SECTION I - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Brom-O-Gas 1%, Brom-O-Gas 0.5%, Brom-O-Gas 0.25%
Manufacturer: Great Lakes Chemical Corporation
Address: P.O. Box 2200
City: West Lafayette
State: Indiana
Zip: 47906-0200
Emergency Telephone Number: 1-800-949-5167
Information Telephone Number: 1-765-497-6100
Fax: 1-765-497-6123
Chemtrec Phone: 1-800-424-9300
Effective Date: 9/30/97
Supercede Date: 2/97
MSDS Prepared By: Regulatory Affairs Department/Great Lakes Chemical Corporation
Synonyms: None
Product Use: EPA Registered Pesticide
Chemical Name: Methyl bromide/chloropicrin mixture
Chemical Family: Alkyl bromide; halonitroalkane

Additional Information
No information available

SECTION II - COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>CAS No.</th>
<th>%</th>
<th>EXPOSURE LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloropicrin</td>
<td>76062</td>
<td>0.25 - 1</td>
<td>Y (Hazardous)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.1 ppm (OSHA PEL TWA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (OSHA PEL STEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (OSHA PEL CEIL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.1 ppm (ACGIH TLV TWA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (ACGIH TLV STEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (ACGIH TLV CEIL)</td>
</tr>
<tr>
<td>Methyl bromide</td>
<td>74839</td>
<td>99 - 99.75</td>
<td>Y (Hazardous)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (OSHA PEL TWA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (OSHA PEL STEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C20 ppm (Skin) (OSHA PEL CEIL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 ppm (Skin) (ACGIH TLV TWA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (ACGIH TLV STEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (ACGIH TLV CEIL)</td>
</tr>
</tbody>
</table>

*Mixture. Indented chemicals components of mixture.
Material Safety Data Sheet

MSDS Number: 00098
Product Name: Brom-O-Gas 1%, Brom-O-Gas 0.5%, Brom-O-Gas 0.25%

Effective Date: 9/30/97
Page: 2 of 12

Additional Information

Methyl bromide additional limits:
EPA Fumigation Limit = 5 ppm

Chloropicrin additional limits:
OSHA IDHL = 4 ppm
NIOSH REL = 0.1 ppm
EPA Fumigation Limit = 0.1 ppm

Section III - Hazards Identification

Emergency Overview:
Colorless gas at normal temperatures and pressures. Colorless liquid below boiling point of methyl bromide. Intensely irritating tear gas odor. Highly toxic. May be fatal if inhaled. Toxic. Harmful if swallowed. Corrosive to eyes. Corrosive to skin. Causes severe respiratory tract, nose and throat irritation. Mutagen May cause heart effects. Contact can result in chemical burns. Respiratory distress Lung damage Cardiac arrest Neurotoxic effects May cause central nervous system effects.

Relevant Routes of Exposure:
Ingestion, inhalation and skin absorption

Methyl Bromide:
Symptoms appear slowly and include: dizziness, blurred vision, lassitude, sensation of fatigue, staggering gait, slurred speech, nausea, vomiting, lack of appetite, and loss of muscle coordination. High concentrations can cause convulsions, very high concentrations cause lung damage. Chronic overexposure causes peripheral nerve damage. Prolonged skin and eye contact can cause burns.

Chloropicrin:
Chloropicrin is a powerful irritant with effects observed on all body surfaces. Liquid chloropicrin is corrosive to skin. It causes severe watering of the eyes, shortness of breath (pulmonary edema), dizziness, nausea and vomiting. Severe exposure may cause weak and irregular heartbeat, asthmatic attack and may be fatal. Skin wounds exposed to chloropicrin become septic.
SECTION III - HAZARDS IDENTIFICATION

Medical Conditions
Generally Aggravated By
Exposure:
Potential Health Effects: See Section XI for additional information.

Eyes:
Skin:
Ingestion:
Inhalation:

Potential Health Effects:
Corrosive to the eyes. May cause chemical burns.
Blurred vision
Prolonged eye exposure may result in blindness.
Corrosive to skin. May cause chemical burns.
Toxic. May be harmful if swallowed.
Highly toxic. May be fatal if inhaled. May cause severe mucous membrane and respiratory tract irritation, respiratory distress, irregular heartbeat, cardiac arrest and nervous system effects.

