

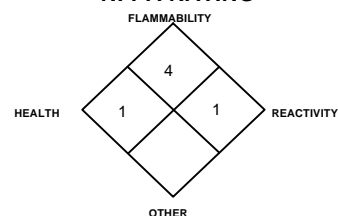


MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS

Standards

NFPA RATING



PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS:

MAPP GAS

Document Number: 002015

PRODUCT USE:

For general analytical/synthetic chemical uses.

SUPPLIER/MANUFACTURER'S NAME:

AIRGAS INC.

ADDRESS:

259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283

BUSINESS PHONE:

1-610-687-5253

EMERGENCY PHONE:

CHEMTREC: 1-800-424-9300

International: 703-527-3887 (Call Collect)

DATE OF PREPARATION:

May 12, 1996

FIRST REVISION:

January 5, 1999

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	
Mixture of: Methyl Acetylene Propadiene	59355-75-8	> 40	1000	1250	1000	1250 (Vacated 1989 PEL)	3400	NIOSH REL: 1000 TWA; 1250 STEL
Propane	74-98-6	> 1	Simple Asphyxiant	NE	1000	NE	2100	NIOSH REL: 1000 ppm DFG MAK: 1000 ppm
Propylene	115-07-1	> 1	A4 : (Not classifiable as Human Carcinogen)		There are no specific exposure limits for Propylene. Propylene is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.			
n-Butane	106-97-8	> 1	800	800	1000	NE	NE	NIOSH REL: 800 DFG MAK: 1000
Isobutane	75-28-5	> 1	There are no specific exposure limits for Isobutane. Isobutane is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
1,3-Butadiene	106-99-0	> 1	2, A2: Suspected Human carcinogen	NE	1	5	2000	NIOSH: Carcinogen; reduce to lowest feasible limit OSHA Action Level: 0.5 ppm
Maximum Impurities		<1%	None of the trace impurities in this mixture contribute significantly to the hazards associated with the product. All hazard information pertinent to this product has been provided in this Material Safety Data Sheet, per the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and State equivalents standards.					

NE = Not Established

C = Ceiling Limit

See Section 16 for Definitions of Terms Used.

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is an colorless, liquefied gas with a foul odor. This product poses a serious fire hazard when accidentally released. The gas is heavier than air, and may spread long distances. Distant ignition and flashback are possible. Flame or high temperature impinging on a localized area of the cylinder of this product can cause the cylinder to explode without activating the cylinder's relief devices. This gas mixture is an asphyxiant and presents a significant health hazard by displacing the oxygen in the atmosphere. Contact with the liquefied gas can cause frostbite. Emergency responders must wear proper personal protective and fire-retardant equipment, and have adequate fire protection, during the situations to which they are responding.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:

The most significant route of over-exposure for this product is by inhalation.

INHALATION: The toxicity of MAPP Gas is very slight, but high concentrations (5000 ppm) can have an anesthetic effect and can cause nausea. The most significant inhalation hazard associated with this product is oxygen displacement. High concentrations of this gas can cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The effects associated with various levels of oxygen are as follows:

CONCENTRATION of OXYGEN

EXPOSURE SYMPTOM

20.9% Oxygen:	Normal oxygen concentration in air.
15-19% Oxygen:	Decreased ability to perform tasks. May impair coordination and may induce early symptoms in persons with heart, lung, or circulatory problems.
12-15% Oxygen:	Breathing increases, especially in exertion. Pulse up. Impaired coordination, perception, and judgment.
10-12% Oxygen:	Breathing further increases in rate and depth, poor coordination and judgment, lips slightly blue.
8-10% Oxygen:	Mental failure, fainting, unconsciousness, ashen face, blueness of lips, nausea (upset stomach), and vomiting.
6-8% Oxygen:	8 minutes, may be fatal in 50-100% of cases; 6 minutes, may be fatal in 25 to 50% of cases; 4-5 minutes, recovery with treatment.
4-6% Oxygen:	Coma in 40 seconds, followed by convulsion, breathing failure, death.



