Safety Data Sheet

12 Component Mix, Nitrogen Balance

In Case of Emergency: Chemtrec 800-424-9300

Section 1: Product and Company Identification

Gas and Supply
125 Thruway Park
Broussard, LA 70518
877-441-7311
Fax: 337-839-8235
www.gasandsupply.com

Part Number: GSPC12NRLP5GC
Synonyms:
Recommended Use: Synthetic/Analytical Chemistry
Usage Restrictions:

Section 2: Hazards Identification

Danger

Hazard Classification:

Acute Oral Toxicity (Category 4)
Aspiration Hazard (Category 1)
Eye Effects (Category 2.A)
Flammable (Category 1)
Gases Under Pressure
Specific target organ toxicity (Single Exposure) (Category 3)

Hazard Statements:

Causes serious eye irritation
Contains gas under pressure; may explode if heated
Extremely flammable gas
Harmful if swallowed
May be fatal if swallowed and enters airways
May cause respiratory irritation;
Toxic to aquatic life with long lasting effects.

Precautionary Statements

Prevention:
Wash thoroughly after handling.
Wear eye protection/face protection.
[In case of inadequate ventilation] wear respiratory protection.
Do not eat, drink or smoke when using this product.
Avoid breathing dust/fume/gas/mist/ vapors/spray.
Use only outdoors or in a well-ventilated area.

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Response:
Eliminate all ignition sources if safe to do so.
Immediately call a poison center or doctor.
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Do NOT induce vomiting.
If swallowed: Rinse mouth. Do NOT induce vomiting.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
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
Ethylene	74-85-1	20%
N-Butane	106-97-8	3%
Trans-2-Butene	624-64-6	5%
cis-2-Butene	590-18-1	3%
iso-Pentane	78-78-4	4%
3 Methyl 1 Butene	563-45-1	0.5%
2-Methyl-1-Butene	563-46-2	3%
Trans-2-Pentene	646-04-8	4%
Cis-2-Pentene	627-20-3	1%
2-Methyl 2-Butene	513-35-9	5%
1-Butene	106-98-9	5%
Nitrogen	7727-37-9	Balance

	Chemical Substance	Chemical Family	Trade Names
Ethylene	Ethylene	Hydrocarbons, Aliphatic, Unsaturated	ACETENE; ETHENE; ETHYLENE, COMPRESSED GAS; OLEFIANT GAS; BICARBURETTED HYDROGEN; UN 1962; C2H4
N-Butane	Butane	Hydrocarbons, Aliphatic, Saturated	N-BUTANE; LIQUIFIED PETROLEUM GAS; NORMAL BUTANE; BUTYL HYDRIDE; LPG; UN 1011; C4H10
Trans-2-Butene	TRANS-2-BUTENE	Hydrocarbons, Aliphatic, Unsaturated	BETA-BUTYLENE; (C)-2-BUTENE; BETA-TRANS-BUTYLENE; LOW-BOILING BUTENE-2; TRANS-1,2-DIMETHYLETHYLENE; TRANS-BUTENE; TRANS-2-BUTYLENE; TRANSBUTENE- 2; 2-TRANS-BUTENE; 2-TRANS-BUTYLENE; (2E)-2-BUTENE; (E)-2-BUTENE; (E)-BUT-2-ENE; TRANS-BUT-2-ENE; UN 1012; C4H8

	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
iso-Pentane	ISOPENTANE	Hydrocarbons, Aliphatic, Saturated	2-METHYLBUTANE; ETHYLDIMETHYLMETHANE; ISOAMYLHYDRIDE; BUTANE,2-METHYL-; 1,1,2-TRIMETHYLETHANE; C5H12
3 Methyl 1 Butene	3-METHYL-1-BUTENE	Hydrocarbons, Aliphatic, Unsaturated	Alpha-Isoamylene; Isopropylethene; Isopropylethylene; 3-Methylbutene; Isopentene; Isopentene-1; 2-Methyl-3-Butene; 3-Methyl-1-Butylene; Isoamylene; Vinylisopropyl; Methyl Butene;
2-Methyl-1-Butene	2-METHYL-1-BUTENE	Hydrocarbons, aliphatic, unsaturated	1-Isoamylene;C2H5C(CH3)=CH2;2-Methylbutene;gamma-Isoamylene;2-methyl-1-buten;2-METHYLBUTENE-1;2-METHYL-1-BUTENE;2-methyl-but-1-ene;1-butene,2-methyl-;Methyl-1-butene, 2-
Trans-2-Pentene	TRANS-2-PENTENE	Hydrocarbons, Aliphatic, Unsaturated	2-PENTENE; TRANS-BETA-AMYLENE; 2-PENTENE, (E)-; (E)-2-PENTENE; 2-AMYLENE; C5H10
Cis-2-Pentene	Cis-2-Pentene	Hydrocarbons, Aliphatic, Unsaturated	2-Pentene (Z); cis-beta-amylene; cis-pentene; (z)-2-pentene; pentene; cismethylethylethylene; 2-pentene; 2-pentene (cis)
2-Methyl 2-Butene	2-Methyl 2-Butene	Hydrocarbons, aliphatic, unsaturated	Amylene; Pentene
1-Butene	1-BUTENE	Hydrocarbons, Aliphatic, Unsaturated	ALPHA-BUTYLENE; ETHYLETHYLENE; BUTYLENE; ALPHA-BUTENE; BUTENE-1; N-BUTENE; N-BUTYLENE; 1-BUTYLENE; UN 1012; C4H8;
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
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.

