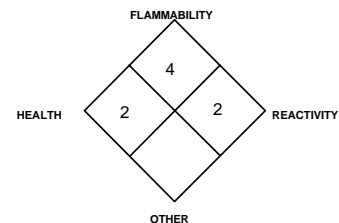


**NFPA RATING**

MATERIAL SAFETY DATA SHEET

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

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

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: **VINYL CHLORIDE - CH₂CHCl**
Document Number: P-0067

PRODUCT USE: For general analytic/synthetic chemical uses.

SUPPLIER/MANUFACTURER'S NAME: MESA Specialty Gases & Equipment
ADDRESS: 3619 Pendleton Avenue, Suite C
 Santa Ana, CA 92704

BUSINESS PHONE: 1-714-434-7102
EMERGENCY PHONE: INFOTRAC: 1-800-535-5053

DATE OF PREPARATION: November 20, 1997
FIRST REVISION: January 23, 1998

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA		IDLH ppm	OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm		
Vinyl Chloride	75-01-4	> 99.9%	5, A1 (Confirmed Human Carcinogen)	NE	1	5, C (15 minutes)	NE	NIOSH: Carcinogen; Reduce exposure to lowest feasible level. Carcinogen: IARC-1; MAK-A1; NTP-1; OSHA-X; NIOSH-X
Maximum Impurities		< 0.1%	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 equivalent 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: Vinyl Chloride is a colorless, liquefied, toxic, flammable gas with a sweet, ethereal odor. Vinyl Chloride is a known human carcinogen and is toxic by all routes of exposure. Contact with the skin and eyes will result in irritation. Inhalation of Vinyl Chloride may produce symptoms of drowsiness, blurred vision, staggering gait and tingling and numbness in the extremities. Contact with the liquid may result in frostbite. Both the liquid and gas pose a serious fire hazard when accidentally released. Vinyl Chloride polymerizes readily when exposed to air, sunlight, heat or oxygen and so can form dangerous explosive air/gas mixtures. Flame or high temperature impinging on a localized area of the cylinder of Vinyl Chloride can cause the cylinder to rupture without activating the cylinder's relief devices. Provide adequate fire protection during emergency response situations.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE:

The most significant routes of overexposure for Vinyl Chloride are by inhalation or skin and eye contact. The following paragraphs describe symptoms of exposure by route of exposure.

INHALATION: Vinyl Chloride acts as a general anesthetic in concentrations over 500 ppm. Overexposure to low levels of Vinyl Chloride will result in dizziness, light-headedness, euphoria, nervousness, drowsiness, headache, blurred vision, impaired hearing and confusion. Acute exposures to 1000 ppm will slowly produce symptoms such as staggering gait and tingling in the hands and feet. Overexposure to extremely high concentrations (greater than 70,000 ppm) of Vinyl Chloride may cause unconsciousness and death, with possible liver, spleen, and kidney damage.

SKIN CONTACT: The gas is mildly irritating to exposed skin. Accidental spraying of the liquid gas may cause burns from freezing, due to rapid evaporation.

EYE CONTACT: Vinyl Chloride gas is mildly irritating to the eyes. Accidental spraying of the liquid into the eye(s) may cause burns from freezing, due to rapid evaporation.



OTHER POTENTIAL HEALTH EFFECTS: 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 such contact can quickly subside.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Overexposure to Vinyl Chloride may cause the following health effects:

ACUTE: The most significant hazard associated with Vinyl Chloride is inhalation of vapors, which can produce symptoms of central nervous system depression, such as dizziness, light-headedness, headache, nervousness confusion and impairment of vision and hearing. Overexposure to extremely high concentrations may cause unconsciousness and death, with possible liver, spleen, and kidney damage. Contact with liquid or rapidly expanding gases may cause frostbite.

CHRONIC: Long-term exposure to low levels of Vinyl Chloride causes angiosarcoma of the liver, which is a rare form of liver cancer. Chronic exposure to Vinyl Chloride has been associated with cancers of the brain, lungs and blood-forming and lymphatic systems. In the past, chronic exposure to high levels of Vinyl Chloride has resulted in acro-osteolysis (a type of degenerative bone disease) and reports of increased frequency of chromosomal changes. These symptoms have been reduced significantly due to current stringent handling procedures. Refer to Section 11 (Toxicology Information) of this MSDS for additional information.