WARNING: Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning and so quickly that individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death.

OTHER POTENTIAL HEALTH EFFECTS: Contact with liquefied gas or rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after such contact can quickly subside.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. Over-exposure to n-Butane may cause the following health effects:

ACUTE: The most significant hazard associated with this product is inhalation of oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, and, at high concentrations, unconsciousness or death may occur. The skin of a victim of over-exposure may have a blue color. Contact with liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

CHRONIC: There are currently no known adverse health effects associated with chronic exposure to this compressed gas.

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH		(BLUE)	1
FLAMMABILITY		(RED)	4
REACTIVITY		(YELLOW)	1
PROTECTIVE EQUIPMENT			B
EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8
For routine industrial applications			

See Section 16 for Definition of Ratings

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus and Fire-Retardant Personal Protective equipment should be worn. Adequate fire protection must be provided during rescue situations.

Remove victim(s) to fresh air, as quickly as possible. Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Only trained personnel should administer supplemental oxygen.

In case of frostbite, place the frostbitten part in warm water. **DO NOT USE HOT WATER.** If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s).

5. FIRE-FIGHTING MEASURES

FLASH POINT (method): -72-88°C (-99-127 °F) (Closed Cup)

AUTOIGNITION TEMPERATURE: Not available.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): 3.4%

Upper (UEL): 10.8%

FIRE EXTINGUISHING MATERIALS: Extinguish fires involving this gas mixture by shutting-off the source of the gas. Use water spray or a foam agent to cool fire-exposed containers, structures, and equipment.

UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this material may decompose and produce toxic gases (including carbon monoxide and carbon dioxide).

DANGER! Fires impinging (direct flame) on the outside surface of unprotected pressure storage vessels of this product can be very dangerous. Direct flame exposure on the cylinder wall can cause an explosion either by BLEVE (Boiling Liquid Expanding Vapor Explosion), or by exothermic decomposition. This is a catastrophic failure of the vessel releasing the contents into a massive fireball and explosion. The resulting fire and explosion can result in severe equipment damage and personnel injury or death over a large area around the vessel. For massive fires in large areas, use unmanned hose holder or monitor nozzles; if this is not possible, withdraw from area and allow fire to burn.

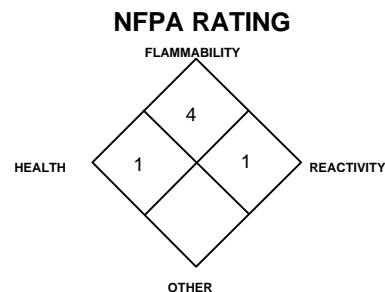
Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Static discharge may cause this product to ignite explosively, if released.

SPECIAL FIRE-FIGHTING PROCEDURES: The best fire-fighting technique may be simply to let the burning gas escape from the pressurized cylinder, tank car, or pipeline. Stop the leak before extinguishing fire. If the fire is extinguished before the leak is sealed, the still-leaking gas could explosively re-ignite without warning and cause extensive damage, injury, or fatality. In this case, increase ventilation (in enclosed areas) to prevent flammable or explosive mixture formation. Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Because of the potential for a BLEVE, evacuation of non-emergency personnel is essential. If water is not available for cooling or protection of vessel exposures, evacuate the area. Other information for pre-planning can be found in the American Petroleum Institute Publications 2510 and 2510A, and the North American Emergency Response Guidebook (Guide Number 116P).

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel. Adequate fire protection must be provided. Minimum Personal Protective Equipment should be **Level B: fire-retardant protective clothing, mechanically-resistant gloves and Self-Contained Breathing Apparatus.** Use only non-sparking tools and equipment. Locate and seal the source of the leaking gas. Protect personnel attempting the shut-off with water-spray. Allow the gas to dissipate. Monitor the surrounding area for oxygen and combustible gas levels.



See Section 16 for Definition of Ratings

6. ACCIDENTAL RELEASE MEASURES (Continued)

The atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus. Combustible gas concentration must be below 10% of the LEL prior to entry. Attempt to close the main source valve prior to entering the area. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there.