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
N-Butane	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.	Not likely route of exposure.	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.
Trans-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.
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.
iso-Pentane	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
3 Methyl 1 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.

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
2-Methyl-1-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.
Trans-2-Pentene	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.	Get medical attention immediately.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.	For ingestion, consider gastric lavage.
Cis-2-Pentene	Wash with soap or mild detergent and plenty of water. Get medical attention if needed	Flush with plenty of water. Get medical attention	Get medical attention	Move to fresh air. Get medical attention	For ingestion, consider gastric lavage
2-Methyl 2-Butene	If it is safe to do so, remove victim to an uncontaminated area, and place them in a comfortable position to wait for medical attention. Immediately remove contaminated clothes and shoes. Cleanse the affected skin areas thoroughly with soap under running water for 15 minutes. Seek medical treatment.	Rinse the affected eye thoroughly for 10 minutes under running water. Seek immediate medical treatment.	Drink a large amount of water. Seek medical treatment. Do not induce vomiting	If it is safe to do so, remove victim to fresh air, and place them in a comfortable position to wait for medical attention. Administer oxygen or artificial respiration if breathing is difficult. Seek immediate medical treatment.	Treat symptomatically and supportively.
1-Butene	If it is safe to do so, remove victim to an uncontaminated area, and place them in a comfortable position to wait for medical attention. Immediately remove contaminated clothes and shoes. Cleanse the affected skin areas thoroughly with soap under running water for 15 minutes. Seek medical treatment.	Rinse the affected eye thoroughly for 10 minutes under running water. Seek immediate medical treatment. For exposure to liquid, immediately warm frostbite area with warm water less than 105F (41C).	Swallowing is not a likely route of exposure.	If it is safe to do so, remove victim to fresh air, and place them in a comfortable position to wait for medical attention. Administer oxygen or artificial respiration if breathing is difficult. Seek immediate medical treatment.	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
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.
N-Butane	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 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. ▪ NA ▪ NA
Trans-2-Butene	Regular dry chemical, high expansion foam Large fires: Flood with fine water spray. Avoid carbon dioxide	Irritating, toxic gases	▪ Any self-contained breathing apparatus with a full facepiece. ▪ Any self-contained breathing apparatus with a full facepiece.
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.
iso-Pentane	Foam, dry chemical, carbon dioxide. Water may be ineffective.	Oxides of carbon	▪ Any self-contained breathing apparatus with a full facepiece. ▪ Any self-contained breathing apparatus with a full facepiece.
3 Methyl 1 Butene	Carbon dioxide, regular dry chemical Large fires: Flood with fine water spray.	Carbon monoxide, carbon dioxide, water and toxic and irritating fumes	▪ Respiratory protection may be needed for frequent or heavy exposure. ▪ 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 self-contained breathing apparatus with a full facepiece.
2-Methyl-1-Butene	Carbon dioxide, regular dry chemical Large fires: Flood with fine water spray.	Carbon monoxide, carbon dioxide, water and toxic and irritating fumes	▪ Respiratory protection may be needed for frequent or heavy exposure. ▪ 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 self-contained breathing apparatus with a full facepiece.
Trans-2-Pentene	Regular dry chemical, regular foam. Avoid carbon dioxide and water	Irritating, toxic gases	▪ Any supplied-air respirator with a full facepiece ▪ Any supplied-air respirator with a full facepiece
Cis-2-Pentene	Regular dry chemical, carbon dioxide, water, regular foam	Not available	▪ Not available ▪ Not available ▪ Not available ▪ Use proper fire-fighting equipment

	Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters
2-Methyl 2-Butene	For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water. Cool containers with flooding quantities of water until well after fire is out.	Carbon monoxide, carbon dioxide, water and toxic and irritating fumes	▪ Respiratory protection may be needed for frequent or heavy exposure. ▪ 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 self-contained breathing apparatus with a full facepiece.
1-Butene	Carbon dioxide, regular dry chemical Large fires: Flood with fine water spray.	Carbon monoxide, carbon dioxide, water and toxic and irritating fumes	▪ Respiratory protection may be needed for frequent or heavy exposure. ▪ 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 self-contained breathing apparatus with a full facepiece.
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
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.
N-Butane	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Do not touch spilled material.	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.
Trans-2-Butene	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Do not touch spilled material.	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.
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.
iso-Pentane	Keep unnecessary people away, isolate hazard area and deny entry.	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.
3 Methyl 1 Butene	Keep unnecessary people away, isolate hazard area and deny entry. Do not touch spilled material.	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. Ventilate closed spaces before entering.
2-Methyl-1-Butene	Keep unnecessary people away, isolate hazard area and deny entry. Do not touch spilled material.	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. Ventilate closed spaces before entering.
Trans-2-Pentene	Keep unnecessary people away, isolate hazard area and deny entry.	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.
Cis-2-Pentene	Keep unnecessary people away, isolate hazard area, and deny entry	Not available	Stop leak if possible without personal risk.

	Personal Precautions	Environmental Precautions	Methods for Containment
2-Methyl 2-Butene	Keep unnecessary people away, isolate hazard area and deny entry. Do not touch spilled material.	Avoid heat, flames, sparks and other sources of ignition.	Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.
1-Butene	Keep unnecessary people away, isolate hazard area and deny entry. Do not touch spilled material.	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. Ventilate closed spaces before entering.
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
Ethylene	Avoid ignition sources. Evacuate area, contact emergency personnel. Use fine water spray.	None
N-Butane	Stop leak, evacuate area. Use protective equipment. Contact emergency personnel.	None
Trans-2-Butene	Evacuate area. Contact emergency personnel.	None
cis-2-Butene	Not available	None
iso-Pentane	Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal.	None
3 Methyl 1 Butene	Stop leak, evacuate area and ventilate. Prevent waste from contaminating environment.	N/A
2-Methyl-1-Butene	Stop leak, evacuate area and ventilate. Prevent waste from contaminating environment.	N/A
Trans-2-Pentene	Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal.	None
Cis-2-Pentene	Avoid heat, flames, sparks and other sources of ignition. Small: absorb with sand or other combustible material. Large: dike for later disposal.	Not available
2-Methyl 2-Butene	Remove all sources of ignition. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.	N/A
1-Butene	Stop leak, evacuate area and ventilate. Prevent waste from contaminating environment.	N/A
Nitrogen	N/A	N/A

Section 7: Handling and Storage

	Handling	Storage
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.
N-Butane	Grounding and bonding required. 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. Subject to storage regulations: U.S. OSHA 29 CFR 1910.110.
Trans-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 1910.101.	Keep separated from incompatible substances.

	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.
iso-Pentane	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
3 Methyl 1 Butene	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.
2-Methyl-1-Butene	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. Do not smoke in areas where fluorocarbons are used. Wash hands thoroughly after handling fluorocarbons or materials sprayed with them, especially before eating or smoking. Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. 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.
Trans-2-Pentene	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106.	Grounding and bonding required. Keep separated from incompatible substances.
Cis-2-Pentene	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.

	Handling	Storage
2-Methyl 2-Butene	Keep container tightly closed in a locked area. Protect from sunlight. Protect from ignition sources. Secure cylinders upright to keep them from falling or being knocked over. Store only where temperature will not exceed 125F (52C).	Always handle in a well ventilated area. Use only in closed systems. Open valve slowly. Close cylinder valve after each use; keep closed even when empty. Avoid contact with skin and eyes. Keep away from heat and ignition sources.
1-Butene	Keep container tightly closed in a locked area. Protect from sunlight. Protect from ignition sources. Secure cylinders upright to keep them from falling or being knocked over. Store only where temperature will not exceed 125F (52C).	Always handle in a well ventilated area. Use only in closed systems. Open valve slowly. Close cylinder valve after each use; keep closed even when empty. Avoid contact with skin and eyes. Keep away from heat and ignition sources.
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
Ethylene	TLV-TWA: 200ppm Carcinogenicity Designation A4 (ACGIH)
N-Butane	N-BUTANE: 800 ppm (1900 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 800 ppm (1900 mg/m3) NIOSH recommended TWA 10 hour(s) LIQUIFIED PETROLEUM GAS (LPG): 1000 ppm (1800 mg/m3) OSHA TWA 1000 ppm (1800 mg/m3) NIOSH recommended TWA 10 hour(s) ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA
Trans-2-Butene	TLV-TWA: 250 ppm (ACGIH)
cis-2-Butene	TLV-TWA: ACGIH 250 ppm
iso-Pentane	ISOPENTANE: 600 ppm ACGIH TWA
3 Methyl 1 Butene	No occupational exposure limits established.
2-Methyl-1-Butene	No occupational exposure limits established.
Trans-2-Pentene	TRANS-2-PENTENE: No occupational exposure limits established.
Cis-2-Pentene	None established
2-Methyl 2-Butene	No occupational exposure limits established.
1-Butene	1-BUTENE: No occupational exposure limits established.
Nitrogen	NITROGEN, COMPRESSED GAS: NITROGEN: ACGIH (simple asphyxiant)

Engineering Controls

Handle only in fully enclosed systems or with adequate ventilation.

