



Safety Data Sheet

1500PPM METHANE, 5000PPM ETHANE, 2% PROPANE, 3% ISOBUTANE, 1% ISOPENTANE, 5000PPM N-PENTANE, 100PPM 1,3-BUTADIENE, BALANCE NITROGEN

Section 1: Product and Company Identification

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Product Code: 1500PPM METHANE, 5000PPM ETHANE, 2% PROPANE, 3% ISOBUTANE, 1% ISOPENTANE, 5000PPM N-PENTANE, 100PPM 1,3-BUTADIENE, BALANCE NITROGEN

Part Number: 1500PPM METHANE, 5000PPM ETHANE, 2% PROPANE, 3% ISOBUTANE, 1% ISOPENTANE, 5000PPM N-PENTANE, 100PPM

Synonyms:

Recommended Use:

Usage Restrictions:

Section 2: Hazards Identification



Danger

Hazard Classification:

Aspiration Hazard (Category 1)
Carcinogenicity (Category 1.A)
Flammable (Category 1)
Gases Under Pressure
Germ Cell Mutagenicity (Category 1.B)
Specific target organ toxicity (Single Exposure) (Category 3)

Hazard Statements:

Contains gas under pressure; may explode if heated
Extremely flammable gas
May be fatal if swallowed and enters airways

May cause cancer
 May cause genetic defects
 May cause respiratory irritation;
 Toxic to aquatic life with long lasting effects

Precautionary Statements

Prevention:

Avoid breathing dust/fume/gas/mist/ vapors/spray.
 [In case of inadequate ventilation] wear respiratory protection.
 Do not handle until all safety precautions have been read and understood.
 Use only outdoors or in a well-ventilated area.
 Wear protective gloves, protective clothing, eye protection and face protection.
 Obtain special instructions before use.
 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Response:

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
 Immediately call a poison center or doctor.
 Eliminate all ignition sources if safe to do so.
 Do NOT induce vomiting.
 If swallowed: Rinse mouth. Do NOT induce vomiting.
 If exposed or concerned: Get medical advice/attention.
 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
Methane	74-82-8	1500PPM
Ethane	74-84-0	5000PPM
Propane	74-98-6	2%
Isobutane	75-28-5	3%
iso-Pentane	78-78-4	1%
n-Pentane	109-66-0	5000PPM
1,3-Butadiene	106-99-0	100PPM
Nitrogen	7727-37-9	BALANCE

	Chemical Substance	Chemical Family	Trade Names
Methane	METHANE, COMPRESSED GAS	Hydrocarbons, Aliphatic, Saturated	FIRE DAMP; MARSH GAS; METHYL HYDRIDE; NATURAL GAS; METHANE; UN 1971; R50; CH4
Ethane	ETHANE	Hydrocarbons, Aliphatic, Saturated	BIMETHYL; ETHANE, COMPRESSED; METHYLMETHANE; DIMETHYL; ETHYL HYDRIDE; UN 1035; C2H6
Propane	PROPANE	Hydrocarbons, Aliphatic, Saturated	N-PROPANE; DIMETHYLMETHANE; PROPYL HYDRIDE; R-290; PROPYLHYDRIDE; LIQUEFIED PETROLEUM GAS; LPG; >96% NATURAL GRADE; >99.9% PURE GRADE; UN 1978; C3H8
Isobutane	ISOBUTANE	Hydrocarbons, Aliphatic, Saturated	2-METHYL PROPANE; TRIMETHYL METHANE; UN 1969; C4H10
iso-Pentane	ISOPENTANE	Hydrocarbons, Aliphatic, Saturated	2-METHYLBUTANE; ETHYLDIMETHYLMETHANE; ISOAMYLHYDRIDE; BUTANE,2-METHYL-; 1,1,2-TRIMETHYLETHANE; C5H12
n-Pentane	N-PENTANE	Hydrocarbons, Aliphatic, Saturated	PENTANE; AMYL HYDRIDE; UN 1265; C5H12
1,3-Butadiene	1,3-BUTADIENE	Hydrocarbons, Aliphatic, Unsaturated	BUTADIENE, INHIBITED; BIVINYL; BIETHYLENE; PYRROLYLENE; VINYLETHYLENE; DIVINYL; BUTA-1,3-DIENE; ALPHA,GAMMA-BUTADIENE; ERYTHRENE; METHYLALLENE; BUTADIENE; UN 1010; C4H6

