

Material Safety Data Sheet



Flammable Gas Mixture: 1 Butene / 1 Pentene / 1,3 Butadiene / 2-Methyl-2-Butene / Acetylene / Carbon Dioxide / Carbon Monoxide / Cis-2-Butene / Cis-2-Pentene / Cyclopropane / Ethane / Ethylene / Hexane / Hydrogen / Hydrogen Sulfide / Isobutane / Isobutylene / Isopentane / Methane / N Butane / N Pentane / Nitrogen / Oxygen / Propane / Propadiene / Propylene / Trans-2-Butene / Trans-2-Pentene

Section 1. Chemical product and company identification

- Product name** : Flammable Gas Mixture: 1 Butene / 1 Pentene / 1,3 Butadiene / 2-Methyl-2-Butene / Acetylene / Carbon Dioxide / Carbon Monoxide / Cis-2-Butene / Cis-2-Pentene / Cyclopropane / Ethane / Ethylene / Hexane / Hydrogen / Hydrogen Sulfide / Isobutane / Isobutylene / Isopentane / Methane / N Butane / N Pentane / Nitrogen / Oxygen / Propane / Propadiene / Propylene / Trans-2-Butene / Trans-2-Pentene
- Supplier** : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253
- Product use** : Synthetic/Analytical chemistry.
- MSDS #** : 007869
- Date of Preparation/Revision** : **5/6/2008.**
- In case of emergency** : 1-866-734-3438

Section 2. Hazards identification

- Physical state** : Gas.
DANGER!
FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
MAY BE FATAL IF INHALED.
MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.
CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
CONTENTS UNDER PRESSURE.

Keep away from heat, sparks and flame. Do not puncture or incinerate container. Do not breathe gas. Avoid contact with eyes, skin and clothing. Contains material that can cause target organ damage. Risk of cancer depends on duration and level of exposure. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed. Avoid breathing gas. Use with adequate ventilation.

Contact with rapidly expanding gases can cause frostbite.
- Target organs** : Contains material which causes damage to the following organs: mucous membranes, upper respiratory tract, skin.
Contains material which may cause damage to the following organs: blood, lungs, the nervous system, the reproductive system, heart, peripheral nervous system, cardiovascular system, central nervous system (CNS), eye, lens or cornea, muscle tissue.
- Routes of entry** : Inhalation Dermal Eyes
- Potential acute health effects**
- Eyes** : Moderately irritating to eyes. Contact with rapidly expanding gas may cause burns or frostbite.
- Skin** : Moderately irritating to the skin. Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : Very toxic by inhalation. Moderately irritating to the respiratory system.
- Ingestion** : Ingestion is not a normal route of exposure for gases

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Potential chronic health effects : **CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [ethylene]. Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [propylene]. Classified 3 (Not classifiable for humans.) by IARC [cyclopropane]. Classified 1 (Known to be human carcinogens.) by NTP, + (Proven.) by NIOSH [1,3-butadiene]. Classified A2 (Suspected for humans.) by ACGIH, 2A (Probable for human.) by IARC [1,3-butadiene].
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

