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MATERIAL SAFETY DATA SHEET
GEBAUER’S ETHYL CHLORIDE®

II. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS NO.</th>
<th>Concentration</th>
<th>OSHA PEL</th>
<th>ACGIH TLV-TWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl Chloride</td>
<td>75-00-3</td>
<td>&gt;99</td>
<td>1000 ppm</td>
<td>100 ppm</td>
</tr>
</tbody>
</table>

III. HAZARDS IDENTIFICATION

<table>
<thead>
<tr>
<th>Health Rating</th>
<th>Flammability Rating</th>
<th>Reactivity Rating</th>
<th>Special Rating</th>
<th>Lab Protective Equipment</th>
<th>Storage Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - Moderate</td>
<td>4 - Acute</td>
<td>0 - None</td>
<td>None</td>
<td>Neoprene or Viton gloves, labcoat, goggles or face shield, vent hood.</td>
<td>Red (Flammable)</td>
</tr>
</tbody>
</table>

Inhalation

Headache, dizziness, nausea, vomiting, loss of coordination and disorientation may produce narcotic and anesthetic effects. May produce central nervous system depression, respiratory paralysis, or fatal coma with respiratory or cardiac arrest. May sensitize myocardium to endogenous epinephrine, causing dangerous dysrhythmias. Although absorbed through lungs and skin, it also is rapidly given off through the lungs.

Ingestion

Unlike route of exposure due to gaseous nature.

Skin Contact

Rapid evaporation of liquid may cause frostbite. Symptoms of frostbite are blanching of the skin, cold feeling numbness. Cutaneous sensitization may occur, but is extremely rare. Freezing can occasional alter pigmentation. A single prolonged skin exposure is not likely to result in absorption of harmful amounts.

Eye Contact

Is a slight irritant to mucosal tissues.

Chronic Exposure

Long term Exposure to high levels may produce the following: loss of muscle coordination, involuntary eye movements, tremors, speech disturbance, sluggish reflexes and hallucinations. These symptoms are alleviated when the overexposure is ended.

Aggravation of Preexisting Conditions

The defatting properties of Ethyl Chloride may aggravate existing dermatitis.

IV. FIRST AID MEASURES

Inhalation
Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

Ingestion
Unlike route of exposure due to gaseous nature.

Skin Contact
For exposure to liquid, immediately warm frostbite area with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an opthalmologist, immediately.

Eye Contact
For contact with the liquid, immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an opthalmologist, immediately.

Unusual Fire and Explosion Hazards
Flammable liquid and gas. Very dangerous fire hazard when exposed to heat, flame or powerful oxidizers. Ethyl chloride is heavier than air and the vapors may hug the ground, making distant ignition and flashback possible. During a fire, toxic gases (hydrogen chloride, chlorine and phosgene) may be produced. Direct exposure to flames may cause container explosion. Static discharge may ignite ethyl chloride.

V. FIRE FIGHTING MEASURES

Flash point - 11°F (-24°C) TCC, -7°F (-27°C) TOC
Autoignition temperature - 95°F (35°C)
FLAMMABLE LIMITS IN AIR (% by volume) - lower 1.8% Upper 15.4%

Special Fire Fighting Procedures
DANGER! Flammable liquid and gas. Evacuate all personnel from danger area. Use water spray to cool fire-exposed containers, structures and equipment. Use water spray, carbon dioxide or dry chemicals as extinguishing media. Remove sources of ignition if without risk. Remove all containers from fire area if without risk; continue cooling water spray while moving containers. Do not extinguish any flames emitted from containers, stop flow of material if without risk, or allow flames to burn out. Self contained breathing apparatus may be required by rescue workers.

Unusual Fire and Explosion Hazards
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VI. ACCIDENTAL RELEASE MEASURES

Spill and Leak Response
Flammable liquid and Gas. Eliminate all sources of ignition. Allow spilled ethyl chloride to evaporate, ventilate enclosed areas. In case of large spill, evacuate all personnel from area. For Entry Into Unknown Concentrations That Could Be IDLH (>3800 ppm): Full Face Self Contained Breathing Apparatus

Waste Disposal Method
Comply with federal, state and local laws; return unused quantities to Gebauer co by making appropriate arrangements for pick-up and transportation.

VII. HANDLING AND STORAGE

Storage Precautions
Store in cool, dry well ventilated area. Protect against physical damage. Do not subject to temperatures above 120°F (50°C). Do not store near high frequency ultrasound equipment or explosion proof electrical equipment.

Usage and Handling Precautions
Use in well-ventilated areas. Do not use near open flame.

VIII. EXPOSURE CONTROLS - PERSONAL PROTECTION

Ventilation/Engineering Controls
Use with adequate ventilation.

Respiratory Protection
For clinical setting: minimize inhalation of vapors by patient, especially when applying to head and neck. For large spills (>1000 ppm TWA and >3800 ppm instantaneous exposure): full face, positive pressure , self-contained breathing apparatus should be available for emergency use.

Skin Protection
Wear neoprene or viton gloves for exposures >1000 ppm TWA and >3800 ppm instantaneous exposure.

Eye Protection
Splash goggles or safety glasses.
**IX. PHYSICAL AND CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point (°F)</td>
<td>54.1°F (12.3°C)</td>
</tr>
<tr>
<td>Freezing Point (°F)</td>
<td>-213.9°F (-136.4°C)</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>Greater than 1</td>
</tr>
<tr>
<td>Vapor Density (Air = 1 @ 70°F)</td>
<td>2.23</td>
</tr>
<tr>
<td>Vapor Pressure (°F)</td>
<td>20.1 psig (5.4 psig)</td>
</tr>
<tr>
<td>Specific Gravity (°F)</td>
<td>0.8939</td>
</tr>
<tr>
<td>pH</td>
<td>Essentially neutral</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Slight by slow hydrolysis</td>
</tr>
<tr>
<td>Odor</td>
<td>Ethereal</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear and colorless liquid or gas</td>
</tr>
</tbody>
</table>

**X. STABILITY AND REACTIVITY**

**Stability**
- Normally stable in air. In presence of moisture, slowly hydrolyses forming hydrochloric acid.
- Carbon monoxide, hydrogen chloride gas, phosgene gas, and carbon dioxide.
- Alkali metals such as sodium, and potassium, powdered metals such as aluminum, zinc and magnesium and strong oxidizers.
- Not expected to occur.

**Incompatible Materials**
- Contact with incompatible materials and exposure to heat, sparks and other sources of ignition and exposure to high heat.

**Hazardous Decomposition Products**
- Gas is dissipated rapidly in a ventilated area.
- Suspected to have toxic effects with long term exposure to: central nervous system depression, liver and kidney. No information on adverse effects to plant life., except for frost produced upon evaporation.
- Carcinomas of the uterus were observed in female mice exposed to 15,000 ppm during the course of a 2-year inhalation study.
- Has been shown to be mutagenic in bacteria, with and without activation. A 2-year study in mice did not yield increases in bone marrow micronuclei.
- Normal stability in air. In presence of moisture, slowly hydrolyses forming hydrochloric acid.
- Carbon monoxide, hydrogen chloride gas, phosgene gas, and carbon dioxide.
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**Hazardous Polymerization**
- Incompatible materials and exposure to heat, sparks and other sources of ignition and exposure to high heat.

**Conditions to Avoid**
- Inhalation: Can produce varying degrees of intoxication; i.e. loss of coordination, drunkenness, possible convulsions, abdominal cramps, nausea and coma. It has been reported that concentrated vapors can produce narcotic and anesthetic effects in humans and may produce deep or even fatal anesthesia. Inhalation may also be irritating to the respiratory tract.
- Eye/Skin: Liquid spilled on skin may cause possible frostbite. For eye contact, there are no specific known effects., but the effects may be the same as contact with skin.
- Increased liver weights were observed in rats and mice after exposure to 2500, 5000, 10,000 and 19,000 ppm for 6 hrs/day, 5 dys/week for 13 weeks. No other effects were observed in the study.
- Carcinogenicity: Suspected to have toxic effects with long term exposure to: central nervous system depression, liver and kidney. No information on adverse effects to plant life., except for frost produced upon evaporation.
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**Environmental Stability**
- Gas is dissipated rapidly in a ventilated area.
- Suspected to have toxic effects with long term exposure to: central nervous system depression, liver and kidney. No information on adverse effects to plant life., except for frost produced upon evaporation.
- No evidence currently available.

**Effect on Aquatic Life**
- Effect on Plants and Animals
- Effect on Aquatic Life
- No evidence currently available.

**Effects of overexposure:**

**Acute**
- Inhalation: Can produce varying degrees of intoxication; i.e. loss of coordination, drunkenness, possible convulsions, abdominal cramps, nausea and coma. It has been reported that concentrated vapors can produce narcotic and anesthetic effects in humans and may produce deep or even fatal anesthesia. Inhalation may also be irritating to the respiratory tract.
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- No evidence currently available.

**Effect on Aquatic Life**
- No evidence currently available.

**Waste disposal must be in accordance with appropriate Federal, State and local regulations.**

**USA TSCA:**

**Listed: 100 LBS.**

**Europe EINECS:**

**Listed: 100 LBS.**

**Canada DSL:**

**Listed: 100 LBS.**

**Korea ECL:**

**Listed: 100 LBS.**

**Japan MITI (ENCS):**

**Listed: 100 LBS.**

**State Regulatory Information:**

**Ethyl Chloride is covered under:**
- The specific State regulations listed.

**California:**
- Designated Toxic and Hazardous Substances
- Permissible Exposure Limits for Chemical Contaminants
- Substance List
- Toxic Substance List
- Substance List
- Critical Materials Register
- List of Hazardous Substances
- Employer Information/Toxic Substance List
- Right to Know Hazardous Substance List
- Hazardous Substance
- Hazardous Substance List
- Toxic and Hazardous Substances

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- Toxic and Hazardous Substances

**California Proposition 65:**
- Ethyl Chloride is on the California Proposition 65 lists. This product contains a chemical known to the State of California to cause cancer.

This MSDS was revised and updated as of 11/25/02 by Gebauer Company.