

# Material Safety Data Sheet



Flammable Gas Mixture: 1 Butene / 1 Pentene / Carbon Dioxide / Carbon Monoxide / Cis-2-Butene / Ethane / Ethylene / Hexane / Hydrogen / Hydrogen Sulfide / Isobutane / Isobutylene / Isopentane / Methane / N Butane / Nitrogen / Propane / Propylene / Trans-2-Butene

## Section 1. Chemical product and company identification

- Product name** : Flammable Gas Mixture: 1 Butene / 1 Pentene / Carbon Dioxide / Carbon Monoxide / Cis-2-Butene / Ethane / Ethylene / Hexane / Hydrogen / Hydrogen Sulfide / Isobutane / Isobutylene / Isopentane / Methane / N Butane / Nitrogen / Propane / Propylene / Trans-2-Butene
- 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 #** : 009133
- Date of Preparation/Revision** : 7/1/2009.
- 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 MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.  
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 may cause target organ damage, based on animal data. 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 may cause damage to the following organs: blood, lungs, the nervous system, heart, peripheral nervous system, cardiovascular system, upper respiratory tract, skin, eyes, central nervous system (CNS), 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
- Potential chronic health effects** : **CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [1-Propene]. Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [Ethene]. Classified A4 (Not classifiable for humans or animals.) by ACGIH [1-Propene, 2-methyl-].  
**MUTAGENIC EFFECTS:** Not available.  
**TERATOGENIC EFFECTS:** Not available.

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**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>
Methane	74-82-8	14.4 - 99	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 1000 ppm 8 hour(s).
Nitrogen	7727-37-9	1 - 99	Oxygen Depletion [Asphyxiant]
Propane	74-98-6	0.1 - 86	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 1000 ppm 8 hour(s). <b>NIOSH REL (United States, 6/2008).</b> TWA: 1800 mg/m <sup>3</sup> 10 hour(s). TWA: 1000 ppm 10 hour(s). <b>OSHA PEL (United States, 11/2006).</b> TWA: 1800 mg/m <sup>3</sup> 8 hour(s). TWA: 1000 ppm 8 hour(s). <b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 1800 mg/m <sup>3</sup> 8 hour(s). TWA: 1000 ppm 8 hour(s).
Propylene	115-07-1	0.05 - 86	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 500 ppm 8 hour(s). <b>ACGIH TLV (United States, 1/2005).</b> TWA: 500 ppm 8 hour(s). Form: All forms
Ethane	74-84-0	0.1 - 20	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 1000 ppm 8 hour(s).
Ethylene	74-85-1	0.02 - 20	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 200 ppm 8 hour(s).
Hydrogen	1333-74-0	1 - 20	Oxygen Depletion [Asphyxiant]
Carbon Dioxide	124-38-9	0.1 - 10	<b>ACGIH TLV (United States, 1/2008).</b> STEL: 54000 mg/m <sup>3</sup> 15 minute(s). STEL: 30000 ppm 15 minute(s). TWA: 9000 mg/m <sup>3</sup> 8 hour(s). TWA: 5000 ppm 8 hour(s). <b>NIOSH REL (United States, 6/2008).</b> STEL: 54000 mg/m <sup>3</sup> 15 minute(s). STEL: 30000 ppm 15 minute(s). TWA: 9000 mg/m <sup>3</sup> 10 hour(s). TWA: 5000 ppm 10 hour(s). <b>OSHA PEL (United States, 11/2006).</b> TWA: 9000 mg/m <sup>3</sup> 8 hour(s). TWA: 5000 ppm 8 hour(s). <b>OSHA PEL 1989 (United States, 3/1989).</b> STEL: 54000 mg/m <sup>3</sup> 15 minute(s). STEL: 30000 ppm 15 minute(s). TWA: 18000 mg/m <sup>3</sup> 8 hour(s). TWA: 10000 ppm 8 hour(s).
Hydrogen Sulfide	7783-06-4	0.0001 - 7	<b>ACGIH TLV (United States, 1/2008).</b> STEL: 21 mg/m <sup>3</sup> 15 minute(s). STEL: 15 ppm 15 minute(s). TWA: 14 mg/m <sup>3</sup> 8 hour(s). TWA: 10 ppm 8 hour(s). <b>NIOSH REL (United States, 6/2008).</b> CEIL: 15 mg/m <sup>3</sup> 10 minute(s). CEIL: 10 ppm 10 minute(s). <b>OSHA PEL 1989 (United States, 3/1989).</b> STEL: 21 mg/m <sup>3</sup> 15 minute(s). STEL: 15 ppm 15 minute(s). TWA: 14 mg/m <sup>3</sup> 8 hour(s).