Section 3. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Hydrogen	1333-74-0	5.8 - 99	Simple asphyxiant.
Nitrogen	7727-37-9	1 - 99	Simple asphyxiant.
Methane	74-82-8	0.1 - 90	ACGIH TLV (United States, 1/2007). TWA: 1000 ppm 8 hour(s).
Propane	74-98-6	0.1 - 90	ACGIH TLV (United States, 1/2007). TWA: 1000 ppm 8 hour(s). NIOSH REL (United States, 12/2001). TWA: 1800 mg/m ³ 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 1800 mg/m ³ 8 hour(s).
Carbon Monoxide	630-08-0	0.0025 - 10	ACGIH TLV (United States, 1/2007). TWA: 29 mg/m ³ 8 hour(s). NIOSH REL (United States, 12/2001). CEIL: 229 mg/m ³ TWA: 40 mg/m ³ 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 55 mg/m ³ 8 hour(s).
Ethylene	74-85-1	0.02 - 10	ACGIH TLV (United States, 1/2007). TWA: 200 ppm 8 hour(s).
Carbon Dioxide	124-38-9	0.1 - 10	ACGIH TLV (United States, 1/2007). STEL: 54000 mg/m ³ 15 minute(s). TWA: 9000 mg/m ³ 8 hour(s). NIOSH REL (United States, 12/2001). STEL: 54000 mg/m ³ 15 minute(s). TWA: 9000 mg/m ³ 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 9000 mg/m ³ 8 hour(s).
Propylene	115-07-1	0.05 - 10	ACGIH TLV (United States, 1/2007). TWA: 500 ppm 8 hour(s).
Ethane	74-84-0	0.1 - 10	ACGIH TLV (United States, 1/2007). TWA: 1000 ppm 8 hour(s).
Isobutane	75-28-5	0.01 - 10	ACGIH TLV (United States, 1/2007). TWA: 1000 ppm 8 hour(s). NIOSH REL (United States, 12/2001). TWA: 1900 mg/m ³ 10 hour(s).
Cyclopropane	75-19-4	0.01 - 5	Ministry of Social Assistance and Family Policies and Ministry of Public Health (RO, 10/2006). Short term: 700 mg/m ³ 15 minute(s). VLA: 500 mg/m ³ 8 hour(s).
Hexane	110-54-3	0.005 - 5	ACGIH TLV (United States, 1/2007). Skin

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			TWA: 50 ppm 8 hour(s).
			NIOSH REL (United States, 12/2001).
			TWA: 180 mg/m ³ 10 hour(s).
			OSHA PEL (United States, 11/2006).
			TWA: 1800 mg/m ³ 8 hour(s).
2-Methyl-2-Butene	513-35-9	0.1 - 5	
Trans-2-Pentene	646-04-8	0.1 - 5	
Cis-2-Pentene	627-20-3	0.1 - 5	
1-Pentene	109-67-1	0.1 - 5	
Acetylene	74-86-2	0.1 - 5	NIOSH REL (United States, 12/2001).
			CEIL: 2662 mg/m ³
Cis-2-Butene	590-18-1	0.1 - 5	
Isobutylene	115-11-7	1 - 5	Ministry of Labor and Social Policy and Ministry of Health (Bulgaria, 8/2007).
			Limit value 8 hours: 100 mg/m ³ 8 hour(s).
			Del Lietuvos Higienos Normos (Lithuania, 10/2007).
			TWA: 100 mg/m ³ 8 hour(s).
Isopentane	78-78-4	0.01 - 5	ACGIH TLV (United States, 1/2007).
			TWA: 600 ppm 8 hour(s).
Pentane	109-66-0	0.01 - 5	ACGIH TLV (United States, 1/2007).
			TWA: 600 ppm 8 hour(s).
			NIOSH REL (United States, 12/2001).
			CEIL: 1800 mg/m ³ 15 minute(s).
			TWA: 350 mg/m ³ 10 hour(s).
			OSHA PEL (United States, 11/2006).
			TWA: 2950 mg/m ³ 8 hour(s).
Oxygen	7782-44-7	1 - 5	
1,2-Propadiene (Allene)	463-49-0	0.1 - 5	
1-Butene	106-98-9	1 - 5	
Hydrogen Sulfide	7783-06-4	0.0001 - 5	ACGIH TLV (United States, 1/2007).
			STEL: 21 mg/m ³ 15 minute(s).
			TWA: 14 mg/m ³ 8 hour(s).
			NIOSH REL (United States, 12/2001).
			CEIL: 15 mg/m ³ 10 minute(s).
			OSHA PEL Z2 (United States, 11/2006).
			AMP: 50 ppm 10 minute(s).
			CEIL: 20 ppm
1,3-Butadiene	106-99-0	0.0001 - 5	ACGIH TLV (United States, 1/2007).
			TWA: 4.4 mg/m ³ 8 hour(s).
			OSHA PEL (United States, 11/2006).
			STEL: 5 ppm 15 minute(s).
			TWA: 1 ppm 8 hour(s).
Trans-2-Butene	624-64-6	1 - 5	
n-Butane	106-97-8	0.01 - 5	ACGIH TLV (United States, 1/2007).
			TWA: 1000 ppm 8 hour(s).
			NIOSH REL (United States, 12/2001).
			TWA: 1900 mg/m ³ 10 hour(s).

