol, acetone, hydrocarbons, organic solvents
Nitrogen	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
Nitric Oxide	May react on contact with air. May react on contact with water. Releases toxic, corrosive, flammable or explosive gases. May explode during distillation or evaporation.	May react on contact with air. May react on contact with water. Releases toxic, corrosive, flammable or explosive gases. May explode during distillation or evaporation.	Metals, bases, metal oxides, reducing agents, combustible materials, halo carbons, oxidizing materials, halogens, metal carbide, metal salts
Sulfur Dioxide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, metals, bases, oxidizing materials, halogens, metal carbide, metal oxides, peroxides, reducing agents, potassium, sodium, nitril chloride, acrolein, metal oxides, carbide
Carbon Monoxide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium
Methane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Halogens, oxidizing materials, combustible materials
Carbon Dioxide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, oxidizing materials, metal salts, reducing agents, metal carbide, metals, bases

	Stability	Conditions to Avoid	Incompatible Materials
Nitrogen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metals, oxidizing materials

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
Nitric Oxide	Oxides of nitrogen	Will not polymerize.
Sulfur Dioxide	Forms sulfurous acid solution on reaction with water.	Will not polymerize.
Carbon Monoxide	Oxides of carbon	Will not polymerize.
Methane	Oxides of carbon	Will not polymerize.
Carbon Dioxide	Carbon monoxide	Will not polymerize.
Nitrogen	Oxides of nitrogen	Will not polymerize.

Section 11: Toxicology Information

Acute Effects

	Oral LD50	Dermal LD50	Inhalation
Nitric Oxide	LC50 Inhalation Gas. Rat 1068 mg/m3 4 hours	Not available	Irritation, nausea, vomiting, stomach pain, chest pain, difficulty breathing, headache, dizziness, bluish skin color, lung congestion
Sulfur Dioxide	LC50, 1 hr, rat = 2520 ppm	Not available	Allergic reactions, burns, toxic
Carbon Monoxide	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
Methane	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
Carbon Dioxide	Not established	Not established	Ringing in the ears, nausea, irregular heartbeat, headache, drowsiness, dizziness, tingling sensation, visual disturbances, suffocation, convulsions, coma
Nitrogen	Not available	Not available	Nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma

	Eye Irritation	Skin Irritation	Sensitization
Nitric Oxide	Irritation (possibly severe)	Irritation (possibly severe)	Acute toxicity, Category 1, inhalation; H330: Fatal if inhaled. Skin corrosion, Category 1B; H314: Causes severe skin burns and eye damage.
Sulfur Dioxide	Corrosive, burns	Corrosive, burns	Acute toxicity, Category 3, inhalation; H331: Toxic if inhaled. Skin corrosion, Category 1B; H314: Causes severe skin burns and eye damage.
Carbon Monoxide	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.
Methane	No information on significant adverse effects	No information on significant adverse effects	Difficulty breathing
Carbon Dioxide	Irritation, frostbite, blurred vision	Liquid: blisters, frostbite	Difficulty breathing
Nitrogen	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
Nitric Oxide	Not available	Available.	Not available	No data
Sulfur Dioxide	IARC: Human Inadequate Evidence, Animal Limited Evidence, Group 3; ACGIH: A4 -Not Classifiable as a Human Carcinogen	Available.	Available.	No data
Carbon Monoxide	Not available	Available.	Available.	No data
Methane	Not available	Not available	Not available	No data
Carbon Dioxide	Not available	Not established	Available.	No data
Nitrogen	Not hazardous	Not available	Not available	No data

Section 12: Ecological Information

Fate and Transport

	Eco toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environment
Nitric Oxide	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Readily biodegrades	Not available	Not expected to leach through the soil or the sediment.
Sulfur Dioxide	Fish toxicity: 3000 ug/L 0.667-0.833 hour(s) (Avoidance) Atlantic menhaden (Brevoortia tyrannus) Invertebrate toxicity: Not available Algal toxicity: 500 ug/L 6 day(s) (Cellular) Green algae (Rhizoclonium hieroglyphicum) Phyto toxicity: Not available Other toxicity: >=150 ug/L NR hour(s) (Biochemical) Duckweed (Lemna minor)	Not available	Not available	Not available
Carbon Monoxide	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.
Methane	Fish toxicity: Not available Invertebrate 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.

	Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available			
Carbon Dioxide	Fish toxicity: 150000 ug/L 48 day(s) (Mortality) Brown trout (Salmo trutta) 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.	Leaches through the soil
Nitrogen	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

Nitric Oxide	Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. D003. Dispose in accordance with all applicable regulations.
Sulfur Dioxide	Dispose in accordance with all applicable regulations.
Carbon Monoxide	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Methane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Carbon Dioxide	Dispose in accordance with all applicable regulations.
Nitrogen	Dispose in accordance with all applicable regulations.