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TWA: 10 ppm 8 hour(s).  
**OSHA PEL Z2 (United States, 11/2006).**  
 AMP: 50 ppm 10 minute(s).  
 CEIL: 20 ppm

1-Butene	106-98-9	0.1 - 5	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 250 ppm 8 hour(s).
1-Pentene	109-67-1	0.1 - 5	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 29 mg/m <sup>3</sup> 8 hour(s). TWA: 25 ppm 8 hour(s). <b>NIOSH REL (United States, 6/2008).</b> CEIL: 229 mg/m <sup>3</sup> CEIL: 200 ppm TWA: 40 mg/m <sup>3</sup> 10 hour(s). TWA: 35 ppm 10 hour(s). <b>OSHA PEL (United States, 11/2006).</b> TWA: 55 mg/m <sup>3</sup> 8 hour(s). TWA: 50 ppm 8 hour(s). <b>OSHA PEL 1989 (United States, 3/1989).</b> CEIL: 229 mg/m <sup>3</sup> CEIL: 200 ppm TWA: 40 mg/m <sup>3</sup> 8 hour(s). TWA: 35 ppm 8 hour(s).
Carbon Monoxide	630-08-0	0.0001 - 5	
Cis-2-Butene	590-18-1	0.1 - 5	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 250 ppm 8 hour(s).
N-Hexane	110-54-3	0.0001 - 5	<b>ACGIH TLV (United States, 1/2008).</b> <b>Absorbed through skin.</b> TWA: 50 ppm 8 hour(s). <b>NIOSH REL (United States, 6/2008).</b> TWA: 180 mg/m <sup>3</sup> 10 hour(s). TWA: 50 ppm 10 hour(s). <b>OSHA PEL (United States, 11/2006).</b> TWA: 1800 mg/m <sup>3</sup> 8 hour(s). TWA: 500 ppm 8 hour(s). <b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 180 mg/m <sup>3</sup> 8 hour(s). TWA: 50 ppm 8 hour(s).
Isobutane	75-28-5	0.01 - 5	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 1000 ppm 8 hour(s). <b>NIOSH REL (United States, 6/2008).</b> TWA: 1900 mg/m <sup>3</sup> 10 hour(s). TWA: 800 ppm 10 hour(s).
Isobutylene	115-11-7	0.1 - 5	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 250 ppm 8 hour(s).
Trans-2-Butene	624-64-6	0.1 - 5	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 250 ppm 8 hour(s).
Isopentane	78-78-4	0.01 - 5	<b>ACGIH TLV (United States, 1/2008).</b> TWA: 600 ppm 8 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 sulfide (H<sub>2</sub>S)).
- Flash point** : Lowest known value: Closed cup: -188.15°C (-306.7°F). (Methane)
- Flammable limits** : Greatest known range: Lower: 4% Upper: 75% (Hydrogen)
- 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 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

Methane

**ACGIH TLV (United States, 1/2008).**

TWA: 1000 ppm 8 hour(s).

Nitrogen

Oxygen Depletion [Asphyxiant]

Propane

**ACGIH TLV (United States, 1/2008).**

TWA: 1000 ppm 8 hour(s).

**NIOSH REL (United States, 6/2008).**

TWA: 1800 mg/m<sup>3</sup> 10 hour(s).

TWA: 1000 ppm 10 hour(s).

**OSHA PEL (United States, 11/2006).**

TWA: 1800 mg/m<sup>3</sup> 8 hour(s).

TWA: 1000 ppm 8 hour(s).

**OSHA PEL 1989 (United States, 3/1989).**

TWA: 1800 mg/m<sup>3</sup> 8 hour(s).

TWA: 1000 ppm 8 hour(s).

1-Propene

**ACGIH TLV (United States, 1/2008).**

TWA: 500 ppm 8 hour(s).

**ACGIH TLV (United States, 1/2005).**

TWA: 500 ppm 8 hour(s). Form: All forms

Ethane

**ACGIH TLV (United States, 1/2008).**

TWA: 1000 ppm 8 hour(s).

Ethene

**ACGIH TLV (United States, 1/2008).**

TWA: 200 ppm 8 hour(s).

