

Safety Data Sheet



Division of Fresno Oxygen



Barnes Welding Supply/Barnes Specialty Gases

Division of Fresno Oxygen

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Section 1: Product and Company Identification

Barnes Welding Supply / Barnes Specialty Gases - Division of Fresno Oxygen

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FOR CHEMICAL EMERGENCIES DURING TRANSPORTATION ONLY CALL INFOTRAC 1-800-535-5053

Product Name: GC Calibration
Gas Part Number: CS 3500U06F

Synonyms: Non-Flammable Gas Mixture Cis-2-Butene & Multi Component Gas Mixture CS Mixes
Recommended Use: For general analytical/synthetic gas mixture
Usage Restrictions:

Section 2: Hazards Identification



Hazard Classification:

Gases Under Pressure
Specific target organ toxicity (Single Exposure) (Category 3)

Hazard Statements:

Contains gas under pressure; may explode if heated
May cause respiratory irritation;

Precautionary Statements

Prevention:

Use only outdoors or in a well-ventilated area.
Avoid breathing dust/fume/gas/mist/ vapors/spray.
[In case of inadequate ventilation] wear respiratory protection.

Response:

Call a poison center or doctor if you feel unwell.
If inhaled: Remove person to fresh air and keep comfortable for breathing.

Storage:

Store in a well-ventilated place. Keep container tightly closed.
Protect from sunlight.
Store locked up.

Disposal:

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

Section 3: Composition/Information on Ingredients

	CAS #	Concentration
cis-2-Butene	590-18-1	1 ppm
Ethylene	74-85-1	10 ppm
Carbon Dioxide	124-38-9	2 %
Oxygen	7782-44-7	2 %
Nitrogen	7727-37-9	Balance

	Chemical Substance	Chemical Family	Trade Names
cis-2-Butene	CIS-2-BUTENE	Hydrocarbons, Aliphatic, Unsaturated	2-BUTENE-CIS; CIS-1,2-DIMETHYLETHYLENE; CIS-BUTYLENE; 2-BUTENE (CIS); SYM-DIMETHYLETHYLENE; DIMETHYLETHYLENE; PSEUDO-BUTYLENE; CIS-BUTENE-2; 'HIGH-BOILING' BUTENE-2; (Z)-2-BUTENE; CIS-2-BUTYLENE; BETA-CIS-BUTYLENE; (2Z)-2-BUTENE; (Z)-BUT-2-ENE; CIS-BUT-2-ENE; CIS-BUTENE; UN1012; C4H8
Ethylene	Ethylene	Hydrocarbons, Aliphatic, Unsaturated	ACETENE; ETHENE; ETHYLENE, COMPRESSED GAS; OLEFIANT GAS; BICARBURETTED HYDROGEN; UN 1982; C2H4
Carbon Dioxide	CARBON DIOXIDE, GAS	Inorganic gases	CARBONIC ACID GAS; CARBONIC ANHYDRIDE; CARBON DIOXIDE; CARBON OXIDE; UN 1013; CO2
Oxygen	OXYGEN, COMPRESSED GAS	Inorganic gases	OXYGEN; DIOXYGEN; MOLECULAR OXYGEN; OXYGEN MOLECULE; PURE OXYGEN; UN 1072; O2
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
cis-2-Butene	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.
Ethylene	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. Seek immediate medical attention. Check for frostbite. Thaw frostbite slowly with lukewarm water. Avoid mouth-to-mouth contact by using a mouth shield or guard to perform artificial respiration.	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.
Oxygen	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
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
cis-2-Butene	Carbon dioxide, regular dry chemical Large fires: Flood with fine water spray.	Carbon monoxide, carbon dioxide, water and toxic and irritating fumes.	- Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode. - Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.
Ethylene	Carbon dioxide, regular dry chemical Large fires: Flood with fine water spray.	Carbon monoxide, carbon dioxide and toxic and irritating fumes	- Any self-contained breathing apparatus with a full facepiece. - Any self-contained breathing apparatus with a full facepiece.
Carbon Dioxide	Non-flammable	Non-flammable	- Any appropriate escape-type, self-contained breathing apparatus. - Non-flammable
Oxygen	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	- Respiratory protection may be needed for frequent or heavy exposure. - None
Nitrogen	Non-flammable. Use suitable extinguishing media for surrounding fire. Cylinders may rupture or explode if exposed to heat.	Non-flammable	Respiratory protection may be needed for frequent or heavy exposure.