TARGET ORGANS: Central nervous system, liver, spleen, kidneys, respiratory system and, potentially, the reproductive system.

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH		(BLUE)	2
FLAMMABILITY		(RED)	4
REACTIVITY		(YELLOW)	2
PROTECTIVE EQUIPMENT			X
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 VINYL CHLORIDE 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. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary.

SKIN EXPOSURE: Immediately flush affected area with water for at least 15 minutes. If areas of the skin are burned and contaminated clothing adheres to them, gently cut clothing away. Contact with the liquid or rapidly expanding gases can cause frostbite. In the event of frostbite, medical attention must be sought. Frozen tissue is painless and appears waxy, with a possible yellow color. Frozen tissue will become swollen, painful and prone to infection when thawed. If the frozen part of the body has been thawed by the time medical attention has been obtained, cover the area with a dry sterile dressing and a large bulky protective covering.

EYE EXPOSURE: In the event of contact with the eyes, flush the affected eye(s) with running water for at least 15 minutes. Victims of eye exposure should be taken to medical attention immediately.

5. FIRE-FIGHTING MEASURES

FLASH POINT (Open Cup): -77.8°C (-108°F)

AUTOIGNITION TEMPERATURE: 472.0°C (881.6°F)

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): 4.0%

Upper (UEL): 22.0%

FIRE EXTINGUISHING MATERIALS: Extinguish Vinyl Chloride fires by shutting off the source of the gas. Care must be taken with the use of water as Vinyl Chloride reacts to water; water spray should be used to cool fire-exposed containers, structures and equipment. Use carbon dioxide, foam or dry chemicals as extinguishing media, if possible.

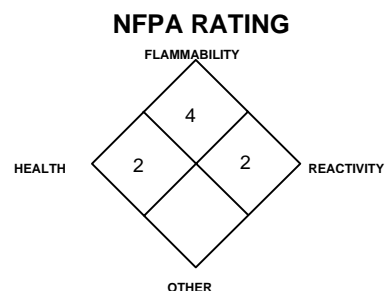
UNUSUAL FIRE AND EXPLOSION HAZARDS: Extremely flammable gas. Very dangerous fire hazard when exposed to heat, flame or powerful oxidizers. If stored for prolonged periods of time in the absence of sufficient polymerization inhibitor, dangerous peroxide compounds may form by oxidization with atmospheric oxygen in the presence of various contaminants. Contact with metals such as copper, aluminum and certain catalytic impurities can cause violent polymerization. Explosion hazard in confined spaces. During a fire, toxic gases (i.e. hydrogen chloride, carbon dioxide, carbon monoxide, and traces of phosgene) may be produced. Water spray should be used with care, as Vinyl Chloride reacts with water.

DANGER! Fires impinging (direct flame) on the outside surface of unprotected cylinders of Vinyl Chloride can be very dangerous. Exposure to fire could cause a catastrophic failure of the cylinder releasing the contents into a fireball and explosion of released gas. The resulting fire and explosion can result in severe equipment damage and personnel injury or death over a large area around the cylinder. 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 Vinyl Chloride to ignite explosively.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters 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 the flow of gas cannot be stopped, it is better to allow the gas to burn rather than form potentially explosive air/gas hazard. If the fire is extinguished before the flow of gas can be stopped, the gas can explosively re-ignite. If water is not available for cooling or protection of cylinder exposures, evacuate the area. Refer to the North American Emergency Response Guidebook (Guide #116P) for additional information.



See Section 16 for Definition of Ratings

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Evacuate immediate area. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a gas release, clear the affected area, protect people, and respond with trained personnel.

Eliminate any possible sources of ignition, and provide maximum explosion-proof ventilation. If the gas is leaking from cylinder or valve, contact the supplier. Adequate fire protection must be provided. Use only non-sparking tools and equipment during the response.