	Chemical Substance	Chemical Family	Trade Names
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
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.
Ethane	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.
Propane	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.
Isobutane	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
n-Pentane	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes.	Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	Aspiration hazard. DO NOT induce vomiting. If vomiting occurs, keep head lower than hips to help prevent aspiration. Get immediate medical attention. Give artificial respiration if not breathing.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.	Not available

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
1,3-Butadiene	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. For exposure to liquid, immediately warm frostbite area with warm water less than 105F (41C).	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).	Get immediate medical attention.	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
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.
Ethane	Carbon dioxide, regular dry chemical Large fires: Flood with fine water spray.	Toxic gases	<ul style="list-style-type: none"> ▪ Any self-contained breathing apparatus with a full facepiece. ▪ Any self-contained breathing apparatus with a full facepiece.
Propane	Regular dry chemical, high expansion foam Large fires: Flood with fine water spray.	Carbon monoxide, carbon dioxide, water and toxic and irritating fumes	<ul style="list-style-type: none"> ▪ Any self-contained breathing apparatus with a full facepiece. ▪ Any self-contained breathing apparatus with a full facepiece.
Isobutane	Carbon dioxide, regular dry chemical Large fires: Flood with fine water spray.	Carbon monoxide, carbon dioxide, water and toxic and irritating fumes	<ul style="list-style-type: none"> ▪ Any self-contained breathing apparatus with a full facepiece. ▪ Any self-contained breathing apparatus with a full facepiece.
iso-Pentane	Foam, dry chemical, carbon dioxide. Water may be ineffective.	Oxides of carbon	<ul style="list-style-type: none"> ▪ Any self-contained breathing apparatus with a full facepiece. ▪ Any self-contained breathing apparatus with a full facepiece.
n-Pentane	Regular dry chemical, carbon dioxide, water, regular foam Large fires: Use regular foam or flood with fine water spray.	Carbon monoxide, carbon dioxide and toxic and irritating fumes	<ul style="list-style-type: none"> ▪ Any self-contained breathing apparatus with a full facepiece. ▪ Any self-contained breathing apparatus with a full facepiece.
1,3-Butadiene	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Toxic carbon monoxide may be given off during combustion.	<ul style="list-style-type: none"> ▪ Use self-contained breathing apparatus.
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
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.
Ethane	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.
Propane	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.
Isobutane	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.
n-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.
1,3-Butadiene	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.
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
Methane	Not available	Not available
Ethane	Contact emergency personnel immediately.	Not available
Propane	Contact emergency personnel	None
Isobutane	Contact emergency personnel. Avoid ignition sources.	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
n-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.	Not available
1,3-Butadiene	Stop leak, evacuate and ventilate the area.	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). Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.
Nitrogen	N/A	N/A