Carcinogenicity:
NTP:
IARC:
OSHA:
ACGIH:
OTHER:

Additional Information
Methyl bromide has been classified as Group 3 by IARC. An IARC Group 3 material exhibits limited evidence for carcinogenicity in experimental animals and no human data.

SECTION IV - FIRST AID MEASURES

Eyes: In all cases of overexposure, get medical attention immediately.
Take person to a doctor or emergency treatment facility.
If in eyes, hold eyelids open and flush with steady gentle stream of water for at least 15 minutes.

Skin: In all cases of overexposure, get medical attention immediately.
Take person to a doctor or emergency treatment facility.
If on skin, immediately remove contaminated clothing, shoes, and other items covering skin. Wash contaminated skin area thoroughly with soap and water.

Ingestion: In all cases of overexposure, get medical attention immediately.
Take person to a doctor or emergency treatment facility.
Do not give anything by mouth to an unconscious person.

Inhalation: In all cases of overexposure, get medical attention immediately.
Take person to a doctor or emergency treatment facility.
If inhaled, remove exposed person from contaminated area.
Keep warm. Make sure person can breathe freely. If breathing has stopped, give artificial respiration. Give oxygen if needed.
If not unconscious, rinse mouth out with water.

Antidotes: No information available

Notes to Physicians and/or Protection for First-Aiders: No information available
**Section IV - First Aid Measures**

No information available

**Section V - Fire Fighting Measures**

Flammable Limits in Air (% by Volume): Unknown for mixture
For methyl bromide: ~10-15%

Flash Point: None

Autoignition Temperature: Not available

Extinguishing Media: All conventional media are suitable.

Fire Fighting Instructions: Wear a self-contained breathing apparatus and protective clothing to prevent skin and eye contact in fire situations.

Unusual Fire and Explosion Hazards: Under fire conditions, toxic and irritating fumes may be emitted.
Containers can explode in fire situations. Use water spray to cool containers exposed to heat.
Non-flammable in concentrated form. See Flammable Limits in Air. Methyl bromide is ignitable by a high energy spark at the flammability limits listed above.
Heated material decomposes violently at 112 degrees C to severely toxic gases, especially in contact with metals.

Flammability Classification: Non-flammable gas

Known or Anticipated Hazardous Products of Combustion: Hydrogen bromide and/or bromine
Hydrogen chloride and/or chlorine
Oxides of nitrogen
Phosgene
Carbon monoxide and carbon dioxide

Additional Information

No information available
**SECTION VI - ACCIDENTAL RELEASE MEASURES**

Accidental Release Measures: Evacuate immediate area of spill or leak. Use a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator for entry into affected area to correct problem. Move leaking or damaged cylinders or containers outdoors or to an isolated location, observing strict safety precautions. Work upwind if possible. Allow spill to evaporate. Do not permit entry into spill area by persons without appropriate respiratory protection until concentration of methyl bromide is determined to be less than 5 ppm.

Personal Precautions: See Section VIII.

Environmental Precautions: No information available

Additional Information

**SECTION VII - HANDLING AND STORAGE**

Handling: Use appropriate personal protection equipment. Avoid eye, skin and clothing contact. Do not breathe mist or vapor. Persons moving or handling containers should wear protective clothing. Open container only in a well-ventilated area wearing protective clothing and respiratory protection if necessary. Cylinders should not be subjected to rough handling or mechanical shock such as dropping, bumping, dragging, or sliding. Do not use rope slings, hooks, tongs, or similar devices to unload cylinders. Transport cylinders using hand truck, fork truck or other device to which the cylinder can be firmly secured. Do not remove valve protection bonnet and safety cap until immediately before use. Replace safety cap and valve protection bonnet when cylinder is not in use. When cylinder is empty close, valve, screw safety cap onto valve outlet, and replace protection bonnet before returning to shipper. Only a registrant is authorized to refill cylinders. Do not use cylinders for any other purpose.

Storage: Store upright in a cool, dry, well-ventilated area under lock and key. Post as a pesticide storage area. Store cylinders upright, secured to a rack or wall to prevent tipping. Keep away from direct sunlight. Store away from heat, sparks, and flame. Keep container tightly closed.