Hydrogen

Oxygen Depletion [Asphyxiant]

Carbon dioxide

**ACGIH TLV (United States, 1/2008).**

STEL: 54000 mg/m<sup>3</sup> 15 minute(s).

STEL: 30000 ppm 15 minute(s).

TWA: 9000 mg/m<sup>3</sup> 8 hour(s).

TWA: 5000 ppm 8 hour(s).

**NIOSH REL (United States, 6/2008).**

STEL: 54000 mg/m<sup>3</sup> 15 minute(s).

STEL: 30000 ppm 15 minute(s).

TWA: 9000 mg/m<sup>3</sup> 10 hour(s).

TWA: 5000 ppm 10 hour(s).

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	<p><b>OSHA PEL (United States, 11/2006).</b> TWA: 9000 mg/m<sup>3</sup> 8 hour(s). TWA: 5000 ppm 8 hour(s).</p> <p><b>OSHA PEL 1989 (United States, 3/1989).</b> STEL: 54000 mg/m<sup>3</sup> 15 minute(s). STEL: 30000 ppm 15 minute(s). TWA: 18000 mg/m<sup>3</sup> 8 hour(s). TWA: 10000 ppm 8 hour(s).</p>
Hydrogen sulfide (H2S)	<p><b>ACGIH TLV (United States, 1/2008).</b> STEL: 21 mg/m<sup>3</sup> 15 minute(s). STEL: 15 ppm 15 minute(s). TWA: 14 mg/m<sup>3</sup> 8 hour(s). TWA: 10 ppm 8 hour(s).</p> <p><b>NIOSH REL (United States, 6/2008).</b> CEIL: 15 mg/m<sup>3</sup> 10 minute(s). CEIL: 10 ppm 10 minute(s).</p> <p><b>OSHA PEL 1989 (United States, 3/1989).</b> STEL: 21 mg/m<sup>3</sup> 15 minute(s). STEL: 15 ppm 15 minute(s). TWA: 14 mg/m<sup>3</sup> 8 hour(s). TWA: 10 ppm 8 hour(s).</p> <p><b>OSHA PEL Z2 (United States, 11/2006).</b> AMP: 50 ppm 10 minute(s). CEIL: 20 ppm</p>
1-Butene	<p><b>ACGIH TLV (United States, 1/2008).</b> TWA: 250 ppm 8 hour(s).</p>
1-Pentene	
Carbon monoxide	<p><b>ACGIH TLV (United States, 1/2008).</b> TWA: 29 mg/m<sup>3</sup> 8 hour(s). TWA: 25 ppm 8 hour(s).</p> <p><b>NIOSH REL (United States, 6/2008).</b> CEIL: 229 mg/m<sup>3</sup> CEIL: 200 ppm TWA: 40 mg/m<sup>3</sup> 10 hour(s). TWA: 35 ppm 10 hour(s).</p> <p><b>OSHA PEL (United States, 11/2006).</b> TWA: 55 mg/m<sup>3</sup> 8 hour(s). TWA: 50 ppm 8 hour(s).</p> <p><b>OSHA PEL 1989 (United States, 3/1989).</b> CEIL: 229 mg/m<sup>3</sup> CEIL: 200 ppm TWA: 40 mg/m<sup>3</sup> 8 hour(s). TWA: 35 ppm 8 hour(s).</p>
2-Butene, (2Z)-	<p><b>ACGIH TLV (United States, 1/2008).</b> TWA: 250 ppm 8 hour(s).</p>
Hexane	<p><b>ACGIH TLV (United States, 1/2008). Absorbed through skin.</b> TWA: 50 ppm 8 hour(s).</p> <p><b>NIOSH REL (United States, 6/2008).</b> TWA: 180 mg/m<sup>3</sup> 10 hour(s). TWA: 50 ppm 10 hour(s).</p> <p><b>OSHA PEL (United States, 11/2006).</b> TWA: 1800 mg/m<sup>3</sup> 8 hour(s). TWA: 500 ppm 8 hour(s).</p> <p><b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 180 mg/m<sup>3</sup> 8 hour(s). TWA: 50 ppm 8 hour(s).</p>
Isobutane	<p><b>ACGIH TLV (United States, 1/2008).</b> TWA: 1000 ppm 8 hour(s).</p> <p><b>NIOSH REL (United States, 6/2008).</b> TWA: 1900 mg/m<sup>3</sup> 10 hour(s).</p>