Section 7: Handling and Storage

	Handling	Storage
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.
Ethane	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
Propane	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.
Isobutane	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
n-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.
1,3-Butadiene	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
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
Ethane	TLV-TWA: 1000ppm (Aliphatic hydrocarbon gases: Alkane C1 - C4) (ACGIH)
Propane	PROPANE: 1000 ppm (1800 mg/m3) OSHA TWA 1000 ppm (1800 mg/m3) NIOSH recommended TWA 10 hour(s) LIQUIFIED PETROLEUM GAS (LPG): 1000 ppm (1800 mg/m3) OSHA TWA 1000 ppm ACGIH TWA 1000 ppm (1800 mg/m3) NIOSH recommended TWA 10 hour(s) ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA
Isobutane	ISOBUTANE: 800 ppm (1900 mg/m3) NIOSH recommended TWA 10 hour(s) LIQUIFIED PETROLEUM GAS (LPG): 1000 ppm (1800 mg/m3) OSHA TWA 1000 ppm ACGIH TWA 1000 ppm (1800 mg/m3) NIOSH recommended TWA 10 hour(s) ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA
iso-Pentane	ISOPENTANE: 600 ppm ACGIH TWA
n-Pentane	PENTANE: 1000 ppm (2950 mg/m3) OSHA TWA 600 ppm (1770 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 750 ppm (2210 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 600 ppm ACGIH TWA 120 ppm (350 mg/m3) NIOSH recommended TWA 10 hour(s) 610 ppm (1800 mg/m3) NIOSH recommended ceiling 15 minute(s)
1,3-Butadiene	BUTADIENE, INHIBITED: 1,3-BUTADIENE: 1 ppm OSHA TWA 5 ppm OSHA STEL 15 minute(s) 0.5 ppm OSHA action level 2 ppm ACGIH TWA NIOSH TWA (lowest feasible concentration)
Nitrogen	NITROGEN, COMPRESSED GAS: NITROGEN: ACGIH (simple asphyxiant)

Engineering Controls

Handle only in fully enclosed systems.

	Eye Protection	Skin Protection	Respiratory Protection
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.
Ethane	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.

	Eye Protection	Skin Protection	Respiratory Protection
Propane	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.
Isobutane	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.
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.
n-Pentane	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.
1,3-Butadiene	For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and shower in work area.	For the gas: Protective clothing is not required. For the liquid: Wear appropriate chemical resistant clothing.	Use 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
Methane	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
Ethane	Gas	Colorless	Colorless	N/A	Gas	Sweet odor	N/A
Propane	Gas	Clear	Colorless	N/A	Gas	Gasoline odor	N/A
Isobutane	Gas	Colorless	Colorless	N/A	Gas	Petroleum odor	N/A
iso-Pentane	Liquid	Colorless	Colorless	N/A	Liquid	Gasoline like	N/A
n-Pentane	Liquid	Clear	Colorless	N/A	Liquid	Gasoline odor	N/A
1,3-Butadiene	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
Methane	-369 F (-223 C)	Not available	724.44 (log = 2.87) (estimated from water solubility)	999 F (537 C)	15%	5%
Ethane	-211 F (-135 C) (CC)	Not available	912.01 (log = 2.97) (estimated from water solubility)	882 F (472 C)	0.125	0.03
Propane	-157 F (-105 C)	Not available	Not available	842 F (450 C)	0.095	0.021
Isobutane	-126 F (-88 C) (CC)	Not available	Not available	864 F (462 C)	0.084	0.018
iso-Pentane	<-60 F (<-51 C) (CC)	IA	Not available	788 F (420 C)	0.076	0.014
n-Pentane	<-40 F (<-40 C) (CC)	IA	Not available	500 F (260 C)	0.078	0.014
1,3-Butadiene	-105 F (-76 C)			788 F (420 C)	0.115	0.02
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