Minimum Personal Protective Equipment should be **Level B: fire-retardant protective clothing, 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. Combustible gas concentration must be below 10% of the LEL (4%) prior to entry. Monitor the surrounding area for combustible gas levels and oxygen level. The atmosphere must have levels of Vinyl Chloride below those listed in Section 2 (Information and Composition on Ingredients) and 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.

THIS IS AN EXTREMELY FLAMMABLE GAS, WHICH IS ALSO TOXIC AND A KNOWN HUMAN CARCINOGEN. 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 Vinyl Chloride IN YOU. Do not eat or drink while handling chemicals. Be aware of any signs of exposure as indicated in Section 2 (Composition and Information on Ingredients); exposures to fatal concentrations of Vinyl Chloride could occur rapidly.

NOTE: Refer to the OSHA Vinyl Chloride Standard (29 CFR 1910.1017) for specific requirements associated with the use of this gas. The Action Level for Vinyl Chloride is 0.5 ppm. In workplaces where employees are exposed above the Action Level, the OSHA requirements for monitoring, establishment of regulated areas, methods of compliance, respiratory protection, emergency response protocol, medical surveillance, training, and record-keeping must be followed.

STORAGE AND HANDLING PRACTICES: Entrances to regulated areas (as defined by the OSHA Vinyl Chloride Standard) must be posted with legible signs which reads as follows:

**CANCER-SUSPECT AGENT AREA
AUTHORIZED PERSONNEL ONLY**

Vinyl Chloride should be used in a well-ventilated area, preferably in a hood with forced ventilation. 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). 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). This gas is heavier than air and will accumulate in low areas. Do not store below ground level.

Steel is recommended for all piping, storage tanks and equipment used with Vinyl Chloride. Copper and its alloys and aluminum should never be used in equipment used with Vinyl Chloride due to the potential for violent polymerization with these materials.

Keep the smallest amount on-site as is necessary. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time.

7. HANDLING and STORAGE (Continued)

STORAGE AND HANDLING PRACTICES (continued): Use non-sparking ventilation systems, approved explosion-proof equipment, and appropriate electrical systems. Electrical equipment used in gas-handling operations, or located in storage areas, should be non-sparking or explosion proof. Use a check valve in the discharge line to prevent hazardous backflow. Never tamper with pressure relief devices in valves and cylinders.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Use a check valve or trap in the discharge line to prevent hazardous backflow. 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 work 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 Vinyl Chloride. 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.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. A hood with forced ventilation is preferred, due to the significant toxicity and flammability hazards of Vinyl Chloride. Installation of automatic monitoring equipment to detect the level of Vinyl Chloride and potentially explosive air-gas mixtures is highly recommended.

RESPIRATORY PROTECTION: Maintain exposure levels of Vinyl Chloride below the levels listed in Section 2 (Composition and Information on Ingredients) and oxygen levels above 19.5% in the workplace. During an emergency situation, before entering the area, check for flammable gas level as well as oxygen-deficient atmospheres. Use supplied air respiratory protection if Vinyl Chloride levels exceed exposure limits and if oxygen level is below 19.5% or during emergency response to a release of Vinyl Chloride. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standards. The following are NIOSH recommendations for respiratory protection for concentration of Vinyl Chloride in air.

CONCENTRATION

AT ANY DETECTABLE CONCENTRATION:

ESCAPE:

RESPIRATORY EQUIPMENT

Positive pressure, full-facepiece Self-Contained Breathing Apparatus (SCBA) or positive pressure, full-facepiece Supplied Air Respirator (SAR) with an auxiliary positive pressure SCBA.

Gas mask with canister to protect against Vinyl Chloride, or escape-type SCBA.

NOTE: Follow the specific respiratory selection guidelines of the OSHA Vinyl Chloride Standard in regulated areas (as defined by 29 CFR 1910.1017).

EYE PROTECTION: Splash goggles or safety glasses and face shield when handling the liquid or gas.

HAND PROTECTION: Wear leather gloves when handling cylinders of Vinyl Chloride. Chemical resistant gloves should be worn when using Vinyl Chloride.