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

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- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : Call medical doctor or poison control center immediately. Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Section 5. Fire fighting measures

- Flammability of the product** : Flammable.
- Auto-ignition temperature** : Lowest known value: 259.85°C (499.7°F) (hydrogen sulphide).
- Flash point** : Lowest known value: Closed cup: -188.15°C (-306.7°F). (methane)
- Flammable limits** : Greatest known range: Lower: 2.5% Upper: 82% (acetylene)
- Products of combustion** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
sulfur oxides

- Fire-fighting media and instructions** : In case of fire, use water spray (fog), foam or dry chemical.

In case of fire, allow gas to burn if flow cannot be shut off immediately. Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.

Contains gas under pressure. Extremely flammable. In a fire or if heated, a pressure increase will occur and the container may burst or explode. Gas may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back, causing fire or explosion.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

- Handling** : Use only with adequate ventilation. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling. High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Keep container closed. Avoid contact with skin and clothing. Use with adequate ventilation. Avoid contact with eyes. Keep away from heat, sparks and flame. To avoid fire, eliminate ignition sources. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Storage** : Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Segregate from oxidizing materials. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

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Section 8. Exposure controls/personal protection

- Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Full chemical-resistant suit and self-contained breathing apparatus should be worn only by trained and authorized persons.

Product name

hydrogen	Simple asphyxiant.
nitrogen	Simple asphyxiant.
methane	ACGIH TLV (United States, 1/2007). TWA: 1000 ppm 8 hour(s).
propane	ACGIH TLV (United States, 1/2007). TWA: 1000 ppm 8 hour(s). NIOSH REL (United States, 12/2001). TWA: 1800 mg/m ³ 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 1800 mg/m ³ 8 hour(s).
carbon monoxide	ACGIH TLV (United States, 1/2007). TWA: 29 mg/m ³ 8 hour(s). NIOSH REL (United States, 12/2001). CEIL: 229 mg/m ³ TWA: 40 mg/m ³ 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 55 mg/m ³ 8 hour(s).
ethylene	ACGIH TLV (United States, 1/2007). TWA: 200 ppm 8 hour(s).
carbon dioxide	ACGIH TLV (United States, 1/2007). STEL: 54000 mg/m ³ 15 minute(s). TWA: 9000 mg/m ³ 8 hour(s). NIOSH REL (United States, 12/2001). STEL: 54000 mg/m ³ 15 minute(s). TWA: 9000 mg/m ³ 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 9000 mg/m ³ 8 hour(s).
propylene	ACGIH TLV (United States, 1/2007). TWA: 500 ppm 8 hour(s).
ethane	ACGIH TLV (United States, 1/2007). TWA: 1000 ppm 8 hour(s).