	Boiling Point	Freezing Point	Vapor Pressure	Vapor Density	Specific Gravity	Water Solubility	pH	Odor Threshold	Evaporation Rate	Viscosity
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
Ethane	-128 F (-89 C)	-297 F (-183 C)	28842 mmHg @ 21 C	1.05 (Air=1)	Not applicable	4.7% @ 20 C	Not applicable	899 ppm	Not applicable for gas. Refrigerated liquefied ethane will evaporate rapidly at room temperature	0.00852 cP @ 0 C
Propane	-40 F (-40 C)	-310 F (-190 C)	6398 mmHg @ 21.1 C	1.55 (Air=1)	0.5853 @ -45 C	Very slightly soluble	Not applicable	5000-20000 ppm	Not applicable	Not available
Isobutane	10 F (-12 C)	-254 F (-159 C)	3.1 atm @ 21 C	2 (Air=1)	0.549 @ 20 C	Slightly soluble	Not applicable	Not available	Not applicable	0.0077 cP @ 25 C
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
n-Pentane	96.93 F (36.07 C)	-201.5 F (-129.7 C)	400 mmHg @ 18.5 C	2.5 (Air=1)	0.626	0.0004	Not available	2.2-5000 ppm	28.6 (butyl acetate=1)	<32 SUS
1,3-Butadiene	23 F (-5 C)	-164 F (-109 C)	910 mmHg @ 20 C	1.87 (Air=1)	0.6211 @ 20 C	0.05% @ 20 C	Not applicable	1.6 ppm	>25 (butyl acetate=1)	0.00075 mPa.s (0.00075 centipoise) @ 20 C and 101.33 kPa; 0.33 mPa.s (0.33 centipoise) @ -40 C; 0.25 mPa.s (0.25 centipoise) @ 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
Methane	16.04	C-H4	0.717 g/L @ 0 C	Not available	Not applicable	Not applicable	Soluble: Alcohol, ether, benzene, organic solvents
Ethane	30.07	C-H3-C-H3	1.242 g/L @ 25 C	Not available	Not available	1	Soluble: Benzene, ethanol
Propane	44.11	C-H3-C-H2-C-H3	0.116	Not available	Not available	Not applicable	Soluble: Absolute alcohol, ether, chloroform, benzene, turpentine
Isobutane	58.12	C4-H10	Not available	Not available	100%	Not applicable	Soluble: Alcohol, ether, chloroform
iso-Pentane	72.15	C-H3-C-H2-C-H-(C-H3)2	Not available	Not available	100%	Not available	Ether, alcohol, hydrocarbons, oils
n-Pentane	72.15g/mol	C5-H12	Not available	Not available	Not available	Not available	Soluble: Alcohol, ether, acetone, benzene, chloroform
1,3-Butadiene	54.09	C-H2:C-H-C-H:C-H2	Not available	Not available	100%	Not applicable	Soluble: Organic solvents, ether, acetone, benzene, ethanol, cyclohexane, methanol, carbon tetrachloride, chloroform
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
Methane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Halogens, oxidizing materials, combustible materials
Ethane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, halogens,
Propane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, combustible materials, halogen compounds,
Isobutane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, halogen compounds
iso-Pentane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials
n-Pentane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, combustible materials, halogen compounds
1,3-Butadiene	May explode if exposed to shock, friction or heating. Stable when inhibited. Explosive, shock- and heat-sensitive polymeric peroxides may be produced in the presence of air. The polyperoxide formed is insoluble in 1,3-butadiene and forms a separate layer, thus increasing the hazard.	May explode if exposed to shock, friction or heating. Stable when inhibited. Explosive, shock- and heat-sensitive polymeric peroxides may be produced in the presence of air. The polyperoxide formed is insoluble in 1,3-butadiene and forms a separate layer, thus increasing the hazard.	Metal carbide, metal salts, combustible materials, metals, oxidizing materials, halogens, metal oxides, copper, aluminum tetrahydroborate, vinylacetylene, crotonaldehyde, boron trifluoride and phenol
Nitrogen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metals, oxidizing materials

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
Methane	Oxides of carbon	Will not polymerize.
Ethane	Oxides of carbon	Will not polymerize.
Propane	Oxides of carbon	Will not polymerize.
Isobutane	Oxides of carbon	Will not polymerize.
iso-Pentane	Oxides of carbon	Will not polymerize.
n-Pentane	Oxides of carbon	Will not polymerize.
1,3-Butadiene	Oxides of carbon	May polymerize. Avoid contact with heat, air, light, initiators or curing agents. May polymerize with evolution of heat. Closed containers may rupture violently.
Nitrogen	Oxides of nitrogen	Will not polymerize.