THIS IS AN EXTREMELY FLAMMABLE GAS. Protection of all personnel and the area must be maintained.

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product IN YOU. Do not eat or drink while handling chemicals. Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this product (due to oxygen displacement) could occur without any significant warning symptoms.

STORAGE AND HANDLING PRACTICES: Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Compressed gases can present significant safety hazards. Store containers away from heavily trafficked areas and emergency exits. Post "No Smoking or Open Flames" signs in storage or use areas.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Store in cool, dry, well-ventilated area, away from sources of heat, ignition and direct sunlight. Do not allow area where cylinders are stored to exceed 52 °C (125 °F). Isolate from oxidizers such as oxygen, chlorine, or fluorine. Use a check valve or trap in the discharge line to prevent hazardous backflow. Post "No Smoking or Open Flame" signs in storage and use areas. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Never tamper with pressure relief devices in valves and cylinders. Electrical equipment should be non-sparking or explosion proof. The following rules are applicable to situations in which cylinders are being used:

Before Use: Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap, if provided, in-place until cylinder is ready for use.

During Use: Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

After Use: Close main cylinder valve. Replace valve protection cap, if provided. Mark empty cylinders "EMPTY".

NOTE: Use only DOT or ASME code containers. Earth-ground and bond all lines and equipment associated with this product. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For additional information refer to the Compressed Gas Association Pamphlet P-1, *Safe Handling of Compressed Gases in Containers*. Additionally, refer to CGA Bulletin SB-2 "Oxygen Deficient Atmospheres".

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Purge gas handling equipment with inert gas (i.e. nitrogen) before attempting repairs. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Local exhaust ventilation is preferred, because it prevents dispersion of this gas mixture into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of oxygen and the presence of potentially explosive air-gas mixtures.

RESPIRATORY PROTECTION: Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if oxygen levels are below 19.5% or during emergency response to a release of this product. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standards.

EYE PROTECTION: Splash goggles or safety glasses, for protection from rapidly expanding gases and splashes of liquefied gas mixture.

HAND PROTECTION: Wear mechanically-resistant gloves when handling cylinders of this product.

BODY PROTECTION: Use body protection appropriate for task. Transfer of large quantities under pressure may require protective equipment appropriate to protect employees from splashes of liquefied product, as well as fire retardant items.

9. PHYSICAL and CHEMICAL PROPERTIES

VAPOR DENSITY: 1.82 kg/m³

SPECIFIC GRAVITY (air = 1): 1.48

SOLUBILITY IN WATER: Very slight.

EVAPORATION RATE (nBuAc = 1): Not applicable.

ODOR THRESHOLD: 100 ppm (detection)

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

APPEARANCE AND COLOR: Colorless, liquefied gas with a foul odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): The foul odor is a distinct characteristic of this gas mixture. Additionally, in terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

pH: Not applicable.

FREEZING POINT: -188 to -103°C (-306 to -153°F)

BOILING POINT(@ 1 atm.): -47 to -23 °C (-54 to -10°F)

EXPANSION RATIO: Not applicable

VAPOR PRESSURE (psia): 122

SPECIFIC VOLUME (ft³/lb): 9.1

10. STABILITY and REACTIVITY

STABILITY: MAPP Gas is a stabilized mixture of Methyl Acetylene and Propadiene. Other alkane and alkylene hydrocarbons are added as stabilizers; these stabilizers serve to render this mixture shock insensitive.

DECOMPOSITION PRODUCTS: When ignited in the presence of oxygen, this gas will burn to produce carbon monoxide, carbon dioxide.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride). Additionally, avoid contact with acetylide-forming metals (copper, silver, mercury).

HAZARDOUS POLYMERIZATION: Will not occur. This product contains stabilizers.