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isobutane	<p>ACGIH TLV (United States, 1/2007). TWA: 1000 ppm 8 hour(s).</p> <p>NIOSH REL (United States, 12/2001). TWA: 1900 mg/m³ 10 hour(s).</p>
cyclopropane	<p>Ministry of Social Assistance and Family Policies and Ministry of Public Health (RO, 10/2006). Short term: 700 mg/m³ 15 minute(s). VLA: 500 mg/m³ 8 hour(s).</p>
n-hexane	<p>ACGIH TLV (United States, 1/2007). Skin TWA: 50 ppm 8 hour(s).</p> <p>NIOSH REL (United States, 12/2001). TWA: 180 mg/m³ 10 hour(s).</p> <p>OSHA PEL (United States, 11/2006). TWA: 1800 mg/m³ 8 hour(s).</p>
2-methylbut-2-ene 2-pentene, (e)- 2-pentene, (z)- pent-1-ene acetylene	<p>NIOSH REL (United States, 12/2001). CEIL: 2662 mg/m³</p>
(Z)-but-2-ene 2-methylpropene	<p>Ministry of Labor and Social Policy and Ministry of Health (Bulgaria, 8/2007). Limit value 8 hours: 100 mg/m³ 8 hour(s).</p> <p>Del Lietuvos Higienos Normos (Lithuania, 10/2007). TWA: 100 mg/m³ 8 hour(s).</p>
isopentane	<p>ACGIH TLV (United States, 1/2007). TWA: 600 ppm 8 hour(s).</p>
pentane	<p>ACGIH TLV (United States, 1/2007). TWA: 600 ppm 8 hour(s).</p> <p>NIOSH REL (United States, 12/2001). CEIL: 1800 mg/m³ 15 minute(s). TWA: 350 mg/m³ 10 hour(s).</p> <p>OSHA PEL (United States, 11/2006). TWA: 2950 mg/m³ 8 hour(s).</p>
oxygen allene but-1-ene hydrogen sulphide	<p>ACGIH TLV (United States, 1/2007). STEL: 21 mg/m³ 15 minute(s). TWA: 14 mg/m³ 8 hour(s).</p> <p>NIOSH REL (United States, 12/2001). CEIL: 15 mg/m³ 10 minute(s).</p> <p>OSHA PEL Z2 (United States, 11/2006). AMP: 50 ppm 10 minute(s). CEIL: 20 ppm</p>
1,3-butadiene	<p>ACGIH TLV (United States, 1/2007). TWA: 4.4 mg/m³ 8 hour(s).</p> <p>OSHA PEL (United States, 11/2006). STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s).</p>
(E)-but-2-ene butane	<p>ACGIH TLV (United States, 1/2007). TWA: 1000 ppm 8 hour(s).</p> <p>NIOSH REL (United States, 12/2001). TWA: 1900 mg/m³ 10 hour(s).</p>

Consult local authorities for acceptable exposure limits.

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Section 9. Physical and chemical properties

- Melting/freezing point** : -82.8°C (-117°F) This is based on data for the following ingredient: hydrogen sulphide. Weighted average: -199.6°C (-327.3°F)
- Critical temperature** : Lowest known value: -240.1°C (-400.2°F) (hydrogen).
- Vapor density** : Highest known value: 2 (Air = 1) (isobutane). Weighted average: 0.94 (Air = 1)
- Gas Density (lb/ft³)** : Weighted average: 0.08

Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Extremely reactive or incompatible with the following materials: oxidizing materials, reducing materials and combustible materials.
Highly reactive or incompatible with the following materials: metals, acids and alkalis.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
carbon monoxide	TDLo Intraperitoneal	Rat	35 mL/kg	-
	LC50 Inhalation Gas.	Rat	3760 ppm	1 hours
	LC50 Inhalation Gas.	Mouse	2444 ppm	4 hours
n-hexane	LD50 Oral	Rat	25 g/kg	-
	LDLo Intraperitoneal	Rat	9100 mg/kg	-
	TDLo Oral	Rat	20000 mg/kg	-
pentane	LD50 Oral	Rat	>2000 mg/kg	-
hydrogen sulphide	LC50 Inhalation Gas.	Rat	712 ppm	1 hours
	LC50 Inhalation Gas.	Mouse	634 ppm	1 hours
	LD50 Oral	Rat	5480 mg/kg	-

- Chronic effects on humans** : **CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [ethylene]. Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [propylene]. Classified 3 (Not classifiable for humans.) by IARC [cyclopropane]. Classified 1 (Known to be human carcinogens.) by NTP, + (Proven.) by NIOSH [1,3-butadiene]. Classified A2 (Suspected for humans.) by ACGIH, 2A (Probable for human.) by IARC [1,3-butadiene].
Contains material which causes damage to the following organs: mucous membranes, upper respiratory tract, skin.
Contains material which may cause damage to the following organs: blood, lungs, the nervous system, the reproductive system, heart, peripheral nervous system, cardiovascular system, central nervous system (CNS), eye, lens or cornea, muscle tissue.

- Other toxic effects on humans** : No specific information is available in our database regarding the other toxic effects of this material to humans.