Section 11: Toxicology Information

Acute Effects

	Oral LD50	Dermal LD50	Inhalation
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
Ethane	Not available	Not available	Irritation, nausea, vomiting, irregular heartbeat, headache, dizziness, disorientation, emotional disturbances, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma
Propane	LC50 Inhalation Gas. Rat >800000 ppm 15 minutes	Not available	Nausea, vomiting, irregular heartbeat, headache, symptoms of drunkenness, disorientation, suffocation, convulsions, coma
Isobutane	LC50, 1 hr, rat = 285,000 ppmv	Not available	Irritation, nausea, vomiting, headache, symptoms of drunkenness, suffocation, convulsions, coma
iso-Pentane	Not available	Not available	Irritation, difficulty breathing, symptoms of drunkenness
n-Pentane	>2000 mg/kg oral-rat LD50	Not available	Irritation, nausea, difficulty breathing, headache, drowsiness, dizziness, disorientation, mood swings, loss of coordination, central nervous system depression, asphyxiant
1,3-Butadiene	5480 mg/kg oral-rat LD50	Not established	Irritation, nausea, headache, drowsiness, dizziness, loss of coordination
Nitrogen	Not available	Not available	Nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma

	Eye Irritation	Skin Irritation	Sensitization
Methane	No information on significant adverse effects	No information on significant adverse effects	Difficulty breathing
Ethane	Frostbite	Frostbite	Difficulty breathing
Propane	Liquid: frostbite, blurred vision	Liquid: blisters, frostbite	Central nervous system depression, difficulty breathing
Isobutane	Liquid: frostbite, blurred vision	Liquid: blisters, frostbite	Respiratory tract irritation, central nervous system depression, 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.
n-Pentane	Irritation	Irritation	Respiratory tract irritation, skin irritation, aspiration hazard, central nervous system depression
1,3-Butadiene	Irritation, blurred vision at very high concentration	Liquid: blisters, frostbite	Germ cell mutagenicity, Category 1B; H340: May cause genetic defects. Carcinogenicity, Category 1A; H350: May cause cancer.
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
Methane	Not available	Not available	Not available	No data
Ethane	Not Listed.	Not available	Not available	No data
Propane	Not available	Not available	Not available	No data
Isobutane	Not available	Not available	Not available	No data
iso-Pentane	Not available	Not available	Not available	No data
n-Pentane	Not available	Not available	Not available	No data
1,3-Butadiene	OSHA: Carcinogen; NTP: Known Human Carcinogen; IARC: Human Limited Evidence, Animal Sufficient Evidence, Group 2A; ACGIH: A2 - Suspected Human Carcinogen; EC: Category 2	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
Methane	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Moderately volatile from water.	Accumulates very little in the bodies of living organisms.	Not expected to leach through the soil or the sediment.
Ethane	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Highly volatile from water.	Accumulates very little in the bodies of living organisms.	Leaches through the soil or the sediment at a slow rate.
Propane	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
Isobutane	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
iso-Pentane	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available	Not available	Not available	Not available

	Phyto toxicity: Not available Other toxicity: Not available			
n-Pentane	Fish toxicity: Not available Invertebrate toxicity: 3000000 ug/L 48 week(s) (Mortality) Pacific oyster (Crassostrea gigas) Algal toxicity: 1000 ug/L 8 year(s) EC50 (Photosynthesis) Algae, phytoplankton, algal mat (Algae) Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
1,3-Butadiene	Fish toxicity: 24 Hr LC50 Lagodon rhomboides: 71.5 mg/L Invertebrate toxicity: 96 Hr EC50 Daphnia magna: 24.8 mg/L Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	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

Methane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Ethane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Propane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Isobutane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. 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.
n-Pentane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
1,3-Butadiene	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. D003.
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, Isobutane)
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
Methane	Methane, compressed	UN1971	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
Ethane	Ethane	UN1035	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
Propane	Propane	UN1978	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
Isobutane	ISOBUTANE see also PETROLEUM GASES, LIQUEFIED	UN1969	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
n-Pentane	Pentanes	UN1265	3	II	3	N/A	N/A	N/A
1,3-Butadiene	Butadienes, stabilized	UN1010	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
Methane	Methane, compressed	UN1971	2.1	Not applicable
Ethane	Ethane	UN1035	2.1	Not applicable
Propane	Propane	UN1978	2.1	Not applicable
Isobutane	Isobutane	UN1969	2.1	Not applicable
iso-Pentane	Pentanes	UN1265	3	I
n-Pentane	Pentanes	UN1265	3	II
1,3-Butadiene	BUTADIENES, STABILIZED OR BUTADIENES AND HYDROCARBON MIXTURE, stabilized containing more than 40 percent butadienes	UN1010	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
Methane	Not regulated.	Not regulated.	Not regulated.
Ethane	Not regulated.	Not regulated.	Not regulated.
Propane	Not regulated.	Not regulated.	Not regulated.
Isobutane	Not regulated.	Not regulated.	Not regulated.
iso-Pentane	Not regulated.	Not regulated.	Not regulated.
n-Pentane	Not regulated.	Not regulated.	Not regulated.
1,3-Butadiene	1,3-Butadiene: 10 LBS RQ	Not regulated.	Not regulated.
Nitrogen	Not regulated.	Not regulated.	Not regulated.