BODY PROTECTION: Use body protection appropriate for task. Chemical resistant material is recommended for protection against contamination with Vinyl Chloride. Safety shoes are recommended when handling cylinders. Response to leaks requires the use of fire retardant clothing. Transfer of large quantities under pressure may require protective equipment appropriate to protect employees from gas spraying, as well as fire-retardant items.

9. PHYSICAL and CHEMICAL PROPERTIES

GAS DENSITY @ 21.1°C (70°F) and 1 atm: 0.160 lb/ft³ (2.56 kg/m³)

LIQUID DENSITY @ 21.1°C (70°F) and 1 atm: 56.71 lb/ft³ (908.41 kg/m³)

SPECIFIC GRAVITY @ 15°C (59°F) air = 1: 1.74

EVAPORATION RATE (nBuAc = 1): Not applicable.

FREEZING/MELTING POINT @ 1 atm: -153.9°C (-457°F)

EXPANSION RATIO: Not applicable.

SOLUBILITY IN WATER wt/wt @ 1 atm/25°C (77°F): 0.00114

COEFFICIENT WATER/OIL DISTRIBUTION: Log K_{ow} = 0.6 (calculated).

BOILING POINT @ 1 atm: -13.4°C (7.93°F)

pH: Not applicable.

VAPOR PRESSURE @ 21.1°C (70°F) psig: 35.3

ODOR THRESHOLD: 2000 ppm

SPECIFIC VOLUME (ft³/lb): 6.25

APPEARANCE AND COLOR: Colorless gas with a sweet, ethereal odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): The odor is not a reliable warning property. 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.

10. STABILITY and REACTIVITY

STABILITY: Stable with polymerization inhibitor. Without an inhibitor, storage for prolonged periods of time can form potentially hazardous peroxides by oxidization with atmospheric oxygen in the presence of a variety of contaminants.

DECOMPOSITION PRODUCTS: Decomposition products of Vinyl Chloride include the following toxic gases: carbon monoxide, carbon dioxide and hydrogen chloride gas and trace amounts of phosgene.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Vinyl Chloride is incompatible with strong oxidizers, copper and its alloys, aluminum, certain catalytic impurities, oxides of nitrogen. Vinyl Chloride can react violently with all these materials.

HAZARDOUS POLYMERIZATION: Hazardous polymerization can occur in the presence of air, sunlight or heat. Vinyl Chloride can cause violent polymerization in the presence of strong oxidizers. Vinyl Chloride also polymerizes violently upon contact with copper and its alloys, aluminum and certain catalytic impurities.

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 Vinyl Chloride (gas).

Microsomal Mutagenicity Assay-Salmonella typhimurium 1 pph

Cytogenetic Analysis-Human: HeLa cell 10 mmol/L

Inhalation-Man TCLO: 30 mg/m³ (5 years male): Reproductive effects

Inhalation-Man TCLO: 200 ppm/14 years: Carcinogenic effects,

Oral-Rat TDLo: 1 ppm/4 hours and 3463 mg/kg/52 weeks, intermittent: Carcinogenic effects

Inhalation-Rat TCLO: 10,000 ppm/4 hours (12-18 days preg): Carcinogenic effects, Teratogenic effects

Intraperitoneal-Rat TDLo: 21 mg/kg/65 weeks, intermittent: Equivocal tumorigenic agent

Subcutaneous-Rat TDLo: 21 mg/kg/6765 weeks, intermittent: Equivocal tumorigenic agent

