



MSDS - Pro Flame

MATERIAL SAFETY DATA SHEET

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

CHEMTANE 2

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

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: FLAMMABLE GAS MIXTURE

PRODUCT USE: Fuel Gas

SUPPLIER/MANUFACTURER'S NAME: JALAPA GAS & CHEMICAL CORPORATION

ADDRESS: 7223 Decker Drive; Baytown, TX 77520

BUSINESS PHONE: 1-281-424-8787

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EMERGENCY PHONE: 1-800-424-9300 [in U.S.] (CHEMTREC) 1-703-527-3887 DATE OF PREPARATION: May 1, 2001

2. COMPOSITION and INFORMATION ON INGREDIENTS

Chemtane 2	CAS #	Mole %	Exposure Limits In Air					
			ACGIH		OSHA		NIOSH	OTHER
			TLV PPM	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	ppm
Propane	74-98-6	99.50%	2500	NE	1000	NE	2100 (based on LEL)	NIOSH REL: TWA = 1000 DFG MAKs: TWA = 1000PEAK = 2*MAK 60 min., momentary value
Chemtane 2: This proprietary blend of hydrocarbons are all present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).	Balance	None of the other components contribute significantly additional hazards at the concentrations present in this product. All pertinent hazard information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards; and Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).						

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This is a colorless, flammable gas mixture, which may have a mild, gasoline-like odor. The main health hazard associated with this gas mixture is oxygen deprivation by displacing the oxygen in the atmosphere. The gas poses a serious fire hazard when accidentally released. The gas may spread long distances. Distant ignition and flashback are possible. Emergency responders must wear personal protective equipment appropriate for the situation to which they are responding.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant route of overexposure for this product is by inhalation. The following page presents information that describes the symptoms of overexposure to this gas mixture.

INHALATION: The most significant hazard associated with this gas mixture is oxygen deprivation (asphyxiation) when this gas mixture is present in high enough concentrations to significantly lower oxygen concentration. 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. The effects associated with various levels of oxygen are as follows (Concentration: Symptoms of Exposure):

12-16% Oxygen: Breathing and pulse rate increased, muscular coordination slightly disturbed.

10-14% Oxygen: Emotional upset, abnormal fatigue, disturbed respiration.

6-10% Oxygen: Nausea and vomiting, collapse or loss of consciousness.

Below 6%: Convulsive movements, possible respiratory collapse, and death.

It should be noted that before adverse health effects or suffocation could occur, the LEL of the main component, Propane may be reached, causing fire. Prolonged exposure to high concentration levels of this gas mixture (as may occur in a confined space) may also cause adverse effects on the central nervous system. Symptoms may include headache, dizziness, drowsiness, confusion and loss of consciousness.

See Section 16 for Definition of Ratings

SKIN AND EYE CONTACT: Brief skin and eye contact is not expected to cause adverse effect, unless contact is to an abrupt release of the gas mixture (see "Other Potential Health Effects" for further information). Prolonged contact with this gas mixture may result in irritation to the skin and eyes. Repeated skin exposure may cause dermatitis (dry, red, itchy skin).

OTHER POTENTIAL HEALTH EFFECTS: The Propane component of this gas mixture is considered to be a weak cardiac sensitizer, based on animal testing. Contact with the rapidly expanding gases may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact can quickly subside.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Overexposure to

this gas mixture may cause the health effects indicated below:

ACUTE: This gas mixture can cause oxygen deprivation and presents a health hazard by displacing the oxygen in the atmosphere. High concentration inhalation exposure may cause adverse central nervous system effects. Contact with 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.

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CHRONIC: Prolonged skin contact may result in mild irritation of the skin. Refer to Section 11 (Toxicological Information) of this MSDS for further information.

TARGET ORGANS: ACUTE: Respiratory system, skin, eyes. CHRONIC: Skin.

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

1. 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. 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). Remove victim(s) to fresh air, as quickly as possible. In case of eye contact which leads to irritation, immediately flush eyes with copious amounts of water for at least 15 minutes. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. 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.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions, as well as disorders involving the "Target Organs", as listed in Section 3 (Hazard Information), may be aggravated by overexposure to the components of this product.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen as soon as possible, following exposure.

2. FIRE-FIGHTING MEASURES

The flash point, autoignition, and flammability limits have not been determined for this mixture. The following information is for the main component of this gas mixture, Propane.

FLASH POINT: -104°C (-156°F)

AUTOIGNITION TEMPERATURE: 450°C (842°F)

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): 2.1% Upper (UEL): 9.5%

The following information is this gas mixture:

FIRE EXTINGUISHING MATERIALS: Flammable gas. Extinguish fires 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: An extreme explosion hazard exists in areas in which the gas has been released, but the material has not yet ignited.

DANGER! Fires impinging (direct flame) on the outside surface of cylinders or storage vessels can be very dangerous. Direct flame exposure on the cylinder wall can cause an 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 gas mixture to ignite explosively.