Section 14: Transportation Information

U.S. DOT 49 CFR 172.101

DOT Information For This Mixture

Shipping Name	Compressed gas, n.o.s. (Nitrogen, Carbon Dioxide)
UN Number	UN1956
Hazard Class	2.2
Hazard Information	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
Nitric Oxide	Nitric oxide, compressed	UN1660	2.3	Not applicable	2.3; 5.1;8	Forbidden	Forbidden	Toxic-Inhalation Hazard Zone A
Sulfur Dioxide	Sulfur dioxide	UN1079	2.3	Not applicable	2.3; 8	Forbidden	Forbidden	Toxic-Inhalation Hazard Zone C
Carbon Monoxide	Carbon monoxide, compressed	UN1016	2.3	Not applicable	2.3; 2.1	Forbidden	25 kg	Toxic-Inhalation Hazard Zone D
Methane	Methane, compressed	UN1971	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
Carbon Dioxide	Carbon dioxide	UN1013	2.2	Not applicable	2.2	75 kg or L	150kg	None
Nitrogen	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
Nitric Oxide	Nitric oxide, compressed	UN1660	2.3; 5.1; 8	Not applicable
Sulfur Dioxide	Sulfur dioxide	UN1079	2.3; 8	Not applicable
Carbon Monoxide	Carbon monoxide, compressed	UN1016	2.3; 2.1	Not applicable
Methane	Methane, compressed	UN1971	2.1	Not applicable
Carbon Dioxide	Carbon dioxide	UN1013	2.2	Not applicable
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable

Section 15: Regulatory Information

U.S. Regulations

	CERCLA Sections	SARA 355.30	SARA 355.40
Nitric Oxide	10 LBS RQ	100 LBS TPQ	10 LBS RQ
Sulfur Dioxide	Not regulated.	500 LBS TPQ	500 LBS RQ
Carbon Monoxide	Not regulated.	Not regulated.	Not regulated.
Methane	Not regulated.	Not regulated.	Not regulated.
Carbon Dioxide	Not regulated.	Not regulated.	Not regulated.
Nitrogen	Not regulated.	Not regulated.	Not regulated.

SARA 370.21

	Acute	Chronic	Fire	Reactive	Sudden Release
Nitric Oxide	Yes	No	No	No	Yes
Sulfur Dioxide	Yes	Yes	No	No	Yes
Carbon Monoxide	Yes	No	Yes	No	Yes
Methane	Yes	No	Yes	No	Yes
Carbon Dioxide	Yes	No	No	No	Yes
Nitrogen	Yes	No	No	No	Yes

SARA 372.65

Nitric Oxide	Not regulated.
Sulfur Dioxide	Not regulated.
Carbon Monoxide	Not regulated.
Methane	Not regulated.
Carbon Dioxide	Not regulated.
Nitrogen	Not regulated.

OSHA Process Safety

Nitric Oxide	250 LBS TQ
Sulfur Dioxide	1000 LBS TQ
Carbon Monoxide	Not regulated.
Methane	Not regulated.
Carbon Dioxide	Not regulated.
Nitrogen	Not regulated.

State Regulations

	CA Proposition 65
Nitric Oxide	Not regulated.
Sulfur Dioxide	WARNING: This product can expose you to chemicals including sulfur dioxide, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov .
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 www.P65Warnings.ca.gov .
Methane	Not regulated.
Carbon Dioxide	Not regulated.

Nitrogen	Not regulated.
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Canadian Regulations

	WHMIS Classification
Nitric Oxide	ACD1
Sulfur Dioxide	AD1
Carbon Monoxide	A, B1, D1A, D2A.
Methane	A, B1
Carbon Dioxide	A
Nitrogen	A

National Inventory Status

	US Inventory (TSCA)	TSCA 12b Export Notification	Canada Inventory (DSL/NDSL)
Nitric Oxide	Listed on inventory.	Not listed.	Not determined.
Sulfur Dioxide	Listed on inventory.	Not listed.	Not determined.
Carbon Monoxide	Listed on inventory.	Not listed.	Listed on inventory.
Methane	Listed on inventory.	Not listed.	Listed on inventory.
Carbon Dioxide	Listed on inventory.	Not listed.	Listed on inventory.
Nitrogen	Listed on inventory.	Not listed.	Listed on inventory.

Section 16: Other Information

	NFPA Rating
Nitric Oxide	HEALTH=4 FIRE=0 REACTIVITY=1 SPECIAL=OX
Sulfur Dioxide	HEALTH=3 FIRE=0 REACTIVITY=0
Carbon Monoxide	HEALTH=2 FIRE=4 REACTIVITY=0
Methane	HEALTH=0 FIRE=4 REACTIVITY=0
Carbon Dioxide	HEALTH=3 FIRE=0 REACTIVITY=0 SPECIAL=SA
Nitrogen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA

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