Oral-Rat LD₅₀: 500 mg/kg

Inhalation-Mouse TCLO: 50 ppm/30 weeks: Carcinogenic effects

Inhalation-Hamster TCLO: 50 ppm/4H/30 weeks: Carcinogenic effects

Inhalation-Rat TC: 50 ppm/7H/26 weeks: Carcinogenic effects

Inhalation-Rat TC: 100 ppm/7H/26 weeks: Carcinogenic effects

Inhalation-Mouse TC: 50 ppm/47 weeks I: Carcinogenic effects

Oral-Rat TD: 34 g/kg/3 years, Intermittent: Carcinogenic effects

Inhalation-Mouse TC: 50 ppm/6H/4 weeks: Carcinogenic effects

Inhalation-Mouse TC: 50 ppm/4H/30 weeks: Carcinogenic effects

Inhalation-Rat TC: 250 ppm/2 Years, Intermittent: Carcinogenic effects

Inhalation-Human TC: 300 mg/m³/ weeks: Carcinogenic effects, Blood effects

Inhalation-Rat TC: 5 ppm/4H/52 weeks: Carcinogenic effects

Inhalation Rat TC: 50 ppm/6H-43 weeks: Carcinogenic effects

SUSPECTED CANCER AGENT: Vinyl Chloride is a known human carcinogen, which is listed by the following agencies: IARC-1 (Carcinogenic to Humans); MAK-A1 (Capable of Inducing Malignant Tumors/Human Evidence); NTP-1 (Known to be a Carcinogen); OSHA-X (Carcinogen); ACGIH-A1 (Confirmed Human Carcinogen); NIOSH-X (Carcinogen); Cal-OSHA (Carcinogen).

IRRITANCY OF PRODUCT: Vinyl Chloride can be mildly irritating to eyes and skin. Contact with the liquid or rapidly expanding gases can cause frostbite to exposed tissue.

SENSITIZATION TO THE PRODUCT: Vinyl Chloride is not known to be a sensitizer to humans upon prolonged or repeated contact.

11. TOXICOLOGICAL INFORMATION (Continued)

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of Vinyl Chloride on the human reproductive system.

Mutagenicity: Human mutation data are reported for Vinyl Chloride.

Embryotoxicity: There is insufficient evidence currently available to categorize Vinyl Chloride as embryotoxic to humans.

Teratogenicity: There is insufficient evidence currently available to categorize Vinyl Chloride as teratogenic to humans.

Reproductive Toxicity: Vinyl chloride is reported to produce adverse effects on the human reproductive system (i.e. changes in spermatogenesis).

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: Conditions relating to the target organs may be aggravated by overexposures to Vinyl Chloride. See Section 3 (Hazard Identification) for information on these conditions.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary. Treat symptoms and eliminate exposure. Refer to the OSHA Vinyl Chloride Standard (29 CFR 1910.1017; paragraph K and Appendix A) for specific information on Medical Surveillance requirements (i.e. for the general physical exam, medical history, serum specimens, specific tests, and re-examination protocol).

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

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: This gas will be dissipated rapidly in well-ventilated areas. There are limited data indicating the Vinyl Chloride is resistant to biodegradation in aerobic systems. Evaporation half-life from water is 0.45-2.5 hours.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This gas can be harmful to animal life. Suspected toxic effects on a variety of test animals during clinical studies indicate adverse effects on the central nervous system and liver. Plants may be damaged by frost produced in the presence of rapidly expanding gases. Additional data on the effects of Vinyl Chloride on plants are available as follows:

Increased production of hydrogen peroxide in germinating seeds exposed to Vinyl Chloride gas decreased their sulfhydryl content and thereby produced adverse effects and abnormalities in growth. Threshold levels of Vinyl Chloride were greater than 200 ppm and saturation level was 1000 ppm.

EFFECT OF CHEMICAL ON AQUATIC LIFE: The effect of Vinyl Chloride effects on aquatic life is not fully known. The following data are available for Vinyl Chloride.

Estimated Bioconcentration Factor of 7. Reported water solubility of 2,700 mg/L. Based on the BCF, Vinyl Chloride is not expected to significantly bioconcentrate in aquatic organisms.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Return cylinders with residual product to MESA Specialty Gases & Equipment. 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.

<u>PROPER SHIPPING NAME:</u>	Vinyl chloride, inhibited
<u>HAZARD CLASS NUMBER and DESCRIPTION:</u>	2.1 (Flammable Gas)
<u>UN IDENTIFICATION NUMBER:</u>	UN 1086
<u>PACKING GROUP:</u>	Not Applicable
<u>DOT LABEL(S) REQUIRED:</u>	Flammable Gas (Note: Per the requirements of the OSHA Vinyl Chloride Standard, 29 CFR 1910.1017, the additional legend "Cancer-Suspect Agent" must be applied near the label or placard).