	Eye Protection	Skin Protection	Respiratory Protection
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.
N-Butane	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 full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

	Eye Protection	Skin Protection	Respiratory Protection
Trans-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 self-contained breathing apparatus with a full facepiece.
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.
iso-Pentane	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.
3 Methyl 1 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.	Respiratory protection may be needed for frequent or heavy exposure.
2-Methyl-1-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.	Respiratory protection may be needed for frequent or heavy exposure.
Trans-2-Pentene	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 supplied-air respirator with a full facepiece
Cis-2-Pentene	Wear splash resistant safety goggles.	Wear appropriate chemical resistant clothing	Not available
2-Methyl 2-Butene	Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and shower in work area.	Wear appropriate chemical resistant clothing.	Respiratory protection may be needed for frequent or heavy exposure.
1-Butene	Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and shower in work area.	Wear appropriate chemical resistant clothing.	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
Ethylene	Gas	Colorless	Colorless	N/A	Compressed gas	Sweet odor	Sweet taste
N-Butane	Gas	Colorless	Colorless	NA	Gas	Unpleasant odor	NA
Trans-2-Butene	Gas	Clear	Colorless	N/A	Gas, liquid	Aromatic odor	N/A
cis-2-Butene	Gas	Colorless	Colorless	N/A	Gas	Distinct odor	N/A
iso-Pentane	Liquid	Colorless	Colorless	N/A	Liquid	Gasoline like	N/A

	Physical State	Appearance	Color	Change in Appearance	Physical Form	Odor	Taste
3 Methyl 1 Butene	The substance is liquid or gaseous. Boiling point is in the range of room temperature.	Colorless	Colorless	N/A	Gas	Distinct odor	N/A
2-Methyl-1-Butene	Liquid	Colorless	Colorless	N/A	Gas	Disagreeable odor	N/A
Trans-2-Pentene	Liquid	Not available	Not available	N/A	Liquid	Not available	N/A
Cis-2-Pentene	Liquid	Colorless	Colorless	Not available	Liquid	Hydrocarbon Odor	Not available
2-Methyl 2-Butene	Liquid	Colorless	Colorless	N/A	Liquid	Petroleum-like	N/A
1-Butene	Gas	Colorless	Colorless	N/A	Gas	Distinct odor	N/A
Nitrogen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless

	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
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
N-Butane	-76 F (-60 C) (CC)	NA	630.96 (log = 2.80) (estimated from water solubility)	549 F (287 C)	0.085	0.019
Trans-2-Butene	-99 F (-73 C)	Not available	Not available	615 F (324 C)	0.097	0.018
cis-2-Butene	-99 F (-73 C) (gas)	Not available	Not available	617 F (325 C)	0.09	0.017
iso-Pentane	<-60 F (<-51 C) (CC)	IA	Not available	788 F (420 C)	0.076	0.014
3 Methyl 1 Butene	-71 F (-57 C)	3	68 (log = 1.84) estimated	689 F (365 C)	9.1%	1.5%
2-Methyl-1-Butene	30.2F (1C)	3		Not available	Not available	1.4%
Trans-2-Pentene	-49 F (-45 C)	IA	Not available	Not available	Not available	Not available
Cis-2-Pentene	Not available	Not available	Not available	Not available	Not available	Not available
2-Methyl 2-Butene	< -6.7 deg C	3		Not available	Not available	Not available
1-Butene	-112 F (-80 C)			725 F (385 C)	0.1	0.016
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
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
N-Butane	30 F (-1 C)	-216 F (-138 C)	1557 mmHg @ 20 C	2.1 (Air=1)	0.5788 @ 0 C	0.15	NA	6.16 ppm	NA	NA
Trans-2-Butene	34 F (1 C)	-159 F (-106 C)	1592 mmHg @ 21 C	1.95 (Air=1)	0.613 @ 15.5 C	Insoluble	Not applicable	Not available	Not applicable	Not available
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
iso-Pentane	82 F (28 C)	-256 F (-160 C)	Not available	2.5 (Air=1)	0.6201	Insoluble	Not available	Not available	Not available	Not available
3 Methyl 1 Butene	68.2 F (20.1 C)	-271.3 F (-168.5 C)	760 mmHg @ 20 C	2.526 (Air=1)	0.6213 @ 25 C	Insoluble	Not applicable	Not available	Not applicable	0.00753 cP @ 25 C
2-Methyl-1-Butene	87.8F (31C)	-214.6F (-137C)	9.98 PSI (@ 20C)	Not available	0.65	Insoluble	Not applicable	Not available	Not applicable	Not available.
Trans-2-Pentene	97 F (36 C)	-213 F (-136 C)	Not available	2.42 (Air=1)	0.6482	Insoluble	Not available	Not available	Not applicable	Not available
Cis-2-Pentene	99 F	-240 F	426 mmHg at 21 deg C	2.42 (Air=1)	.6556	Insoluble	Not available	Not available	Not available	Not available
2-Methyl 2-Butene	35-38 deg C	-134 deg C	Not available	2.4 (Air=1)	0.66	Insoluble	Not applicable	Not available	Not applicable	Not available
1-Butene	21 F (-6 C)	-301 F (-185 C)	1976 mmHg @ 21.1 C	2 (Air=1)	Not applicable	Insoluble	Not applicable	24 ppm (55 mg/m3) (unspecified)	Not applicable	0.00763 cP @ 20 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
Ethylene	28.05	C-H2-C-H2	1.261 g/L @ 0 C	Not available	100%	1	Soluble: Alcohol, ether, acetone, benzene
N-Butane	58.12	C-H3-(C-H2)2-C-H3	NA	NA	100%	NA	Alcohol, ether, chloroform
Trans-2-Butene	56.11	C4-H8	Not available	Not available	100%	Not applicable	Soluble: Organic solvents
cis-2-Butene	56.11	C4-H8	Not available	Not available	100%	Not applicable	Soluble: Alcohol, ether, benzene
iso-Pentane	72.15	C-H3-C-H2-C-H-(C-H3)2	Not available	Not available	100%	Not available	Ether, alcohol, hydrocarbons, oils