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1-Propene, 2-methyl-

TWA: 800 ppm 10 hour(s).  
**ACGIH TLV (United States, 1/2008).**

2-Butene, (2E)-

TWA: 250 ppm 8 hour(s).  
**ACGIH TLV (United States, 1/2008).**

Butane, 2-methyl-

TWA: 250 ppm 8 hour(s).  
**ACGIH TLV (United States, 1/2008).**  
 TWA: 600 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

## Section 9. Physical and chemical properties

- Melting/freezing point** : -82.8°C (-117°F) This is based on data for the following ingredient: Hydrogen sulfide (H<sub>2</sub>S). Weighted average: -188.42°C (-307.2°F)
- Critical temperature** : Lowest known value: -240.1°C (-400.2°F) (Hydrogen).
- Vapor density** : Highest known value: 2 (Air = 1) (Isobutane ). Weighted average: 1.11 (Air = 1)
- Gas Density (lb/ft<sup>3</sup>)** : 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.
- 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 dioxide	LC50 Inhalation Gas.	Rat	470000 ppm	30 minutes	
Hydrogen sulfide (H <sub>2</sub> S)	LC50 Inhalation Vapor	Rat	820 mg/m <sup>3</sup>	3 hours	
	LC50 Inhalation Vapor	Rat	700 mg/m <sup>3</sup>	4 hours	
	LC50 Inhalation Vapor	Rat	470 mg/m <sup>3</sup>	6 hours	
	LC50 Inhalation Gas.	Mouse	634 ppm	1 hours	
	LC50 Inhalation Gas.	Rat	712 ppm	1 hours	
	Carbon monoxide	TDLo Intraperitoneal	Rat	35 mL/kg	-
		LC50 Inhalation Vapor	Rat	13500 mg/m <sup>3</sup>	15 minutes
LC50 Inhalation Vapor		Rat	1900 mg/m <sup>3</sup>	4 hours	
LC50 Inhalation Gas.		Rat	3760 ppm	1 hours	
LC50 Inhalation Gas.		Mouse	2444 ppm	4 hours	
LC50 Inhalation Gas.		Rat	6600 ppm	30 minutes	
LC50 Inhalation Gas.		Rat	1807 ppm	4 hours	
Hexane	LD50 Oral	Rat	25 g/kg	-	
	LDLo Intraperitoneal	Rat	9100 mg/kg	-	
	TDLo Oral	Rat	20000 mg/kg	-	
	LC50 Inhalation Vapor	Rat	627000 mg/m <sup>3</sup>	3 minutes	

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	LC50 Inhalation Vapor	Rat	96000 ppm	1 hours
	LC50 Inhalation Gas.	Rat	48000 ppm	4 hours
Isobutane	LC50 Inhalation Vapor	Rat	658000 mg/m3	4 hours
	LC50 Inhalation Gas.	Rat	57 pph	15 minutes
1-Propene, 2-methyl-	LC50 Inhalation Vapor	Rat	550000 mg/m3	4 hours
Butane, 2-methyl-	LC50 Inhalation Vapor	Rat	280000 mg/m3	4 hours

**Chronic effects on humans** : **CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [1-Propene]. Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [Ethene]. Classified A4 (Not classifiable for humans or animals.) by ACGIH [1-Propene, 2-methyl-].  
Contains material which may cause damage to the following organs: blood, lungs, the nervous system, heart, peripheral nervous system, cardiovascular system, upper respiratory tract, skin, eyes, central nervous system (CNS), muscle tissue.

**Other toxic effects on humans** : Hazardous by the following route of exposure: of skin contact (irritant).

**Specific effects**

**Carcinogenic effects** : No known significant effects or critical hazards.

**Mutagenic effects** : No known significant effects or critical hazards.

**Reproduction toxicity** : No known significant effects or critical hazards.

**Section 12. Ecological information**

**Aquatic ecotoxicity**

Product/ingredient name	Test	Result	Species	Exposure
Hydrogen sulfide (H2S)	-	Acute EC50 770 ug/L Fresh water	Crustaceans - Amphipod - Crangonyx richmondensis lauren - 10 mm	48 hours
	-	Acute EC50 540 ug/L Fresh water	Crustaceans - Amphipod - Crangonyx richmondensis lauren - 10 mm	48 hours
	-	Acute LC50 7 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - FRY	96 hours
	-	Acute LC50 4 ug/L Fresh water	Fish - Lake whitefish - Coregonus clupeaformis - Yolk-sac fry	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 - Yolk-sac fry	96 hours
	-	Acute LC50 <2 ug/L	Fish - Yellow	96 hours

