

Material Safety Data Sheet



Flammable Gas Mixture: 1 Butene / 1 Hexene / Benzene / Ethane / Ethylene / Heptane / Hexane / Isobutane / Methane / N Butane / N Pentane / Nitrogen / Nonane / Octane / Propane

Section 1. Chemical product and company identification

- Product name** : Flammable Gas Mixture: 1 Butene / 1 Hexene / Benzene / Ethane / Ethylene / Heptane / Hexane / Isobutane / Methane / N Butane / N Pentane / Nitrogen / Nonane / Octane / Propane
- 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 #** : 008588
- Date of Preparation/Revision** : **3/19/2009.**
- In case of emergency** : 1-866-734-3438

Section 2. Hazards identification

- Physical state** : Gas.
DANGER!
FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
CONTENTS UNDER PRESSURE.
Keep away from heat, sparks and flame. Do not puncture or incinerate container. Contains material that may cause target organ damage, based on animal data. Risk of cancer depends on duration and level of exposure. Use only with adequate ventilation. Keep container closed.
Contact with rapidly expanding gases can cause frostbite.
- Target organs** : Contains material which may cause damage to the following organs: lungs, the nervous system, mucous membranes, heart, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea, muscle tissue.
- Routes of entry** : Inhalation Dermal Eyes
- Potential acute health effects**
- Eyes** : Slightly irritating to the eyes. Contact with rapidly expanding gas may cause burns or frostbite.
- Skin** : Slightly irritating to the skin. Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : Slightly 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 [ethylene]. Classified A1 (Confirmed for humans.) by ACGIH, 1 (Proven for humans.) by IARC, 1 (Known to be human carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH [benzene].
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.

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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>
Nitrogen	7727-37-9	1 - 93	Oxygen Depletion [Asphyxiant]
N-Butane	106-97-8	5 - 20	ACGIH TLV (United States, 1/2008). TWA: 1000 ppm 8 hour(s). NIOSH REL (United States, 6/2008). TWA: 1900 mg/m ³ 10 hour(s). TWA: 800 ppm 10 hour(s). OSHA PEL 1989 (United States, 3/1989). TWA: 1900 mg/m ³ 8 hour(s). TWA: 800 ppm 8 hour(s).
Propane	74-98-6	0.1 - 20	ACGIH TLV (United States, 1/2008). TWA: 1000 ppm 8 hour(s). NIOSH REL (United States, 6/2008). TWA: 1800 mg/m ³ 10 hour(s). TWA: 1000 ppm 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 1800 mg/m ³ 8 hour(s). TWA: 1000 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). TWA: 1800 mg/m ³ 8 hour(s). TWA: 1000 ppm 8 hour(s).
1-Butene	106-98-9	0.1 - 10	ACGIH TLV (United States, 1/2008). TWA: 250 ppm 8 hour(s).
Ethane	74-84-0	0.1 - 10	ACGIH TLV (United States, 1/2008). TWA: 1000 ppm 8 hour(s).
Ethylene	74-85-1	0.02 - 10	ACGIH TLV (United States, 1/2008). TWA: 200 ppm 8 hour(s).
Isobutane	75-28-5	1 - 10	ACGIH TLV (United States, 1/2008). TWA: 1000 ppm 8 hour(s). NIOSH REL (United States, 6/2008). TWA: 1900 mg/m ³ 10 hour(s). TWA: 800 ppm 10 hour(s).
Methane	74-82-8	0.1 - 10	ACGIH TLV (United States, 1/2008). TWA: 1000 ppm 8 hour(s).
1-Hexene	592-41-6	0.0001 - 5	ACGIH TLV (United States, 1/2008). TWA: 50 ppm 8 hour(s).
n-Heptane	142-82-5	0.0001 - 5	ACGIH TLV (United States, 1/2008). STEL: 2050 mg/m ³ 15 minute(s). STEL: 500 ppm 15 minute(s). TWA: 1640 mg/m ³ 8 hour(s). TWA: 400 ppm 8 hour(s). NIOSH REL (United States, 6/2008). CEIL: 1800 mg/m ³ 15 minute(s). CEIL: 440 ppm 15 minute(s). TWA: 350 mg/m ³ 10 hour(s). TWA: 85 ppm 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 2000 mg/m ³ 8 hour(s). TWA: 500 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 2000 mg/m ³ 15 minute(s). STEL: 500 ppm 15 minute(s). TWA: 1600 mg/m ³ 8 hour(s). TWA: 400 ppm 8 hour(s).
Hexane	110-54-3	0.0001 - 5	ACGIH TLV (United States, 1/2008). Absorbed through skin. TWA: 50 ppm 8 hour(s). NIOSH REL (United States, 6/2008).