Specific effects

- Carcinogenic effects** : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
- Mutagenic effects** : No known significant effects or critical hazards.
- Reproduction toxicity** : No known significant effects or critical hazards.

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Section 12. Ecological information

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
n-hexane	-	Acute LC50 113000 ug/L Fresh water	Fish - Mozambique tilapia - Tilapia mossambica	96 hours
	-	Acute LC50 2500 to 2980 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
hydrogen sulphide	-	Acute EC50 770 ug/L Fresh water	Crustaceans - Amphipod - Crangonyx richmondensis lauren	48 hours
	-	Acute EC50 540 ug/L Fresh water	Crustaceans - Amphipod - Crangonyx richmondensis lauren	48 hours
	-	Acute LC50 7 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	-	Acute LC50 4 ug/L Fresh water	Fish - Lake whitefish - Coregonus clupeaformis	96 hours
	-	Acute LC50 3.2 ug/L Fresh water	Fish - Asian redtail catfish - Hemibagrus nemurus	96 hours
	-	Acute LC50 3 ug/L Fresh water	Fish - Lake whitefish - Coregonus clupeaformis	96 hours
	-	Acute LC50 <2 ug/L Fresh water	Fish - Yellow perch - Perca flavescens	96 hours
	-	Acute LC50 2 ug/L Fresh water	Fish - Lake whitefish - Coregonus clupeaformis	96 hours

Products of degradation : Products of degradation: carbon oxides (CO, CO₂) and water, nitrogen oxides (NO, NO₂ etc.), sulfur oxides (SO₂, SO₃ etc.).

Environmental fate : Not available.

Environmental hazards : No known significant effects or critical hazards.




Toxicity to the environment : Not available.

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Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		-
TDG Classification	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		<p>Explosive Limit and Limited Quantity Index 0.125</p> <p>ERAP Index 3000</p> <p>Passenger Carrying Ship Index Forbidden</p> <p>Passenger Carrying Road or Rail Index Forbidden</p>
Mexico Classification	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		-

Section 15. Regulatory information

United States

U.S. Federal regulations : TSCA 4(a) final test rules: n-hexane; pentane
TSCA 8(a) PAIR: pentane
United States inventory (TSCA 8b): All components are listed or exempted.
TSCA 12(b) one-time export: pentane
TSCA 12(b) annual export notification: n-hexane

SARA 302/304/311/312 extremely hazardous substances: hydrogen sulphide
SARA 302/304 emergency planning and notification: hydrogen sulphide
SARA 302/304/311/312 hazardous chemicals: cyclopropane; n-hexane; 2-methylbut-2-ene; 2-pentene, (e)-; 2-pentene, (z)-; pent-1-ene; acetylene; carbon monoxide; 2-methylpropene; isopentane; pentane; oxygen; allene; ethylene; hydrogen sulphide; 1,3-butadiene; carbon dioxide; propylene; ethane; butane; isobutane; methane; propane; hydrogen; nitrogen

SARA 311/312 MSDS distribution - chemical inventory - hazard identification:
cyclopropane: Fire hazard, Sudden release of pressure, Delayed (chronic) health hazard; n-hexane: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; 2-methylbut-2-ene: Fire hazard; 2-pentene, (e)-: Fire hazard; 2-pentene, (z)-: Fire hazard; pent-1-ene: Fire hazard, Immediate (acute) health hazard; acetylene:

Flammable Gas Mixture: 1 Butene / 1 Pentene / 1,3 Butadiene / 2-Methyl-2-Butene / Acetylene / Carbon Dioxide / Carbon Monoxide / Cis-2-Butene / Cis-2-Pentene / Cyclopropane / Ethane / Ethylene / Hexane / Hydrogen / Hydrogen Sulfide / Isobutane / Isobutylene / Isopentane / Methane / N Butane / N Pentane / Nitrogen / Oxygen / Propane / Propadiene / Propylene / Trans-2-Butene / Trans-2-Pentene