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	Fresh water		perch - Perca flavescens - Yolk-sac fry	
	-	Acute LC50 2 ug/L Fresh water	Fish - Lake whitefish - Coregonus clupeaformis - Yolk-sac fry	96 hours
Hexane	-	Acute LC50 113000 ug/L Fresh water	Fish - Mozambique tilapia - Tilapia mossambica - 99 mm - 10 g	96 hours
	-	Acute LC50 2500 to 2980 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - 31 days - 20.4 mm - 0.123 g	96 hours

- Products of degradation** : Products of degradation: carbon oxides (CO, CO<sub>2</sub>) and water, nitrogen oxides (NO, NO<sub>2</sub> etc.), sulfur oxides (SO<sub>2</sub>, SO<sub>3</sub> etc.).
- Environmental fate** : Not available.
- Environmental hazards** : No known significant effects or critical hazards.
- Toxicity to the environment** : Not available.


### 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
<b>DOT Classification</b>	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		-
<b>TDG Classification</b>	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		<p><b>Explosive Limit and Limited Quantity Index</b> 0.125</p> <p><b>ERAP Index</b> 3000</p> <p><b>Passenger Carrying Ship Index</b> Forbidden</p> <p><b>Passenger Carrying Road or Rail Index</b> Forbidden</p>

**Flammable Gas Mixture: 1 Butene / 1 Pentene / Carbon Dioxide / Carbon Monoxide / Cis-2-Butene / Ethane / Ethylene / Hexane / Hydrogen / Hydrogen Sulfide / Isobutane / Isobutylene / Isopentane / Methane / N Butane / Nitrogen / Propane / Propylene / Trans-2-Butene**

<b>Mexico Classification</b>	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		-
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“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

## Section 15. Regulatory information

### United States

#### U.S. Federal regulations

: **United States inventory (TSCA 8b):** All components are listed or exempted.

**SARA 302/304/311/312 extremely hazardous substances:** Hydrogen sulfide (H2S)

**SARA 302/304 emergency planning and notification:** Hydrogen sulfide (H2S)

**SARA 302/304/311/312 hazardous chemicals:** 1-Pentene; Carbon dioxide ; Carbon monoxide; Ethane; Ethene; Hexane; Hydrogen; Hydrogen sulfide (H2S); Isobutane ; 1-Propene, 2-methyl-; Methane; Nitrogen; Propane; 1-Propene; Butane, 2-methyl-

**SARA 311/312 MSDS distribution - chemical inventory - hazard identification:** 1-Pentene: Fire hazard, Immediate (acute) health hazard; Carbon dioxide : Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard; Carbon monoxide: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard; Ethane: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard; Ethene: Fire hazard, reactive, Sudden release of pressure, Delayed (chronic) health hazard; Hexane: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; Hydrogen: Fire hazard, Sudden release of pressure; Hydrogen sulfide (H2S): Fire hazard, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard; Isobutane : Fire hazard, Sudden release of pressure; 1-Propene, 2-methyl-: Fire hazard, Sudden release of pressure; Methane: Fire hazard, Sudden release of pressure; Nitrogen: Sudden release of pressure; Propane: Fire hazard, Sudden release of pressure; 1-Propene: Fire hazard, Sudden release of pressure; Butane, 2-methyl-: Fire hazard

**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:** 1-Butene; 1-Pentene; 2-Butene, (2Z)-; Ethane; Ethene; Hydrogen; Hydrogen sulfide (H2S); Isobutane ; 1-Propene, 2-methyl-; Methane; Propane; 1-Propene; 2-Butene, (2E)-; Butane, 2-methyl-

**Clean Air Act (CAA) 112 regulated flammable substances:** 1-Butene; 1-Pentene; 2-Butene, (2Z)-; Ethane; Ethene; Hydrogen; Isobutane ; 1-Propene, 2-methyl-; Methane; Propane; 1-Propene; 2-Butene, (2E)-; Butane, 2-methyl-

**Clean Air Act (CAA) 112 regulated toxic substances:** Hydrogen sulfide (H2S)

### SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
<b>Form R - Reporting requirements</b>	: Propylene	115-07-1	0.05 - 86
	Ethylene	74-85-1	0.02 - 20
	Hydrogen Sulfide	7783-06-4	0.0001 - 7
	N-Hexane	110-54-3	0.0001 - 5
<b>Supplier notification</b>	: Propylene	115-07-1	0.05 - 86
	Ethylene	74-85-1	0.02 - 20
	Hydrogen Sulfide	7783-06-4	0.0001 - 7
	N-Hexane	110-54-3	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

: **Connecticut Carcinogen Reporting:** None of the components are listed.