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			<p>TWA: 180 mg/m³ 10 hour(s). TWA: 50 ppm 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 1800 mg/m³ 8 hour(s). TWA: 500 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). TWA: 180 mg/m³ 8 hour(s). TWA: 50 ppm 8 hour(s).</p>
N-Pentane	109-66-0	0.1 - 5	<p>ACGIH TLV (United States, 1/2008). TWA: 600 ppm 8 hour(s). NIOSH REL (United States, 6/2008). CEIL: 1800 mg/m³ 15 minute(s). CEIL: 610 ppm 15 minute(s). TWA: 350 mg/m³ 10 hour(s). TWA: 120 ppm 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 2950 mg/m³ 8 hour(s). TWA: 1000 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 2250 mg/m³ 15 minute(s). STEL: 750 ppm 15 minute(s). TWA: 1800 mg/m³ 8 hour(s). TWA: 600 ppm 8 hour(s).</p>
Nonane	111-84-2	0.01 - 5	<p>ACGIH TLV (United States, 1/2007). TWA: 1050 mg/m³ 8 hour(s). TWA: 200 ppm 8 hour(s). NIOSH REL (United States, 12/2001). TWA: 1050 mg/m³ 10 hour(s). TWA: 200 ppm 10 hour(s). OSHA PEL 1989 (United States, 3/1989). TWA: 1050 mg/m³ 8 hour(s). TWA: 200 ppm 8 hour(s).</p>
Octane	111-65-9	0.01 - 5	<p>ACGIH TLV (United States, 1/2008). TWA: 300 ppm 8 hour(s). NIOSH REL (United States, 6/2008). CEIL: 1800 mg/m³ 15 minute(s). CEIL: 385 ppm 15 minute(s). TWA: 350 mg/m³ 10 hour(s). TWA: 75 ppm 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 2350 mg/m³ 8 hour(s). TWA: 500 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 1800 mg/m³ 15 minute(s). STEL: 375 ppm 15 minute(s). TWA: 1450 mg/m³ 8 hour(s). TWA: 300 ppm 8 hour(s).</p>
Benzene	71-43-2	0.00005 - 0.9	<p>ACGIH TLV (United States, 1/2008). Absorbed through skin. STEL: 8 mg/m³ 15 minute(s). STEL: 2.5 ppm 15 minute(s). TWA: 1.6 mg/m³ 8 hour(s). TWA: 0.5 ppm 8 hour(s). NIOSH REL (United States, 6/2008). STEL: 1 ppm 15 minute(s). TWA: 0.1 ppm 10 hour(s). OSHA PEL (United States, 11/2006). STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s).</p>

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OSHA PEL Z2 (United States, 11/2006).

AMP: 50 ppm 10 minute(s).

CEIL: 25 ppm

TWA: 10 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.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : 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: 286.85°C (548.3°F) (butane).
- Flash point** : Lowest known value: Closed cup: -188.15°C (-306.7°F). (methane)
- Flammable limits** : Greatest known range: Lower: 2.7% Upper: 36% (ethylene)
- Products of combustion** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen 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.

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Section 7. Handling and storage

- Handling** : Use only with adequate ventilation. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. 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. 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).

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.