Section 6: Accidental Release Measures

	Personal Precautions	Environmental Precautions	Methods for Containment
cis-2-Butene	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.
Ethylene	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.
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 1990 (Proposition 65). Keep out of water supplies and sewers.	Stop leak if possible without personal risk.
Oxygen	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.
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
cis-2-Butene	Not available	None
Ethylene	Avoid ignition sources. Evacuate area, contact emergency personnel. Use fine water spray.	None
Carbon Dioxide	Stop leak, evacuate, remove source of ignition.	None
Oxygen	Stop leak and ventilate	None
Nitrogen	N/A	N/A

Section 7: Handling and Storage

	Handling	Storage
cis-2-Butene	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.
Ethylene	Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store in a cool, dry place. Store in a well-ventilated area. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.	Avoid heat, flames, sparks and other sources of ignition. Grounding and bonding required.
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
Oxygen	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.
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
cis-2-Butene	TLV-TWA: ACGIH 250 ppm
Ethylene	TLV-TWA: 200ppm Carcinogenicity Designation A4 (ACGIH)
Carbon Dioxide	CARBON DIOXIDE, GAS: CARBON DIOXIDE: 5000 ppm (9000 mg/m3) OSHA TWA 10000 ppm (18000 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 30000 ppm (54000 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 5000 ppm ACGIH TWA 30000 ppm ACGIH STEL 5000 ppm (9000 mg/m3) NIOSH recommended TWA 10 hour(s) 30000 ppm (54000 mg/m3) NIOSH recommended STEL
Oxygen	OXYGEN, COMPRESSED GAS: No occupational exposure limits established.
Nitrogen	NITROGEN, COMPRESSED GAS: NITROGEN: ACGIH (simple asphyxiant)

Engineering Controls
Handle only in fully enclosed systems.

	Eye Protection	Skin Protection	Respiratory Protection
cis-2-Butene	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 supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.
Ethylene	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.
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.
Oxygen	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.
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
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	Physical State	Appearance	Color	Change in Appearance	Physical Form	Odor	Taste
cis-2-Butene	Gas	Colorless	Colorless	N/A	Gas	Distinct odor	N/A
Ethylene	Gas	Colorless	Colorless	N/A	Compressed gas	Sweet odor	Sweet taste
Carbon Dioxide	Gas	Colorless	Colorless	N/A	Gas	Odorless	Acid taste
Oxygen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless
Nitrogen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless

	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
cis-2-Butene	-99 F (-73 C) (gas)	Not available	Not available	617 F (325 C)	0.09	0.017
Ethylene	Approximately -212.8 F (-136 C) (CC); extremely flammable gas	Not available	281.84 (log = 2.45) (estimated from water solubility)	842 F (450 C)	0.36	0.027
Carbon Dioxide	Not flammable	Not available	N/A	Nonflammable	Nonflammable	Nonflammable
Oxygen	Not flammable	Not available	Not available	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
cis-2-Butene	39 F (4 C)	-218 F (-139 C)	Not available	1.9 (Air=1)	0.6	Insoluble	Not applicable	Not available	Not applicable	Not available
Ethylene	-155 F (-104 C)	-272 F (-169 C)	760 mmHg @ -104 C	0.978 @ 0 C; 0.969 @ 21.1 C (air = 1)	Not applicable	0.226	Not applicable	Wide range of reported values: 17 to 959 ppm. Acceptable values are: 270 ppm (310 mg/m3) (detection); 418 ppm (480 mg/m3) (recognition)	Not applicable	LIQUEFIED GAS: 0.16 mPa.s (0.16 centipoise) @ -100 C (18); 0.07 mPa.s (0.07 centipoise) @ 0 C
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
Oxygen	-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
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
cis-2-Butene	56.11	C4-H8	Not available	Not available	100%	Not applicable	Soluble: Alcohol, ether, benzene
Ethylene	28.05	C-H2-C-H2	1.261 g/L @ 0 C	Not available	100%	1	Soluble: Alcohol, ether, acetone, benzene
Carbon Dioxide	44.01	C-O2	0.114	Not available	Not applicable	Not applicable	Soluble: Alcohol, acetone, hydrocarbons, organic solvents
Oxygen	31.9988	O2	1.309 g/L @ 25 C	Not available	Not applicable	Not applicable	Soluble: Alcohol
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
cis-2-Butene	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Halogens, oxidizing materials
Ethylene	May polymerize. Avoid storage and use above room temperature.	May polymerize. Avoid storage and use above room temperature.	Acids, metal salts, halogens, halo carbons, oxidizing materials, metals, peroxides, chlorine, aluminum chloride, nitrogen dioxide or ozone, copper, 5A molecular sieves
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
Oxygen	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
Nitrogen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metals, oxidizing materials

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
cis-2-Butene	Oxides of carbon	May polymerize. Avoid contact with heat, air, light, initiators or curing agents. Can polymerize in the presence of catalysts.
Ethylene	Carbon monoxide, carbon dioxide, hydrocarbons	Polymerizes with evolution of heat. Store in a cool, dry place.
Carbon Dioxide	Carbon monoxide	Will not polymerize.
Oxygen	Miscellaneous decomposition products	Will not polymerize.
Nitrogen	Oxides of nitrogen	Will not polymerize.

Section 11

Section 11: Toxicology Information

Acute Effects			
	Oral LD50	Dermal LD50	Inhalation
cis-2-Butene	Not available	Not available	Irritation, nausea, vomiting, irregular heartbeat, headache, drowsiness, symptoms of drunkenness, suffocation, lung congestion
Ethylene	LC50 (inhalation, mouse) = 96 pph	Not available	Nausea, vomiting, symptoms of drunkenness, bluish skin color, suffocation, convulsions, coma
Carbon Dioxide	Not established	Not established	Ringin g in the ears, nausea, irregular heartbeat, headache, drowsiness, dizziness, tingling sensation, visual disturbances, suffocation, convulsions, coma
Oxygen	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
Nitrogen	Not available	Not available	Nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma

	Eye Irritation	Skin Irritation	Sensitization
cis-2-Butene	Frostbite, blurred vision	Burns, frostbite	Difficulty breathing
Ethylene	Frostbite, blurred vision	Blisters, frostbite	Specific Target Organ Toxicity (single exposure), Category 3; H336: May cause drowsiness or dizziness.
Carbon Dioxide	Irritation, frostbite, blurred vision	Liquid: blisters, frostbite	Difficulty breathing
Oxygen	No information on significant adverse effects	No information on significant adverse effects	No significant target effects reported.
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
cis-2-Butene	Not available	Not available	Not available	No data
Ethylene	IARC: Human Inadequate Evidence, Animal Inadequate Evidence, Group 3; ACGIH: A4 - Not Classifiable as a Human Carcinogen	Not available	Not available	No data
Carbon Dioxide	Not available	Not established	Available.	No data
Oxygen	Not known.	Available.	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
cis-2-Butene	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
Ethylene	Fish toxicity: 22000-25000 ug/L 1 day(s) LC100 (Mortality) Orangespotted sunfish (Lepomis humilis) Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Lemon = 0.025-0.05; epinasty Other toxicity: Tomato = 0.04-0.1 ppm/3-48 hours; leaf epinasty.	Relatively non-persistent in the environment. Moderately volatile from water.	Accumulates very little in the bodies of living organisms.	Leaches through the soil or the sediment at a slow rate.
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
Oxygen	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
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

cis-2-Butene	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 62. Hazardous Waste Number(s): D001.
Ethylene	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.
Oxygen	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
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, Oxygen)
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
cis-2-Butene	Butylene	UN1012	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
Ethylene	Ethylene	UN1962	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
Oxygen	Oxygen, compressed	UN1072	2.2	Not available	2.2; 5.1	75 kg or L	150 kg	N/A
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
cis-2-Butene	Butylene	UN1012	2.1	Not applicable
Ethylene	Ethylene, compressed	UN1962	2.1	Not applicable
Carbon Dioxide	Carbon dioxide	UN1013	2.2	Not applicable
Oxygen	Oxygen, compressed	UN1072	2.2; 5.1	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
cis-2-Butene	Not regulated.	Not regulated.	Not regulated.
Ethylene	Not regulated.	Not regulated.	Not regulated.
Carbon Dioxide	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
cis-2-Butene	Yes	No	Yes	No	Yes
Ethylene	Yes	No	Yes	Yes	Yes
Carbon Dioxide	Yes	No	No	No	Yes
Oxygen	No	No	Yes	No	Yes
Nitrogen	Yes	No	No	No	Yes

SARA 372.65

cis-2-Butene	Not regulated.
Ethylene	ETHYLENE
Carbon Dioxide	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

OSHA Process Safety

cis-2-Butene	Not regulated.
Ethylene	Not regulated.
Carbon Dioxide	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

State Regulations

	CA Proposition 65
cis-2-Butene	Not regulated.
Ethylene	Not regulated.
Carbon Dioxide	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

Canadian Regulations

	WHMIS Classification
cis-2-Butene	A, B1
Ethylene	A, B1, D2B
Carbon Dioxide	A
Oxygen	A,C
Nitrogen	A

National Inventory Status

	US Inventory (TSCA)	TSCA 12b Export Notification	Canada Inventory (DSL/NDSL)
cis-2-Butene	Listed on inventory.	Not listed.	Listed on inventory.
Ethylene	Listed on inventory.	Not listed.	Listed on inventory.
Carbon Dioxide	Listed on inventory.	Not listed.	Listed on inventory.
Oxygen	Listed on inventory.	Not listed.	Not determined.
Nitrogen	Listed on inventory.	Not listed.	Listed on inventory.

Section 16: Other Information

	NFPA Rating
cis-2-Butene	HEALTH=1 FIRE=4 REACTIVITY=0
Ethylene	HEALTH=3 FIRE=4 REACTIVITY=2
Carbon Dioxide	HEALTH=3 FIRE=0 REACTIVITY=0 SPECIAL=SA
Oxygen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=OX
Nitrogen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA

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