	Molecular Weight	Molecular Formula	Density	Weight per Gallon	Volatility by Volume	Volatility	Solvent Solubility
3 Methyl 1 Butene	70.135	(C-H3)2-C-H-C-H-C-H2	2.526 (vapor)	Not available	100%	Not applicable	Alcohol, ether, benzene
2-Methyl-1-Butene	70.13	CH3CH2C(CH3):CH2	Not available.	Not available	Not available.	Not applicable	Alcohol, ether, benzene
Trans-2-Pentene	70.13	C-H3-C-H2-C-H-C-H-C-H3	Not available	Not available	Not available	Not available	Soluble: Alcohol, ether, benzene
Cis-2-Pentene	70.13	CH3CH2CHCHCH3	Not available	Not available	Not available	Not available	Alcohol, ether, benzene
2-Methyl 2-Butene	70.07	C5H10	2.4	Not available	Not available	Not applicable	Alcohol, ether, benzene
1-Butene	56.11	C-H3-C-H2-C-H-C-H2	2.3655 kg/m3 @ 25 C	Not available	100%	Not applicable	Soluble: Alcohol, ether, benzene
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
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
N-Butane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, halogen compounds
Trans-2-Butene	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials
cis-2-Butene	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Halogens, oxidizing materials
iso-Pentane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials
3 Methyl 1 Butene	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metal salts, oxidizing materials, halogens, acids
2-Methyl-1-Butene	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metal salts, oxidizing materials, halogens, acids
Trans-2-Pentene	Normally stable. Oxidizes on prolonged contact with air to form peroxides.	Normally stable. Oxidizes on prolonged contact with air to form peroxides.	Oxidizing materials, halogens, acids
Cis-2-Pentene	Stable at normal conditions	Stable at normal conditions	Oxidizing materials, halogens, acids
2-Methyl 2-Butene	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metal salts, oxidizing materials, halogens, acids
1-Butene	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metal salts, oxidizing materials, halogens, acids
Nitrogen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metals, oxidizing materials

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
Ethylene	Carbon monoxide, carbon dioxide, hydrocarbons	Polymerizes with evolution of heat. Store in a cool, dry place.
N-Butane	Oxides of carbon.	Will not polymerize.
Trans-2-Butene	Oxides of carbon	Can polymerize in the presence of catalysts
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.
iso-Pentane	Oxides of carbon	Will not polymerize.
3 Methyl 1 Butene	Oxides of carbon	Will not polymerize.
2-Methyl-1-Butene	Oxides of carbon	Will not polymerize.
Trans-2-Pentene	Oxides of carbon	Will not polymerize.
Cis-2-Pentene	Oxides of carbon (thermal decomposition)	Will not occur

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
2-Methyl 2-Butene	Oxides of carbon	Will not polymerize.
1-Butene	Oxides of carbon	Polymerizes with evolution of heat. Avoid contact with incompatible materials.
Nitrogen	Oxides of nitrogen	Will not polymerize.