Product name

nitrogen
butane

Oxygen Depletion [Asphyxiant]
ACGIH TLV (United States, 1/2008).
TWA: 1000 ppm 8 hour(s).
NIOSH REL (United States, 6/2008).
TWA: 1900 mg/m³ 10 hour(s).
TWA: 800 ppm 10 hour(s).
OSHA PEL 1989 (United States, 3/1989).
TWA: 1900 mg/m³ 8 hour(s).
TWA: 800 ppm 8 hour(s).

propane

ACGIH TLV (United States, 1/2008).
TWA: 1000 ppm 8 hour(s).
NIOSH REL (United States, 6/2008).
TWA: 1800 mg/m³ 10 hour(s).
TWA: 1000 ppm 10 hour(s).
OSHA PEL (United States, 11/2006).
TWA: 1800 mg/m³ 8 hour(s).
TWA: 1000 ppm 8 hour(s).
OSHA PEL 1989 (United States, 3/1989).
TWA: 1800 mg/m³ 8 hour(s).
TWA: 1000 ppm 8 hour(s).

but-1-ene

ACGIH TLV (United States, 1/2008).

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	TWA: 250 ppm 8 hour(s).
ethane	ACGIH TLV (United States, 1/2008). TWA: 1000 ppm 8 hour(s).
ethylene	ACGIH TLV (United States, 1/2008). TWA: 200 ppm 8 hour(s).
isobutane	ACGIH TLV (United States, 1/2008). TWA: 1000 ppm 8 hour(s). NIOSH REL (United States, 6/2008). TWA: 1900 mg/m ³ 10 hour(s). TWA: 800 ppm 10 hour(s).
methane	ACGIH TLV (United States, 1/2008). TWA: 1000 ppm 8 hour(s).
hex-1-ene	ACGIH TLV (United States, 1/2008). TWA: 50 ppm 8 hour(s).
heptane	ACGIH TLV (United States, 1/2008). STEL: 2050 mg/m ³ 15 minute(s). STEL: 500 ppm 15 minute(s). TWA: 1640 mg/m ³ 8 hour(s). TWA: 400 ppm 8 hour(s). NIOSH REL (United States, 6/2008). CEIL: 1800 mg/m ³ 15 minute(s). CEIL: 440 ppm 15 minute(s). TWA: 350 mg/m ³ 10 hour(s). TWA: 85 ppm 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 2000 mg/m ³ 8 hour(s). TWA: 500 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 2000 mg/m ³ 15 minute(s). STEL: 500 ppm 15 minute(s). TWA: 1600 mg/m ³ 8 hour(s). TWA: 400 ppm 8 hour(s).
n-hexane	ACGIH TLV (United States, 1/2008). Absorbed through skin. TWA: 50 ppm 8 hour(s). NIOSH REL (United States, 6/2008). TWA: 180 mg/m ³ 10 hour(s). TWA: 50 ppm 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 1800 mg/m ³ 8 hour(s). TWA: 500 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). TWA: 180 mg/m ³ 8 hour(s). TWA: 50 ppm 8 hour(s).
pentane	ACGIH TLV (United States, 1/2008). TWA: 600 ppm 8 hour(s). NIOSH REL (United States, 6/2008). CEIL: 1800 mg/m ³ 15 minute(s). CEIL: 610 ppm 15 minute(s). TWA: 350 mg/m ³ 10 hour(s). TWA: 120 ppm 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 2950 mg/m ³ 8 hour(s). TWA: 1000 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 2250 mg/m ³ 15 minute(s). STEL: 750 ppm 15 minute(s). TWA: 1800 mg/m ³ 8 hour(s). TWA: 600 ppm 8 hour(s).
nonane	ACGIH TLV (United States, 1/2007). TWA: 1050 mg/m ³ 8 hour(s). TWA: 200 ppm 8 hour(s). NIOSH REL (United States, 12/2001).