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. For large releases, consider evacuation. Check the North American Emergency Response Guidebook (Guide #115) for recommended isolation distance.

3. 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 release, clear the affected area and protect people. 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 combustible gas levels, and oxygen. Combustible gas concentration must be below 10% of the LEL of Propane (see Section 5, Fire-Fighting Measures) prior to entry of response personnel. The atmosphere must contain components below levels listed in Section 2 (Composition and Information on Ingredients) and have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus. 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.

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

1. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this gas mixture IN YOU. Do not eat or drink while handling chemicals. Be aware of any signs of overexposure [See Section 3 (Hazard Identification)], because overexposure to fatal concentrations of this product 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, fireproof area, away from flammable materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors or loading docks. Avoid storing products by incompatible chemicals. Do not store containers where they can come into contact with moisture. 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.

Cylinders should be separated from oxygen cylinders, or other oxidizers, by a minimum distance of 20 ft., or by a barrier of non-combustible material at least 5 ft. high, having a fire-resistance rating of at least 0.5 hours. Isolate from other incompatible chemicals (refer to Section 10, Stability and Reactivity). Storage areas must meet national electrical codes for Class 1 Hazardous Areas. Post "No Smoking or Open Flames" signs in storage or use areas. Consider installation of leak detection and alarm for storage and use areas. Have appropriate extinguishing equipment in the storage area (i.e. sprinkler system, portable fire extinguishers).

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 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. 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. Always use product in areas where adequate ventilation is provided.

2. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure compliance with exposure limits described in Section 2 (Composition and Information on Ingredients). 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 levels of flammable gas, and oxygen.

RESPIRATORY PROTECTION: Maintain Oxygen levels above 19.5% in the workplace. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). The following are NIOSH recommendations for Propane concentrations in air and are provided for further information (Concentration of Propane: Respiratory Equipment):

- Up to 2100 ppm: Facepiece Self-Contained Breathing Apparatus (SCBA) or full-facepiece Supplied-Air Respirator (SAR).
- Emergency or Planned Entry into Unknown Concentration or IDLH Conditions: Positive pressure, full-facepiece SCBA or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
- Escape: Escape-type SCBA.
- NOTE: The IDLH concentration for Propane is 2100 ppm, which is based on the lower explosive limit (LFL/LEL). Respiratory protection equipment may not be adequate for fire situations. Respiratory protection by itself is not adequate for conditions where the concentration is 10% of LFL/LEL or higher.

EYE PROTECTION: Splash goggles, face-shields or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133, or Canadian Standards.

HAND PROTECTION: Wear mechanically-resistant gloves when handling cylinders of this product. If use of this gas mixture involves the use of other chemicals, wear gloves appropriate for those materials. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate for task. Cotton clothing is recommended to prevent static electric build up. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR.

3. PHYSICAL and CHEMICAL PROPERTIES

The following information is pertinent for Propane, the main component of this gas mixture:

- VAPOR DENSITY: 1.868 kg/m³ (0.115 99 lb/ft³)
- pH: Not applicable.
- SPECIFIC GRAVITY (air =1): 1.550
- FREEZING POINT: -187.7°C (-305.9°F)
- SOLUBILITY IN WATER: Very slight.
- BOILING POINT @ 1 atm: -42°C (-43.7°F)
- EVAPORATION RATE(nBuAc = 1): Not applicable.
- EXPANSION RATIO: Not applicable.
- COEFFICIENT WATER/OIL DISTRIBUTION: 2.36
- SPECIFIC VOLUME (ft³/lb): 8.7
- ODOR THRESHOLD: 22,000-36,000 mg/m³
- VAPOR PRESSURE (psia): 123.7

The following information is pertinent to this gas mixture.

APPEARANCE, ODOR AND COLOR: This is a colorless, flammable gas mixture, which may have a mild, gasoline-like odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): 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.

4. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: None known.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This gas mixture is incompatible with strong oxidizers.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposing cylinders to extremely high temperatures, which could cause the cylinders to rupture. Avoiding exposing this gas mixture to incompatible chemicals.

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

1. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following data are for Propane component of this mixture. All other components are in less than 1% concentration.

PROPANE.

- Skin Contact (Rabbit): Several formulations containing an isobutane-propane mixture were 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 cause 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.

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

IRRITANCY OF PRODUCT: Prolonged contact may result in mild irritation of the skin. Contact with rapidly expanding gases can cause frostbite and damage to exposed skin and eyes.

SENSITIZATION OF PRODUCT: The components of this gas mixture are not human skin or respiratory sensitizers. The Propane component of this gas is considered to be a weak cardiac sensitizer, based on animal testing.

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

- Mutagenicity: This product is not reported to cause mutagenic effects in humans.
- Embryotoxicity: This product is not reported to cause embryotoxic effects in humans.
- Teratogenicity: This product is not reported to cause teratogenic effects in humans.
- Reproductive Toxicity: This product is not reported to cause adverse reproductive effects in humans.