CONDITIONS TO AVOID: Contact with incompatible materials and exposure to heat, sparks and other sources of ignition. Cylinders exposed to high temperatures or direct flame can rupture or burst.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following information is for the components of this gas mixture present in greater than 1 percent concentration:

METHYL ACETYLENE-PROPADIENE MIXTURE: There are no specific toxicology data for this mixture or either of its components. This component is a simple asphyxiant.

1,3-BUTADIENE:

Micronucleus Test (mouse, inhalation) = 100 ppm/6 hours/2 days; carcinogenic effects

Mammalian Somatic Cells (mouse, lymphocyte) 20 pph

TCLo (inhalation, rat) = 8000 ppm/6 hours (6-15 D preg); teratogenic effects

TCLo (inhalation, rat) = 625 ppm /6 hours/61 weeks; carcinogenic effects

TCLo (inhalation, human) = 2000 ppm; eye effects

TCLo (inhalation, human) = 8000 ppm; eye and pulmonary effects

TC (inhalation, rat) = 8000 ppm/6 hours/60 weeks-I; neoplastigenic effects

LD₅₀ (oral, rat) = 5480 mg/kg

LC₅₀ (inhalation, rat) = 285000 mg/m³/4 hours

LC₅₀ (inhalation, mouse) = 27000/m³/2 hours

LCLo (inhalation, rabbit) = 25 pph/23 minutes

N-BUTANE:

LC50 (mouse, inhalation): 680g/m³; 2-hour duration of exposure

LC50 (rat, inhalation): 658 mg/L; 4 hour duration of exposure.

INHALATION (mouse): n-Butane is reported to be anesthetic to mice at 13% concentration in 25 minutes, at 22% in 1 minute.

INHALATION (dog): n-Butane is reported to be anesthetic to dogs at 25% concentration. n-Butane is also a weak cardiac sensitizer (high concentrations can cause abnormal heartbeats in animals under stress).

ISOBUTANE: There is no specific toxicology data for Isobutane. Isobutane is a simple asphyxiant.

PROPANE. Skin Contact (Rabbit): Several formulations containing an isobutane-propane mixture have been tested for skin irritation effects. All formulations contained less than 13% propane. All of the formulations containing propane caused only mild irritation.

Effects on Short-Term Inhalation: Guinea-pigs breathing 5.5% propane by volume developed tremors after 5 minutes. Nausea, retching, and stupefaction were observed when animals were exposed for 30-120 minutes. All the animals survived a two-hour exposure and had no significant tissue damage. A gas concentration of 89% did not cause anesthesia, but depressed the blood pressure of cats. Inhalation of 10 percent propane by mice and 15% by dogs caused weak cardiac sensitization. Presumably, all of these effects are reversible when exposure ceases. In primates, 10% propane caused some change in heart function. At 20% there was aggravation of these symptoms and respiratory depression.

Effects of Long-Term Inhalation: No toxicity or abnormalities were observed when monkeys were exposed to approximately 750 ppm for 90 days. Similar results were obtained when monkeys were exposed to an aerosol spray containing 65% propane and isobutane.

11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

PROPYLENE: Effects on Short-Term Inhalation: In all species tested, propylene is an anesthetic, being approximately twice as toxic as ethylene. A concentration of 40% produced light anesthesia in rats, with no toxic effects within 6 hours of exposure. Exposure to 55% for 3 to 6 minutes, 65% for 2 to 5 minutes, and 70% for 1 to 3 minutes caused deep anesthesia with no central nervous system disturbances. In cats, no toxic signs were observed when anesthesia was induced with propylene concentrations of 20-30%. However, at higher concentrations, toxic effects were seen. Some subtle effects were seen from 40-50%; a drop in blood pressure and increased pulse rate at 70%; and an unusual heart beat from 50-80%. Propylene has been found to be a cardiac sensitizer in dogs. After 4 hours of inhalation exposure to 50,000 ppm propylene, rats pretreated with Aroclor 1254 (a hepatic mixed-function, oxidase inducer) showed liver toxicity. No liver toxicity was observed in control rats or rats pretreated with phenobarbital or beta-naphthoflavone. This evidence suggests that Aroclor pre-treatment is a prerequisite for propylene liver toxicity.