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octane	TWA: 1050 mg/m ³ 10 hour(s). TWA: 200 ppm 10 hour(s). OSHA PEL 1989 (United States, 3/1989). TWA: 1050 mg/m ³ 8 hour(s). TWA: 200 ppm 8 hour(s). ACGIH TLV (United States, 1/2008). TWA: 300 ppm 8 hour(s). NIOSH REL (United States, 6/2008). CEIL: 1800 mg/m ³ 15 minute(s). CEIL: 385 ppm 15 minute(s). TWA: 350 mg/m ³ 10 hour(s). TWA: 75 ppm 10 hour(s). OSHA PEL (United States, 11/2006). TWA: 2350 mg/m ³ 8 hour(s). TWA: 500 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 1800 mg/m ³ 15 minute(s). STEL: 375 ppm 15 minute(s). TWA: 1450 mg/m ³ 8 hour(s). TWA: 300 ppm 8 hour(s).
benzene	ACGIH TLV (United States, 1/2008). Absorbed through skin. STEL: 8 mg/m ³ 15 minute(s). STEL: 2.5 ppm 15 minute(s). TWA: 1.6 mg/m ³ 8 hour(s). TWA: 0.5 ppm 8 hour(s). NIOSH REL (United States, 6/2008). STEL: 1 ppm 15 minute(s). TWA: 0.1 ppm 10 hour(s). OSHA PEL (United States, 11/2006). STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s). OSHA PEL Z2 (United States, 11/2006). AMP: 50 ppm 10 minute(s). CEIL: 25 ppm TWA: 10 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Melting/freezing point	: -135.4°C (-211.7°F) This is based on data for the following ingredient: butane. Weighted average: -189.32°C (-308.8°F)
Critical temperature	: Lowest known value: -146.9°C (-232.4°F) (nitrogen).
Vapor density	: Highest known value: 2 (Air = 1) (butane). Weighted average: 1.24 (Air = 1)
Gas Density (lb/ft³)	: Weighted average: 0.1

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
butane	LC50 Inhalation Vapor	Rat	658 g/m3	4 hours
isobutane	LC50 Inhalation Vapor	Rat	658000 mg/m3	4 hours
	LC50 Inhalation Gas.	Rat	57 pph	15 minutes
hex-1-ene	LD Dermal	Rabbit	>10 g/kg	-
	LD Oral	Rat	>10 g/kg	-
	LC50 Inhalation Gas.	Rat	32000 ppm	4 hours
heptane	LC50 Inhalation Vapor	Rat	103 g/m3	4 hours
	LC50 Inhalation Vapor	Rat	50242 ppm	1 hours
n-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/m3	3 minutes
	LC50 Inhalation Gas.	Rat	48000 ppm	4 hours
pentane	LD50 Oral	Rat	>2000 mg/kg	-
	LC50 Inhalation Vapor	Rat	364 g/m3	4 hours
octane	LC50 Inhalation Vapor	Rat	118 g/m3	4 hours
	LC50 Inhalation Gas.	Rat	25260 ppm	4 hours
benzene	LD50 Dermal	Rabbit	>9400 uL/kg	-
	LD50 Intraperitoneal	Rat	1100 ug/kg	-
	LD50 Oral	Rat	1800 mg/kg	-
	LD50 Oral	Rat	930 mg/kg	-
	LD50 Oral	Rat	1 mL/kg	-
	LD50 Oral	Rat	6400 mg/kg	-
	LDLo Subcutaneous	Rat	5 mg/kg	-
	TDLo Dermal	Rat	0.92 mL/kg	-
	TDLo Oral	Rat	320 mg/kg	-
	TDLo Oral	Rat	1280 mg/kg	-
	LC50 Inhalation Gas.	Rat	10000 ppm	7 hours
	LC50 Inhalation Gas.	Rat	10000 ppm	7 hours

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 A1 (Confirmed for humans.) by ACGIH, 1 (Proven for humans.) by IARC, 1 (Known to be human carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH [benzene]. Contains material which may cause damage to the following organs: lungs, the nervous system, mucous membranes, heart, peripheral nervous system, upper respiratory tract, skin, 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.

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 - 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
heptane	-	Acute LC50 4924000 ug/L Fresh water	Fish - Western mosquitofish - Gambusia affinis - Adult	96 hours
	-	Acute LC50 375000 ug/L Fresh water	Fish - Mozambique tilapia - Tilapia mossambica - 99 mm - 10 g	96 hours
benzene	-	Acute EC50 98800 ug/L Fresh water	Crustaceans - Brine shrimp - Artemia sp. - Nauplii	48 hours
	-	Acute EC50 58400 to 82300 ug/L Fresh water	Crustaceans - Brine shrimp - Artemia sp. - Nauplii	48 hours
	-	Acute EC50 22000 to 29500 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <=24 hours	48 hours
	-	Acute EC50 11730 to 15600 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <=24 hours	48 hours
	-	Acute EC50 10000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Juvenile (Fledgling, Hatchling, Weanling)	48 hours
	-	Acute EC50 9230 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <=24 hours	48 hours
	-	Acute LC50 96200 to 134100 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <=24 hours	48 hours
	-	Acute LC50 76900 to 114100 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <=24 hours	48 hours
	-	Acute LC50 59600 to 80700 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <=24 hours	48 hours