Fire hazard, reactive, Sudden release of pressure, Immediate (acute) health hazard; carbon monoxide: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard; 2-methylpropene: Fire hazard, Sudden release of pressure; isopentane: Fire hazard; pentane: Fire hazard, Immediate (acute) health hazard; oxygen: Fire hazard, Sudden release of pressure, Delayed (chronic) health hazard; allene: Fire hazard, Sudden release of pressure; ethylene: Fire hazard, reactive, Sudden release of pressure, Delayed (chronic) health hazard; hydrogen sulphide: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard; 1,3-butadiene: Fire hazard, reactive, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard; carbon dioxide: Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard; propylene: Fire hazard, Sudden release of pressure; ethane: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard; butane: Fire hazard, Sudden release of pressure; isobutane: Fire hazard, Sudden release of pressure; methane: Fire hazard, Sudden release of pressure; propane: Fire hazard, Sudden release of pressure; hydrogen: Fire hazard, Sudden release of pressure; nitrogen: Sudden release of pressure

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: No products were found.

Clean Air Act (CAA) 112 accidental release prevention: cyclopropane; 2-pentene, (e)-; 2-pentene, (z)-; pent-1-ene; acetylene; (Z)-but-2-ene; 2-methylpropene; isopentane; pentane; allene; but-1-ene; ethylene; hydrogen sulphide; 1,3-butadiene; propylene; (E)-but-2-ene; ethane; butane; isobutane; methane; propane; hydrogen

Clean Air Act (CAA) 112 regulated flammable substances: cyclopropane; 2-pentene, (e)-; 2-pentene, (z)-; pent-1-ene; acetylene; (Z)-but-2-ene; 2-methylpropene; isopentane; pentane; allene; but-1-ene; ethylene; 1,3-butadiene; propylene; (E)-but-2-ene; ethane; butane; isobutane; methane; propane; hydrogen

Clean Air Act (CAA) 112 regulated toxic substances: hydrogen sulphide

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	: Ethylene	74-85-1	0.02 - 10
	Propylene	115-07-1	0.05 - 10
	Hexane	110-54-3	0.005 - 5
	Hydrogen Sulfide	7783-06-4	0.0001 - 5
	1,3-Butadiene	106-99-0	0.0001 - 5
Supplier notification	: Ethylene	74-85-1	0.02 - 10
	Propylene	115-07-1	0.05 - 10
	Hexane	110-54-3	0.005 - 5
	Hydrogen Sulfide	7783-06-4	0.0001 - 5
	1,3-Butadiene	106-99-0	0.0001 - 5

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

California Prop. 65 : **WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Carbon Monoxide	No.	Yes.	No.	No.
1,3-Butadiene	Yes.	Yes.	Yes.	No.

Canada

WHMIS (Canada) : Class A: Compressed gas.
 Class B-1: Flammable gas.
 Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
 Class D-2A: Material causing other toxic effects (Very toxic).
 Class D-2B: Material causing other toxic effects (Toxic).

Flammable Gas Mixture: 1 Butene / 1 Pentene / 1,3 Butadiene / 2-Methyl-2-Butene / Acetylene / Carbon Dioxide / Carbon Monoxide / Cis-2-Butene / Cis-2-Pentene / Cyclopropane / Ethane / Ethylene / Hexane / Hydrogen / Hydrogen Sulfide / Isobutane / Isobutylene / Isopentane / Methane / N Butane / N Pentane / Nitrogen / Oxygen / Propane / Propadiene / Propylene / Trans-2-Butene / Trans-2-Pentene

Section 16. Other information

United States

Label requirements

: FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
MAY BE FATAL IF INHALED.
MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.
CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
CONTENTS UNDER PRESSURE.

Canada

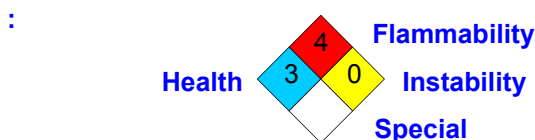
Label requirements

: Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Hazardous Material Information System (U.S.A.)

Health	*	3
Flammability		4
Physical hazards		0

National Fire Protection Association (U.S.A.)



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.