Effects of Long-Term Inhalation: Chronic exposure to mice to concentrations causing central nervous system depression resulted in moderate to very slight fatty degeneration of the liver.

SUSPECTED CANCER AGENT: Specific components of this gas mixture are listed, as follows:

1,3-BUTADIENE:

EPA- B2, Probable Human Carcinogen (sufficient evidence from animal studies; inadequate evidence in epidemiological studies)

IARC - Group 2A; Probably Carcinogenic to Humans (limited human evidence; sufficient evidence in experimental animals)

MAK-A2; Unmistakably Carcinogenic in Animal Experimentation Only

NTP- Group 2, Reasonably Anticipated to be a Carcinogen

ACGIH - A2; Suspect Human Carcinogen

PROPYLENE:

IARC-3: Not Classifiable as to Carcinogenicity to Humans)

ACGIH-A4 : Not Classifiable as Human Carcinogen

The other components of this mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA, and therefore are not considered to be, nor suspected to be cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product is not irritating; however, contact with the liquefied gas mixture or rapidly expanding gases can cause frostbite to exposed tissue.

SENSITIZATION TO THE PRODUCT: This gas mixture is not known to cause sensitization in humans; however, some animals studies indicate that exposure to n-Butane, Propylene, and Propane (components of this gas mixture) can cause weak cardiac sensitization.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: No mutagenicity effects have been described for this has mixture. 1,3-Butadiene (a component of this product) and its metabolites have exhibited mutagenicity in bacterial tests.

Embryotoxicity: No embryotoxic effects have been described for this gas mixture. Refer to the following paragraph for additional information.

Teratogenicity: No teratogenicity effects have been described for this gas mixture. Pregnant rats were exposed to 200, 1000, or 8000 ppm 1,3-Butadiene (a component of this gas mixture) on days 6-15 of gestation. Dose-related maternal and fetal toxicity were observed. Offspring of rats exposed at 8000 ppm had increased numbers of major skeletal abnormalities.

Reproductive Toxicity: No reproductive toxicity effects have been described for this gas mixture. No reproductive effects nor other significant toxic effects were observed in two inhalation studies using rats (1000-8000 ppm; 6 hours/day for 5 days/week over 13 weeks) or rats and guinea pigs (600-6700 ppm daily for 3 months) exposed to 1,3-Butadiene (a component of this gas mixture). In the long-term carcinogenicity studies, there were increased frequencies of uterine and testicular cancers in mice. Non-cancerous atrophy of the ovaries and testes also occurred in mice.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to the components of this product.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary; treat symptoms; reduce or eliminate exposure.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for this compound.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: This gas will be dissipated rapidly in well-ventilated areas. The following environmental data is available for the components of this product.

Butane: Log K_{ow} = 2.89. Water Solubility = 6.4 ppm at 25°C. Log BCF (n-butane) = calculated, 1.78 and 1.97, respectively. Expected Half-life = 0.13 hr. Bioconcentration factors do not indicate that bioconcentration in aquatic organisms is important.

1,3-Butadiene: Log K_{ow} = 1.99. Water Solubility = 735 mg/L at 20 °C. Log BCF = estimated, 19.1. Bioconcentration factor does not indicate that bioconcentration in aquatic organisms is important. This chemical is expected to be biodegraded in the environment.

Propane: Log K_{ow} = 2.36. Water Solubility = 2.62.4 ppm at 25°C. Log BCF = calculated, 1.56 and 1.78, respectively. The bioconcentration in aquatic organisms is not expected to be important.

Propylene: Log K_{ow} = 1.77. Water Solubility = 44.5 mL/100 mL (soluble). In bodies of water, propylene is readily degraded by microorganisms. The bioconcentration in aquatic organisms is not expected to be important.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Any adverse effect on animals would be related to oxygen deficient environments. No adverse effect is anticipated to occur to plant-life, except for frost produced in the presence of rapidly expanding gases.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life. The following aquatic toxicity data is available for the components of this product.