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-	Acute LC50 35 to 43.8 ppm Marine water	Crustaceans - Daggerblade grass shrimp - Palaemonetes pugio - Adult	48 hours
-	Acute LC50 35000 ug/L Marine water	Crustaceans - Daggerblade grass shrimp - Palaemonetes pugio	48 hours
-	Acute LC50 33000 ug/L Marine water	Crustaceans - Daggerblade grass shrimp - Palaemonetes pugio	48 hours
-	Acute LC50 135700 to 168800 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <=24 hours	48 hours
-	Acute LC50 21000 ug/L Marine water	Crustaceans - Brine shrimp - Artemia salina - Nauplii	48 hours
-	Acute LC50 120000 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus aquaticus	48 hours
-	Acute LC50 99200 to 122600 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <=24 hours	48 hours
-	Acute LC50 9.2 to 11.7 mg/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - 2.4 g	96 hours
-	Acute LC50 97800 to 124000 ug/L Fresh water	Crustaceans - Brine shrimp - Artemia sp. - Nauplii	48 hours
-	Acute LC50 5900 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
-	Acute LC50 5300 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling) - 106 mm - 13.9 g	96 hours
-	Acute LC50 139000 to 187000 ug/L Fresh water	Crustaceans - Brine shrimp - Artemia sp. - Nauplii	48 hours
-	Acute LC50 >347000 ug/L Marine water	Crustaceans - Dungeness or edible crab - Cancer magister - Zoea	48 hours
-	Acute LC50 10.76 to	Fish - Sockeye	96 hours

Flammable Gas Mixture: 1 Butene / 1 Hexene / Benzene / Ethane / Ethylene / Heptane / Hexane / Isobutane / Methane / N Butane / N Pentane / Nitrogen / Nonane / Octane / Propane


	12.04 ul/L Fresh water	salmon - Oncorhynchus nerka - Smolt - 2 years - 75 mm	
-	Acute LC50 9.8 ul/L Fresh water	Fish - Coho salmon, silver salmon - Oncorhynchus kisutch - FRY	96 hours
-	Acute LC50 10.9 ul/L Marine water	Fish - Striped bass - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling) - 52 mm - 1.5 g	96 hours
-	Acute LC50 8.47 to 9.09 ul/L Marine water	Fish - Pink salmon - Oncorhynchus gorbuscha - FRY	96 hours
-	Acute LC50 5.8 ul/L Marine water	Fish - Striped bass - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling) - 6 g	96 hours
-	Acute LC50 5.55 to 8.21 ul/L Marine water	Fish - Sockeye salmon - Oncorhynchus nerka - Smolt - 2 years - 75 mm	96 hours
-	Acute LC50 5.28 ul/L Fresh water	Fish - Pink salmon - Oncorhynchus gorbuscha - FRY	96 hours

- Products of degradation** : Products of degradation: carbon oxides (CO, CO₂) and water, nitrogen oxides (NO, NO₂ 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
DOT Classification	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		-

Flammable Gas Mixture: 1 Butene / 1 Hexene / Benzene / Ethane / Ethylene / Heptane / Hexane / Isobutane / Methane / N Butane / N Pentane / Nitrogen / Nonane / Octane / Propane

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).		-

“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

: TSCA 4(a) final test rules: heptane; n-hexane; pentane; nonane

TSCA 8(a) PAIR: heptane; pentane; nonane

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

TSCA 12(b) one-time export: heptane; pentane; nonane

TSCA 12(b) annual export notification: n-hexane

SARA 302/304/311/312 extremely hazardous substances: No products were found.

SARA 302/304 emergency planning and notification: No products were found.