SARA 370.21

	Acute	Chronic	Fire	Reactive	Sudden Release
Methane	Yes	No	Yes	No	Yes
Ethane	Yes	No	Yes	No	Yes
Propane	Yes	No	Yes	No	Yes
Isobutane	Yes	No	Yes	No	Yes
iso-Pentane	Yes	No	Yes	No	No
n-Pentane	Yes	No	Yes	No	No
1,3-Butadiene	Yes	Yes	Yes	Yes	Yes
Nitrogen	Yes	No	No	No	Yes

SARA 372.65

Methane	Not regulated.
Ethane	Not regulated.
Propane	Not regulated.

Isobutane	Not regulated.
iso-Pentane	Not regulated.
n-Pentane	Not regulated.
1,3-Butadiene	1,3-Butadiene
Nitrogen	Not regulated.

OSHA Process Safety

Methane	Not regulated.
Ethane	Not regulated.
Propane	Not regulated.
Isobutane	Not regulated.
iso-Pentane	Not regulated.
n-Pentane	Not regulated.
1,3-Butadiene	Not regulated.
Nitrogen	Not regulated.

State Regulations

	CA Proposition 65
Methane	Not regulated.
Ethane	Not regulated.
Propane	Not regulated.
Isobutane	Not regulated.
iso-Pentane	Not regulated.
n-Pentane	Not regulated.
1,3-Butadiene	Known to the state of California to cause the following: 1,3-Butadiene Cancer (Apr 01, 1988) Developmental toxicity (Apr 16, 2004) Male reproductive toxicity (Apr 16, 2004) Female reproductive toxicity (Apr 16, 2004)
Nitrogen	Not regulated.

Canadian Regulations

	WHMIS Classification
Methane	A, B1
Ethane	A, B1.
Propane	A, B1.
Isobutane	A, B1.
iso-Pentane	B2
n-Pentane	B2
1,3-Butadiene	A, B1, D2A, F
Nitrogen	A

National Inventory Status

	US Inventory (TSCA)	TSCA 12b Export Notification	Canada Inventory (DSL/NDSL)
Methane	Listed on inventory.	Not listed.	Listed on inventory.
Ethane	Listed on inventory.	Not listed.	Listed on inventory.
Propane	Listed on inventory.	Not listed.	Listed on inventory.
Isobutane	Listed on inventory.	Not listed.	Listed on inventory.
iso-Pentane	Listed on inventory.	Not listed.	Listed on inventory.
n-Pentane	Listed on inventory.	PENTANE CAS NUMBER: 109-66-0 SECTION 4	Listed on inventory.
1,3-Butadiene	Listed on inventory.	Not listed.	Listed on inventory.
Nitrogen	Listed on inventory.	Not listed.	Listed on inventory.

Section 16: Other Information

	NFPA Rating
Methane	HEALTH=1 FIRE=4 REACTIVITY=0
Ethane	HEALTH=2 FIRE=4 REACTIVITY=0
Propane	HEALTH=1 FIRE=4 REACTIVITY=0
Isobutane	HEALTH=2 FIRE=4 REACTIVITY=0
iso-Pentane	HEALTH=2 FIRE=4 REACTIVITY=0
n-Pentane	HEALTH=2 FIRE=4 REACTIVITY=0
1,3-Butadiene	HEALTH=1 FIRE=4 REACTIVITY=2
Nitrogen	HEALTH=1 FIRE=0 REACTIVITY=0

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