1, 3-Butadiene: TLm pinperch 71.5 mg/L/24 hours

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Return cylinders with any residual product to AirGas. Do not dispose of locally.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Methyl acetylene and propadiene mixtures, stabilized

HAZARD CLASS NUMBER and DESCRIPTION: 2.1 (Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1060

PACKING GROUP: Not applicable.

DOT LABEL(S) REQUIRED: Flammable Gas

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 116P

MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as a Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

COMPONENT	SARA 302	SARA 304	SARA 313
Mixture: Methyl Acetylene, Propadiene	NO	NO	NO
Propane	NO	NO	NO
Propylene	NO	NO	YES
n-Butane	NO	NO	NO
Isobutane	NO	NO	NO
1,3-Butadiene	NO	YES	YES

SARA Threshold Planning Quantity: Not applicable.

TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.

CERCLA REPORTABLE QUANTITY (RQ): 1,3-Butadiene = a statutory 1 lb RQ is applicable under Clean Air Act Section 112 (b) until this value is adjusted.

OTHER FEDERAL REGULATIONS: n-Butane, Propane, Propylene, and Isobutane are subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for each gas component is 10,000 pounds. Depending on specific operations involving the use of this product, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119).

15. REGULATORY INFORMATION (Continued)

STATE REGULATORY INFORMATION: MAPP Gas is covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous

Substances: MAPP Gas.

California - Permissible Exposure Limits
for Chemical Contaminants: No.

Florida - Substance List: MAPP Gas.

Illinois - Toxic Substance List: No.

Kansas - Section 302/313 List: No.

Massachusetts - Substance List: No.

Minnesota - List of Hazardous
Substances: No.

Missouri - Employer Information/Toxic
Substance List: n-Butane.

New Jersey - Right to Know Hazardous
Substance List: No.

North Dakota - List of Hazardous
Chemicals, Reportable Quantities: No.

Pennsylvania - Hazardous Substance List:
MAPP Gas.

Rhode Island - Hazardous Substance List:
None.

Texas - Hazardous Substance List: MAPP
Gas

West Virginia - Hazardous Substance List:
MAPP Gas

Wisconsin - Toxic and Hazardous
Substances: MAPP Gas

CALIFORNIA PROPOSITION 65: 1,3-Butadiene, a component of this product, is on the California Proposition 65 lists as a chemical known to the State of California to cause cancer.

LABELING:

DANGER:

FLAMMABLE LIQUID AND GAS UNDER PRESSURE.
CAN FORM EXPLOSIVE MIXTURES WITH AIR.
MAY CAUSE FROSTBITE.

Keep away from heat, flames, and sparks.

Store and use with adequate ventilation.

Cylinder temperature should not exceed 125 °F (52 °C).

Do not get liquid in eyes, on skin or clothing.

Close valve after each use and when empty.

Use in accordance with the Material Safety Data Sheet.

FIRST-AID:

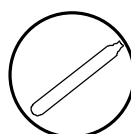
IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

IN CASE OF FROSTBITE, obtain immediate medical attention.

DO NOT REMOVE THIS PRODUCT LABEL.

TARGET ORGANS: Respiratory system.

WHMIS SYMBOLS:



16. OTHER INFORMATION

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
619/565-0302

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. AIRGAS, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, AIRGAS, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

TLV - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour **Time Weighted Average (TWA)**, the 15-minute **Short Term Exposure Limit**, and the instantaneous **Ceiling Level**. Skin adsorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.

PEL - Permissible Exposure Limit - this exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL", is placed next to the PEL which was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

The DFG - MAK is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the **National Fire Protection Association (NFPA)**. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause death. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. The following laws are also pertinent to the information presented in this MSDS: **Superfund Amendments and Reauthorization Act (SARA)**; the **Toxic Substance Control Act (TSCA)**; Marine Pollutant status according to the **DOT**; California's Safe Drinking Water Act (**Proposition 65**); the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund)**. This section also includes information on the precautionary warnings which appear on the materials package label.