SARA 302/304/311/312 hazardous chemicals: hex-1-ene; ethane; ethylene; heptane; n-hexane; isobutane; methane; butane; pentane; nitrogen; nonane; octane; propane

SARA 311/312 MSDS distribution - chemical inventory - hazard identification: hex-1-ene: Fire hazard, Immediate (acute) health hazard; ethane: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard; ethylene: Fire hazard, reactive, Sudden release of pressure, Delayed (chronic) health hazard; heptane: Fire hazard; n-hexane: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; isobutane: Fire hazard, Sudden release of pressure; methane: Fire hazard, Sudden release of pressure; butane: Fire hazard, Sudden release of pressure; pentane: Fire hazard, Immediate (acute) health hazard; nitrogen: Sudden release of pressure; nonane: Fire hazard, Immediate (acute) health hazard; octane: Fire hazard; propane: Fire hazard, Sudden release of pressure

Clean Water Act (CWA) 307: benzene

Clean Water Act (CWA) 311: benzene

Clean Air Act (CAA) 112 accidental release prevention: but-1-ene; ethane; ethylene; isobutane; methane; butane; pentane; propane

Clean Air Act (CAA) 112 regulated flammable substances: but-1-ene; ethane; ethylene; isobutane; methane; butane; pentane; propane

Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

SARA 313

Product name

CAS number

Concentration

Flammable Gas Mixture: 1 Butene / 1 Hexene / Benzene / Ethane / Ethylene / Heptane / Hexane / Isobutane / Methane / N Butane / N Pentane / Nitrogen / Nonane / Octane / Propane

Form R - Reporting requirements	: Ethylene	74-85-1	0.02 - 10
	Hexane	110-54-3	0.0001 - 5
	Benzene	71-43-2	0.00005 - 0.9
Supplier notification	: Ethylene	74-85-1	0.02 - 10
	Hexane	110-54-3	0.0001 - 5
	Benzene	71-43-2	0.00005 - 0.9

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.
 - Louisiana Spill:** None of the components are listed.
 - Massachusetts Spill:** None of the components are listed.
 - Massachusetts Substances:** The following components are listed: PROPANE; NITROGEN; BUTANE; 1-BUTENE; METHANE; ISOBUTANE; ETHYLENE; ETHANE; 1-HEXENE; OCTANE; NONANE; PENTANE; HEXANE; HEPTANE (N-HEPTANE)
 - 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: PROPANE; NITROGEN (COMPRESSED OR LIQUIFIED); BUTANE; METHANE; Isobutane; ETHYLENE; ETHANE; 1-HEXENE; OCTANE; NONANE; PENTANE; n-HEPTANE; BENZENE
 - 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: Hexane; Benzene
 - New York Toxic Chemical Release Reporting:** None of the components are listed.
 - Pennsylvania RTK Hazardous Substances:** The following components are listed: PROPANE; NITROGEN; BUTANE; 1-BUTENE; METHANE; PROPANE, 2-METHYL-; ETHENE; ETHANE; 1-HEXENE; OCTANE; NONANE; PENTANE; HEXANE; HEPTANE; BENZENE
 - 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 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>
Benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)

- Canada**
- WHMIS (Canada)**
- : Class A: Compressed gas.
 - Class B-1: Flammable gas.
 - 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; Benzene
 - Canadian ARET:** None of the components are listed.
 - Canadian NPRI:** The following components are listed: Propane; Butane; Butene; Volatile organic compounds; Butane; Ethylene; Volatile organic compounds; Hexene; Octane; Nonane; Pentane; n-Hexane; Heptane
 - 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.

Flammable Gas Mixture: 1 Butene / 1 Hexene / Benzene / Ethane / Ethylene / Heptane / Hexane / Isobutane / Methane / N Butane / N Pentane / Nitrogen / Nonane / Octane / Propane

Section 16. Other information

United States

Label requirements

: FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
CONTENTS UNDER PRESSURE.

Canada

Label requirements

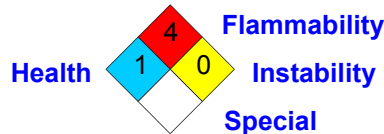
: Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

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

Health	*	1
Flammability		4
Physical hazards		0

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

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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.