Other Precautions: Methyl bromide has no odor at dangerous levels and is extremely hazardous. Do not contaminate water, food, or feed by storage or disposal.
SECTION VII - HANDLING AND STORAGE

No information available

SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: No information available
Ventilation Requirements: Use to keep levels below established threshold values. Use mechanical ventilation for general area control. Ventilation is essential when indoors.

Personal Protective Equipment:
Eye/Face Protection: Full face shield or safety glasses with brow and temple shields. Do NOT wear goggles.
Skin Protection: Do not use gloves. Loose-fitting or well ventilated long-sleeved shirt and pants. Shoes and socks. Do NOT wear jewelry, gloves, tight clothing, rubber protective clothing, or rubber boots when handling.
Respiratory Protection: If the concentration of methyl bromide as measured by detector tube exceeds 5 ppm at any time, all persons in fumigation area must wear NIOSH/MSHA approved SCBA.
Other Protective Clothing or Equipment: Pump and detector tubes for determining methyl bromide concentrations. Measure chloropicrin concentration with a Matheson-Kitagawa detection device using tube 172.
Exposure Guidelines: See Section II.
Work Hygienic Practices: Wash thoroughly after handling. Make sure piping is empty before doing maintenance work. All persons working with methyl bromide/chloropicrin should be trained in the hazards, use of required respirator equipment, emergency procedures and in the proper use of methyl bromide/chloropicrin as a fumigant where applicable.

SECTION IX - PHYSICAL & CHEMICAL PROPERTIES

Appearance: Colorless gas at normal temperatures and pressures. Colorless liquid below boiling point of methyl bromide.
Boiling Point: Not available (methyl bromide = 38.8 degrees F, chloropicrin = 233.6 degrees F)
Bulk Density: Not available
**SECTION IX - PHYSICAL & CHEMICAL PROPERTIES**

- **Color:** Colorless
- **Decomposition Temperature:** Not available
- **Evaporation Rate:** Not available
- **Evaporation Rate Basis:** Not available
- **Freezing Point:** Not available
- **Heat Value:** Not available
- **Melting Point:** Not available (chloropicrin = -83 degrees F)
- **Molecular/Chemical Formula:** CH3Br; CC13NO2
- **Molecular Weight:** NA
- **Octanol/Water Partition Coefficient:** Not available
- **Odor:** Intensely irritating tear gas odor
- **Odor Threshold:** Not available
- **Particle Size:** Not available
- **Percent Volatile:** Not available
- **pH Value:** Not available
- **pH Concentration:** Not available
- **Physical State:** Gas
- **Reactivity in Water:** Not water reactive
- **Saturated Vapor Concentration:** Not available
- **Softening Point:** Not available
- **Solubility in Water:** Not available (methyl bromide = 1.75 g/100 g of water at 68 degrees F, chloropicrin = 0.2 g/100g)
- **Specific Gravity or Density (Water=1):** Not available
- **Vapor Density:** Not available (methyl bromide = -3.27, chloropicrin = ~5.7)
- **Vapor Pressure:** Not available (methyl bromide=1400 at 68 degrees F, chloropicrin48.3 at 68 degrees F)
- **Viscosity:** Not available
- **Volatile Organic Compounds:** Not available
- **Water/Oil Distribution Coefficient:** Not available
- **Weight Per Gallon:** 14.3 pounds

**Additional Information**

No information available

**SECTION X - STABILITY AND REACTIVITY**

- **Stability:** Stable under normal conditions of handling and use.
  
  Bulk containers of chloropicrin have been found to be shock sensitive.
SECTION X - STABILITY AND REACTIVITY

Conditions to Avoid: None known

Incompatibility With Other Materials:
- Aluminum
- Magnesium
- Zinc
- Alkali metals
- Strong bases
- Organic amines
- Reducing agents
- Sulfuric acid
- Incompatible with containers or equipment made of aluminum, magnesium or their alloys.
- Aniline
- 3-Bromopropyne
- Propargyl bromide
- Sodium methoxide
- Sodium hydroxide/alcohol solutions

Hazardous Decomposition Products:
Thermal decomposition may produce the following:
- Hydrogen bromide and/or bromine
- Hydrogen chloride and/or chlorine
- Oxides of nitrogen
- Phosgene
- Carbon monoxide and carbon dioxide

Hazardous Polymerization: Will not occur

Additional Information
No information available

SECTION XI - TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>VALUE (LD60 OR LC50)</th>
<th>ANIMAL</th>
<th>ROUTES</th>
<th>COMPONENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 ppm/05 minutes</td>
<td>Rabbit</td>
<td>Acute Inhalation</td>
<td>Chloropicrin</td>
</tr>
<tr>
<td>3,120 ppm/15 Minutes</td>
<td>Rat</td>
<td>Acute Inhalation</td>
<td>Methyl Bromide</td>
</tr>
<tr>
<td>302 ppm/8H</td>
<td>Rat</td>
<td>Acute Inhalation</td>
<td>Methyl Bromide</td>
</tr>
<tr>
<td>11.9 ppm/4H</td>
<td>Rat</td>
<td>Acute Inhalation</td>
<td>Chloropicrin</td>
</tr>
<tr>
<td>214 mg/kg</td>
<td>Rat</td>
<td>Acute Oral</td>
<td>Methyl Bromide</td>
</tr>
<tr>
<td>250 mg/kg</td>
<td>Rat</td>
<td>Acute Oral</td>
<td>Chloropicrin</td>
</tr>
</tbody>
</table>

Toxicological Information: Methyl Bromide:
An inhalation LC50 of 60,000 ppm for 2 hours has been found in humans. Methyl bromide is a poison and can cause respiratory distress, cardiac arrest and central nervous system effects. Overexposure may cause neurotoxic effects from which recovery may be slow. Methyl bromide demonstrates genotoxicity in several test systems at levels above the TLV. In
a two year inhalation cancer bioassay with rats at 3, 30 and 90 ppm no tumors were observed. In a two generation inhalation reproduction study with rats at 3, 30 and 90 ppm the no observed effect level was 3 ppm. At the higher doses organ weight variation was observed in some offspring.

Chloropicrin:
The inhalation LC50 for cats, rabbits and guinea pigs is 120 ppm for 20 minutes. The intraperitoneal LD50 in the mouse is 25 mg/kg. The intravenous LD50 in the guinea pig is 4.2 mg/kg. The human TCLO is 298 ppm for 10 minutes. The oral TDLO in the mouse is 26,000 mg/kg/78 weeks.

Additional Information
No information available

**SECTION XII - ECOLOGICAL INFORMATION**

Ecological Information: These products are toxic to fish and wildlife. Keep out of lakes, streams and ponds. Do not contaminate water by cleaning of equipment or disposal of wastes.

Chloropicrin will decompose in the environment. The photodegradation half life is 20 days. Bioaccumulation in fish is not expected. Acutely toxic to animals, plants and aquatic organisms. Do not release to the environment.

Additional Information
No information available

**SECTION XIII - DISPOSAL CONSIDERATIONS**

Disposal Considerations: Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Additional Information
Return empty cylinders freight collect to the Great Lakes Chemical Corporation location from which shipment was made. Close cylinder valve by turning clockwise until hand tight. Disconnect lines. Replace safety caps and bonnet. Return partial cylinders only after consulting Great Lakes Chemical Corporation for proper shipping instructions.

**SECTION XIV - TRANSPORT INFORMATION**

**U.S. DOT**

Proper Shipping Name: Methyl Bromide
Hazard Class: 2.3
ID Number: UN1062
Packing Group: N/A
**SECTION XIV - TRANSPORT INFORMATION**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labels</td>
<td>Poison Gas</td>
</tr>
<tr>
<td>Special Provisions</td>
<td>3,B14</td>
</tr>
<tr>
<td>Packaging Exceptions</td>
<td>None</td>
</tr>
<tr>
<td>Non-Bulk Packaging</td>
<td>193</td>
</tr>
<tr>
<td>Bulk Packaging</td>
<td>314, 315</td>
</tr>
<tr>
<td>Air/Rail Limit</td>
<td>Forbidden</td>
</tr>
<tr>
<td>Air Cargo Limit</td>
<td>25 kg</td>
</tr>
<tr>
<td>Vessel Stowage</td>
<td>D</td>
</tr>
<tr>
<td>Other Stowage</td>
<td>40</td>
</tr>
<tr>
<td>Reportable Quantity</td>
<td>1000 lbs</td>
</tr>
</tbody>
</table>

**AIR - ICAO OR IATA**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>Forbidden</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>N/A</td>
</tr>
<tr>
<td>ID Number</td>
<td>N/A</td>
</tr>
<tr>
<td>Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>Packing Group</td>
<td>N/A</td>
</tr>
<tr>
<td>Hazard Labels</td>
<td>N/A</td>
</tr>
<tr>
<td>Packing Instructions</td>
<td>N/A</td>
</tr>
<tr>
<td>Air Passenger Limit Per Package</td>
<td>N/A</td>
</tr>
<tr>
<td>Packing Instruction - Cargo</td>
<td>N/A</td>
</tr>
<tr>
<td>Air Cargo Limit Per Package</td>
<td>N/A</td>
</tr>
<tr>
<td>Special Provisions Code</td>
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</table>

**WATER - IMDG**

<table>
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<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>Chloropicrin and methyl bromide mixture</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>2.3</td>
</tr>
<tr>
<td>ID Number</td>
<td>UN1581</td>
</tr>
<tr>
<td>Packing Group</td>
<td>N/A</td>
</tr>
<tr>
<td>Risk</td>
<td>Toxic Gas</td>
</tr>
<tr>
<td>Emergency Procedures Code</td>
<td>NA</td>
</tr>
<tr>
<td>Medical First Aid Guide Code</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Additional Information**

Poison Inhalation Hazard

**SECTION XV - REGULATORY INFORMATION**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Federal Regulations</td>
<td>The components of this product are either on the TSCA Inventory or exempt (i.e. impurities) from the Inventory. These products are offered as EPA registered pesticides.</td>
</tr>
</tbody>
</table>
**SECTION XV - REGULATORY INFORMATION**

**SARA 313**

The following materials are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

- Methyl Bromide (De Minimus Concentration = 1%)
- Chloropicrin (De Minimus Concentration = 1%)

**CERCLA Reportable Quantities:**
Methyl Bromide = 1,000 lbs.

In compliance with Section 611 of the Clean Air Act:
**WARNING:** Contains methyl bromide, a substance which harms public health and environment by destroying ozone in the upper atmosphere.

**State Regulations:**
- New Jersey Right To Know - Yes
- Pennsylvania Right To Know - Yes
- Massachusetts Right To Know - Yes
- California Proposition 65 - Yes

Methyl bromide is listed as a reproductive toxin for structural fumigation uses by California.

**International Regulations:**
This material (or each component) is listed on the following inventories:
- Canada - DLS
- EU - EINECS
- Japan - ENCS
- Korea - ECL
- Canadian Disclosure List (0.1%) - Chloropicrin

**SARA Hazards:**
- **Acute:** Yes
- **Chronic:** Yes
- **Reactive:** No
- **Fire:** No
- **Pressure:** No

**Additional Information**

The above regulatory information represents only selected regulations and is not meant to be a complete list.
SECTION XVI - OTHER INFORMATION

NFPA Codes:
- Health: 3
- Flammability: 1
- Reactivity: 0
- Other: N

HMIS Codes:
- Health: 3
- Flammability: 0
- Reactivity: 1
- Protection: x

Label Statements: Not available

Other Information: Abbreviations:
- (L) = Loose bulk density in g/ml
- LOEC = Lowest observed effect concentration
- MATC = Maximum acceptable toxicant concentration
- NA = Not available
- N/A = Not applicable
- NL = Not limited
- NOEC = No observed effect concentration
- NR = Not rated
- (P) = Packed bulk density in g/ml
- PNOC = Particulates Not Otherwise Classified
- PNOR = Particulates Not Otherwise Regulated
- REL = Recommended exposure limit
- TS = Trade secret

Additional Information
Information on this form is furnished solely for the purpose of compliance with OSHA’s Hazard Communication Standard, 29CFR 1910.1200 and The Canadian Environmental Protection Act, Canada Gazette Part II, Vol. 122, No. 2 and shall not be used for any other purpose.

Revision Information:
- Replaces JSD: 999
- New Format