**Connecticut Hazardous Material Survey:** None of the components are listed.

**Florida substances:** None of the components are listed.

**Illinois Chemical Safety Act:** None of the components are listed.

**Illinois Toxic Substances Disclosure to Employee Act:** None of the components are listed.

**Louisiana Reporting:** None of the components are listed.

**Flammable Gas Mixture: 1 Butene / 1 Pentene / Carbon Dioxide / Carbon Monoxide / Cis-2-Butene / Ethane / Ethylene / Hexane / Hydrogen / Hydrogen Sulfide / Isobutane / Isobutylene / Isopentane / Methane / N Butane / Nitrogen / Propane / Propylene / Trans-2-Butene**

**Louisiana Spill:** None of the components are listed.

**Massachusetts Spill:** None of the components are listed.

**Massachusetts Substances:** The following components are listed: PROPYLENE (PROPENE); PROPANE; NITROGEN; METHANE; HYDROGEN SULFIDE; HYDROGEN; ETHYLENE; ETHANE; CARBON DIOXIDE; 1-BUTENE; 1-PENTENE; CARBON MONOXIDE; 2-BUTENE-CIS; HEXANE; ISOBUTANE; 2-METHYLPROPENE; 2-BUTENE-TRANS; ISOPENTANE

**Michigan Critical Material:** None of the components are listed.

**Minnesota Hazardous Substances:** None of the components are listed.

**New Jersey Hazardous Substances:** The following components are listed: PROPYLENE; PROPANE; NITROGEN (COMPRESSED OR LIQUIFIED); METHANE; HYDROGEN SULFIDE; HYDROGEN; ETHYLENE; ETHANE; CARBON DIOXIDE; CARBON MONOXIDE; n-HEXANE; Isobutane; ISOBUTYLENE; ISOPENTANE

**New Jersey Spill:** None of the components are listed.

**New Jersey Toxic Catastrophe Prevention Act:** None of the components are listed.

**New York Acutely Hazardous Substances:** The following components are listed: Hydrogen sulfide; Hexane

**New York Toxic Chemical Release Reporting:** None of the components are listed.

**Pennsylvania RTK Hazardous Substances:** The following components are listed: 1-PROPENE; PROPANE; NITROGEN; METHANE; HYDROGEN SULFIDE (H2S); HYDROGEN; ETHENE; ETHANE; CARBON DIOXIDE; 1-BUTENE; 1-PENTENE; CARBON MONOXIDE; 2-BUTENE, (Z)-; HEXANE; PROPANE, 2-METHYL-; 1-PROPENE, 2-METHYL-; 2-BUTENE, (E)-; BUTANE, 2-METHYL-

**Rhode Island Hazardous Substances:** None of the components are listed.

**California Prop. 65**

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

Ingredient name

Cancer

Reproductive

No significant risk level

Maximum acceptable dosage level

Carbon Monoxide

No.

Yes.

No.

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).

**CEPA Toxic substances:** The following components are listed: Methane; Volatile organic compounds; Carbon dioxide

**Canadian ARET:** None of the components are listed.

**Canadian NPRI:** The following components are listed: Propylene; Propane; Volatile organic compounds; Hydrogen sulphide; Ethylene; Volatile organic compounds; Butene; Carbon monoxide; Butene; n-Hexane; Butane; Butene; Pentane

**Alberta Designated Substances:** None of the components are listed.

**Ontario Designated Substances:** None of the components are listed.

**Quebec Designated Substances:** None of the components are listed.

**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 MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.  
CONTENTS UNDER PRESSURE.

**Canada**

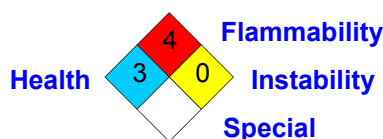
**Flammable Gas Mixture: 1 Butene / 1 Pentene / Carbon Dioxide / Carbon Monoxide / Cis-2-Butene / Ethane / Ethylene / Hexane / Hydrogen / Hydrogen Sulfide / Isobutane / Isobutylene / Isopentane / Methane / N Butane / Nitrogen / Propane / Propylene / Trans-2-Butene**

**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.