Section 11: Toxicology Information

Acute Effects

	Oral LD50	Dermal LD50	Inhalation
Ethylene	LC50 (inhalation, mouse) = 96 pph	Not available	Nausea, vomiting, symptoms of drunkenness, bluish skin color, suffocation, convulsions, coma
N-Butane	LC(50): 658 mg/l (270,000 ppm) butane (4 hour-rat)	Not established	Irritation, nausea, vomiting, headache, drowsiness, symptoms of drunkenness, tingling sensation, suffocation, convulsions, coma, can displace oxygen at high concentrations
Trans-2-Butene	Not available	Not available	Vomiting, headache, symptoms of drunkenness, disorientation, suffocation, convulsions, coma
cis-2-Butene	Not available	Not available	Irritation, nausea, vomiting, irregular heartbeat, headache, drowsiness, symptoms of drunkenness, suffocation, lung congestion
iso-Pentane	Not available	Not available	Irritation, difficulty breathing, symptoms of drunkenness
3 Methyl 1 Butene	No data available	Not established	Mild irritation, nausea, vomiting, symptoms of drunkenness, suffocation, convulsions, coma
2-Methyl-1-Butene	No data available	Not established	Mild irritation, nausea, vomiting, symptoms of drunkenness, suffocation, convulsions, coma
Trans-2-Pentene	Not available	Not available	Irritation, nausea, vomiting, symptoms of drunkenness, convulsions, coma
Cis-2-Pentene	Not available	Not available	Irritation, nausea, vomiting, symptoms of drunkenness, convulsions, coma
2-Methyl 2-Butene	No data available	Not established	Vapors may cause dizziness or suffocation.
1-Butene	Inhalation LC50 Rat 658 mg/L 4 h	Not established	Mild irritation, nausea, vomiting, symptoms of drunkenness, 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
Ethylene	Frostbite, blurred vision	Blisters, frostbite	Specific Target Organ Toxicity (single exposure), Category 3; H336: May cause drowsiness or dizziness.
N-Butane	Frostbite, blurred vision	Blisters, frostbite	Carcinogenicity, Category 1A; H350: May cause cancer. Germ cell mutagenicity, Category 1B; H340: May cause genetic defects.
Trans-2-Butene	Liquid: frostbite, blurred vision	Liquid: burns, frostbite	Central nervous system depression, difficulty breathing
cis-2-Butene	Frostbite, blurred vision	Burns, frostbite	Difficulty breathing
iso-Pentane	Irritation	Irritation	Aspiration hazard, Category 1; H304: May be fatal if swallowed and enters airways. Specific Target Organ Toxicity (single exposure), Category 3; H336: May cause drowsiness or dizziness. Hazardous to the aquatic environment, Chronic Category 2; H411: Toxic to aquatic life with long lasting effects.

	Eye Irritation	Skin Irritation	Sensitization
3 Methyl 1 Butene	Frostbite, blurred vision	Blisters, frostbite	Aspiration hazard, Category 1; H304: May be fatal if swallowed and enters airways. Skin irritation, Category 2; H315: Causes skin irritation. Eye irritation, Category 2; H319: Causes serious eye irritation. Specific Target Organ Toxicity (single exposure), Category 3; H335: May cause respiratory irritation.
2-Methyl-1-Butene	Frostbite, blurred vision	Blisters, frostbite	Aspiration hazard, Category 1; H304: May be fatal if swallowed and enters airways.
Trans-2-Pentene	Irritation	Irritation	Skin irritation, eye irritation
Cis-2-Pentene	Irritation	Irritation	Skin irritation (Category 2), H315: Causes skin irritation. Eye irritation (Category 2A), H319: Causes serious eye irritation. Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335: May cause respiratory irritation. Aspiration hazard (Category 1), H304: May be fatal if swallowed and enters airways.
2-Methyl 2-Butene	May cause eye irritation.	May cause skin irritation.	Acute toxicity, Category 4, oral; H302: Harmful if swallowed. Aspiration hazard, Category 1; H304: May be fatal if swallowed and enters airways.
1-Butene	Mild irritation, frostbite, blurred vision	Blisters, frostbite	Central nervous system depression, 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
Ethylene	IARC: Human Inadequate Evidence, Animal Inadequate Evidence, Group 3; ACGIH: A4 -Not Classifiable as a Human Carcinogen	Not available	Not available	No data
N-Butane	None	Not established	Not established	No data
Trans-2-Butene	Not available	Not available	Not available	No data
cis-2-Butene	Not available	Not available	Not available	No data
iso-Pentane	Not available	Not available	Not available	No data
3 Methyl 1 Butene	Not listed	Not established	Not established	No data
2-Methyl-1-Butene	Not listed	Not established	Not established	No data
Trans-2-Pentene	Not available	Not available	Not available	No data
Cis-2-Pentene	Not available	Not available	Not available	No data
2-Methyl 2-Butene	Not listed	Not established	Not established	No data
1-Butene	Not listed	Not established	Not established	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
Ethylene	Fish toxicity: 22000-25000 ug/L 1 day(s) LC100 (Mortality) Orangespotted sunfish (Lepomis humilis) Invertibrate 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.
N-Butane	Fish toxicity: NA Invertibrate toxicity: NA Algal toxicity: NA Phyto toxicity: NA Other toxicity: Expected to exist entirely in the vapor phase in ambient air.	NA	NA	NA
Trans-2-Butene	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
cis-2-Butene	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
iso-Pentane	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
3 Methyl 1 Butene	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
2-Methyl-1-Butene	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
Trans-2-Pentene	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
Cis-2-Pentene	Fish toxicity: not available Invertibrate toxicity: not available Algal toxicity: not available Phyto toxicity: not available Other toxicity: not available	Not available	Not available	Not available
2-Methyl 2-Butene	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
1-Butene	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
Nitrogen	Fish toxicity: Not available	Not available	Not available	Not available

	Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available			

Section 13: Disposal Considerations

Ethylene	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
N-Butane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Trans-2-Butene	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
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.
iso-Pentane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
3 Methyl 1 Butene	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
2-Methyl-1-Butene	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Trans-2-Pentene	Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. Dispose in accordance with all applicable regulations.
Cis-2-Pentene	Dispose in accordance with all local, state, and federal regulations.
2-Methyl 2-Butene	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
1-Butene	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, Flammable, N.O.S. (Nitrogen, Ethylene)
UN Number	UN1954
Hazard Class	2.1
Hazard Information	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
Ethylene	Ethylene	UN1962	2.1	Not applicable	2.1	Forbidden	150 kg	N/A

	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
N-Butane	Butane	UN1011	2.1	Not applicable	2.1	Forbidden	150 kg	NA
Trans-2-Butene	Butylene	UN1012	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
cis-2-Butene	Butylene	UN1012	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
iso-Pentane	Pentanes (ISOPENTANE)	UN1265	3	I	3	N/A	N/A	N/A
3 Methyl 1 Butene	3-Methyl-1-butene	UN2561	3	I	3	1 L	30 L	N/A
2-Methyl-1-Butene	2-Methyl-1-butene	UN2459	3	I	3	Forbidden	Forbidden	N/A
Trans-2-Pentene	Flammable liquids, n.o.s. (trans-2-pentene)	UN1993	3	II	3	N/A	N/A	N/A
Cis-2-Pentene	Flammable Liquids, n.o.s (cis-2-pentene)	Un1993	3	I	Flammable liquid	Not available	Not available	Not available
2-Methyl 2-Butene	2-Methyl 2-Butene	UN2460	3	II	3	Forbidden	Forbidden	N/A
1-Butene	Butylene	UN1012	2.1	Not available	2.1	Forbidden	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
Ethylene	Ethylene, compressed	UN1962	2.1	Not applicable
N-Butane	Butane	UN 1011	2.1	NA
Trans-2-Butene	Butylene	UN1012	2.1	Not applicable
cis-2-Butene	Butylene	UN1012	2.1	Not applicable
iso-Pentane	Pentanes	UN1265	3	I
3 Methyl 1 Butene	3-Methyl-1-butene	UN2561	3	I
2-Methyl-1-Butene	2-Methyl-1-butene	UN2459	3	I
Trans-2-Pentene	Flammable liquid, n.o.s. (TRANS-2-PENTENE)	UN1993	3	II
Cis-2-Pentene	Flammable liquids, n.o.s (cis-2-pentene)	UN1993	3	I
2-Methyl 2-Butene	2-Methyl 2-Butene	UN2460	3	II
1-Butene	Butylene	UN1012	2.1	N/A
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable

Section 15: Regulatory Information

U.S. Regulations

	CERCLA Sections	SARA 355.30	SARA 355.40

Ethylene	Not regulated.	Not regulated.	Not regulated.
N-Butane	Not regulated.	Not regulated.	Not regulated.
Trans-2-Butene	Not regulated.	Not regulated.	Not regulated.
cis-2-Butene	Not regulated.	Not regulated.	Not regulated.
iso-Pentane	Not regulated.	Not regulated.	Not regulated.
3 Methyl 1 Butene	Not regulated.	Not regulated.	Not regulated.
2-Methyl-1-Butene	Not regulated.	Not regulated.	Not regulated.
Trans-2-Pentene	Not regulated.	Not regulated.	Not regulated.
Cis-2-Pentene	Not available	Not available	Not available
2-Methyl 2-Butene	Not regulated.	Not regulated.	Not regulated.
1-Butene	Not regulated.	Not regulated.	Not regulated.
Nitrogen	Not regulated.	Not regulated.	Not regulated.