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.

ACGIH BIOLOGICAL EXPOSURE INDICES: Currently, there are no Biological Exposure Indices determined for the components of this gas mixture.

2. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: This gas mixture will be dissipated rapidly in well-ventilated areas.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Due to the gaseous nature of this mixture, no adverse effect is expected in animal and plant, except frost produced in the presence of rapidly expanding gases may adversely affect plant life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on the effects of this gas mixture on aquatic life.

3. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Product removed from cylinder must be disposed of in accordance with appropriate U.S. Federal, State and local regulations or with regulations of Canada and its Provinces. Do not dispose of locally.

4. TRANSPORTATION INFORMATION

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

- PROPER SHIPPING NAME: Petroleum gases, liquefied or Liquefied petroleum gas
- HAZARD CLASS NUMBER and DESCRIPTION: 2.1 (Flammable Gas)
- UN IDENTIFICATION NUMBER: UN 1978
- PACKING GROUP: Not Applicable
- DOT LABEL(S) REQUIRED: Flammable Gas
- NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 115
- MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas mixture is considered as dangerous goods, per regulations of Transport Canada. Use the above U.S. DOT shipping information for the preparation of Canadian Shipments.

Additional information for Canadian shipments: Special Provision: 102

5. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this gas mixture. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Propane is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The threshold quantity for this gas 10,000 lbs (4,540 kg).

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under specific State regulations, as denoted below:

- Alaska - Designated Toxic and Hazardous Substances: Propane.
- California - Permissible Exposure Limits for Chemical Contaminants: Propane.
- Florida - Substance List: None. - Illinois - Toxic Substance List: Propane.
- Kansas - Section 302/313 List: None.
- Massachusetts - Substance List: Propane.
- Michigan - Critical Materials Register: None.
- Minnesota - List of Hazardous Substances: Propane.
- Missouri - Employer Information/Toxic Substance List: Propane.
- New Jersey - Right to Know Hazardous Substance List: Propane.
- North Dakota - List of Hazardous Chemicals, Reportable Quantities: None.
- Pennsylvania - Hazardous Substance List: Propane.
- Rhode Island - Hazardous Substance List: Propane.
- Texas - Hazardous Substance List: Propane.
- West Virginia - Hazardous Substance List: Propane.
- Wisconsin - Toxic and Hazardous Substances: Propane.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The components of this gas mixture are not on the California Proposition 65 Lists.

CGA LABELING (For Compressed Gas):

DANGER: FLAMMABLE GAS UNDER PRESSURE. CAN FORM EXPLOSIVE MIXTURES WITH AIR. CAN CAUSE RAPID SUFFOCATION. MAY CAUSE FROSTBITE. Keep away from heat, flames, and sparks. Store and use with adequate ventilation. Cylinder temperature should not exceed 52°C (125°F). Do not get gas 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

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL INVENTORY: The components of this product are listed on the DSL Inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this product are not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS SYMBOLS: Class A: Compressed Gases; Class B1: Flammable Gas

6. OTHER INFORMATION

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.; 9163 Chesapeake Drive, San Diego, CA 92123-1002; 858/565-0302

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. Jalapa Gas & Chemical Corp 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, Jalapa Gas & Chemical Corp 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.

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 (C). Skin absorption 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 - This 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.

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: 0 (minimal acute or chronic exposure hazard); 1 (slight acute or chronic exposure hazard); 2 (moderate acute or significant chronic exposure hazard); 3 (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); 4 (extreme acute exposure hazard; onetime overexposure can be fatal). **Flammability Hazard:** 0 (minimal hazard); 1 (materials that require substantial pre-heating before burning); 2 (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); 3 (Class IB and IC flammable liquids with flash points below 38°C [100°F]); 4 (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]). **Reactivity Hazard:** 0 (normally stable); 1 (material that can become unstable at elevated temperatures or which can react slightly with water); 2 (materials that are unstable but do not detonate or which can react violently with water); 3 (materials that can detonate when initiated or which can react explosively with water); 4 (materials that can detonate at normal temperatures or pressures). **PERSONAL PROTECTIVE EQUIPMENT CODES:** B: Gloves and goggles; C: Gloves, goggles, rubber apron (appropriate body protection); D: Gloves, goggles, faceshield; rubber apron (appropriate body protection);. X: Special attention should be given to PPE Selection.

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: 0 (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); 1 (materials that on exposure under fire conditions could cause irritation or minor residual injury); 2 (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); 3 (materials that can on short exposure could cause serious temporary or residual injury); 4 (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. 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 lethal or toxic effects. 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. Ecological Information: EC is the effect concentration in water.

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. Superfund Amendments and Reauthorization Act (SARA); the Canadian Domestic/Non-Domestic Substances List (DSL/NDL); the U.S. Toxic Substance Control Act (TSCA); Marine Pollutant status according to the DOT; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund); and various state regulations.