11. TOXICOLOGICAL INFORMATION (Continued)

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

MARINE POLLUTANT: Vinyl Chloride is 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 MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: Vinyl Chloride is 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 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Vinyl Chloride	NO	YES	YES

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Vinyl Chloride = 1 lb.

CANADIAN DSL INVENTORY: Vinyl Chloride is listed on the DSL Inventory.

U.S. TSCA INVENTORY STATUS: Vinyl Chloride is listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Vinyl Chloride is regulated under 28 CFR 1910.1017 (OSHA Vinyl Chloride Standard). Vinyl Chloride is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 pounds. Depending on specific operations involving the use of Vinyl Chloride, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Under this regulation Vinyl Chloride is listed in Appendix A of this Standard and the threshold quantity for Vinyl Chloride is 15,000 pounds.

U.S. STATE REGULATORY INFORMATION: Vinyl Chloride is covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: Vinyl Chloride.

California - Permissible Exposure Limits for Chemical Contaminants: Vinyl Chloride.

Florida - Substance List: Vinyl Chloride.

Illinois - Toxic Substance List: Vinyl Chloride.

Kansas - Section 302/313 List: Methyl Chloride.

Massachusetts - Substance List: Vinyl Chloride.

Michigan - Critical Materials Register: Vinyl Chloride.

Minnesota - List of Hazardous Substances: Vinyl Chloride.

Missouri - Employer Information/Toxic Substance List: Vinyl Chloride.

New Jersey - Right to Know Hazardous Substance List: Vinyl Chloride.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: Vinyl Chloride.

Pennsylvania - Hazardous Substance List: Vinyl Chloride.

Rhode Island - Hazardous Substance List: Vinyl Chloride.

Texas - Hazardous Substance List: Vinyl Chloride.

West Virginia - Hazardous Substance List: Vinyl Chloride.

Wisconsin - Toxic and Hazardous Substances: Vinyl Chloride.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Vinyl Chloride is on the Proposition 65 lists. **WARNING**: Contains a chemical known to the State of California to cause cancer.

LABELING:

DANGER:

CANCER SUSPECT AGENT.

FLAMMABLE LIQUID AND GAS UNDER PRESSURE.

CAN FORM EXPLOSIVE MIXTURES WITH AIR.

MAY CAUSE LIVER, KIDNEY, SPLEEN AND OTHER ORGAN DAMAGE.

MAY CAUSE IRRITATION TO EYES, SKIN, AND MUCOUS MEMBRANES.

MAY CAUSE FROSTBITE.

Do not breathe gas.

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

Keep away from heat, flames, and sparks.

Store and use with adequate ventilation in closed systems.

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

Close valve after each use and when empty.

Use in accordance with the Material Safety Data Sheet.

15. REGULATORY INFORMATION (Continued)

LABELING (continued):

NOTE:

Suck-back into cylinder may cause rupture.
Always use a back flow preventative device in piping.

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 CONTACT, immediately flush eyes or skin with water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. (Discard contaminated shoes)

IN CASE OF FROSTBITE, obtain immediate medical attention.

DO NOT REMOVE THIS PRODUCT LABEL.

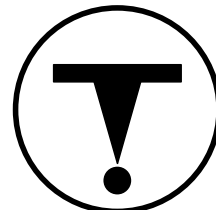
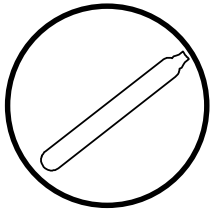
CANADIAN WHMIS SYMBOLS:

Class A: Compressed Gas.

Class B1: Flammable Gas

Class D1B Materials Causing Immediate and Serious Toxic Effects

Class D2A: Other Toxic Material



16. OTHER INFORMATION

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 MESA Specialty Gases & Equipment 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, MESA Specialty Gases & Equipment 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 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).

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 **TDL₀**, the lowest dose to cause a symptom and **TCL₀** 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. **Superfund Amendments and Reauthorization Act (SARA)**; the **Canadian Domestic Substances List (DSL)**; the U.S. **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)**; and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label.