SARA 370.21

	Acute	Chronic	Fire	Reactive	Sudden Release
Ethylene	Yes	No	Yes	Yes	Yes
N-Butane	Yes	No	Yes	No	Yes
Trans-2-Butene	Yes	No	Yes	No	Yes
cis-2-Butene	Yes	No	Yes	No	Yes
iso-Pentane	Yes	No	Yes	No	No
3 Methyl 1 Butene	Yes	No	Yes	No	Yes
2-Methyl-1-Butene	Yes	No	Yes	No	Yes
Trans-2-Pentene	Yes	No	Yes	No	No
Cis-2-Pentene	Yes	No	Yes	No	No
2-Methyl 2-Butene	Yes	No	Yes	No	Yes
1-Butene	Yes	No	Yes	No	Yes
Nitrogen	Yes	No	No	No	Yes

SARA 372.65

Ethylene	ETHYLENE
N-Butane	Not regulated.
Trans-2-Butene	Not regulated.
cis-2-Butene	Not regulated.
iso-Pentane	Not regulated.
3 Methyl 1 Butene	Not regulated.
2-Methyl-1-Butene	Not regulated.
Trans-2-Pentene	Not regulated.
Cis-2-Pentene	Not available
2-Methyl 2-Butene	Not regulated.
1-Butene	Not regulated.
Nitrogen	Not regulated.

OSHA Process Safety

Ethylene	Not regulated.
N-Butane	Not regulated.
Trans-2-Butene	Not regulated.
cis-2-Butene	Not regulated.
iso-Pentane	Not regulated.
3 Methyl 1 Butene	Not regulated.
2-Methyl-1-Butene	Not regulated.
Trans-2-Pentene	Not regulated.
Cis-2-Pentene	Not listed
2-Methyl 2-Butene	Not regulated.

1-Butene	Not regulated.
Nitrogen	Not regulated.

State Regulations

	CA Proposition 65
Ethylene	Not regulated.
N-Butane	Not regulated.
Trans-2-Butene	Not regulated.
cis-2-Butene	Not regulated.
iso-Pentane	Not regulated.
3 Methyl 1 Butene	Not regulated.
2-Methyl-1-Butene	Not regulated.
Trans-2-Pentene	Not regulated.
Cis-2-Pentene	Not listed
2-Methyl 2-Butene	Not regulated.
1-Butene	Not regulated.
Nitrogen	Not regulated.

Canadian Regulations

	WHMIS Classification
Ethylene	A, B1, D2B
N-Butane	A, B1
Trans-2-Butene	A, B1.
cis-2-Butene	A, B1.
iso-Pentane	B2
3 Methyl 1 Butene	A, B1
2-Methyl-1-Butene	B2
Trans-2-Pentene	B
Cis-2-Pentene	Not available
2-Methyl 2-Butene	B-2
1-Butene	A, B1
Nitrogen	A

National Inventory Status

	US Inventory (TSCA)	TSCA 12b Export Notification	Canada Inventory (DSL/NDSL)
Ethylene	Listed on inventory.	Not listed.	Listed on inventory.
N-Butane	Listed on inventory.	Not listed.	Listed on inventory.
Trans-2-Butene	Listed on inventory.	Not listed.	Listed on inventory.
cis-2-Butene	Listed on inventory.	Not listed.	Listed on inventory.
iso-Pentane	Listed on inventory.	Not listed.	Listed on inventory.
3 Methyl 1 Butene	Listed	Not listed	Listed on DSL
2-Methyl-1-Butene	Listed	Not listed	Not determined
Trans-2-Pentene	Listed on inventory.	Not listed.	Not determined.
Cis-2-Pentene	Listed	Not listed	Not available
2-Methyl 2-Butene	Listed	Not listed	Listed on DSL
1-Butene	Listed on inventory.	Not listed.	Listed on inventory.
Nitrogen	Listed on inventory.	Not listed.	Listed on inventory.

Section 16: Other Information

	NFPA Rating
Ethylene	HEALTH=3 FIRE=4 REACTIVITY=2
N-Butane	HEALTH=1 FIRE=4 REACTIVITY=0

Gas and Supply

Trans-2-Butene	HEALTH=1 FIRE=4 REACTIVITY=0
cis-2-Butene	HEALTH=1 FIRE=4 REACTIVITY=0
iso-Pentane	HEALTH=2 FIRE=4 REACTIVITY=0
3 Methyl 1 Butene	HEALTH=2 FIRE=4 REACTIVITY=0
2-Methyl-1-Butene	HEALTH=2 FIRE=4 REACTIVITY=0
Trans-2-Pentene	HEALTH=2 FIRE=4 REACTIVITY=0
Cis-2-Pentene	Health: 2, Fire:4, reactivity: 0
2-Methyl 2-Butene	HEALTH=2 FIRE=3 REACTIVITY=0
1-Butene	HEALTH=1 FIRE=4 REACTIVITY=0
Nitrogen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA

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

Disclaimer: The information contained herein is accurate to the best of our knowledge. Gas and Supply makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances.