

**RESTRICTED USE PESTICIDE**

**DUE TO ACUTE TOXICITY**

For retail sale to and use only by Certified Applicators, or persons under their direct supervision, and only for those uses covered by the Certified Applicator's certification.

**TRICAL**

**METHYL BROMIDE 98%**

**FOR USE ONLY BY PROFESSIONAL FUMIGATORS**

ACTIVE INGREDIENTS:

Methyl Bromide ..... 98%

Chloropicrin ..... 2%

Revised Label

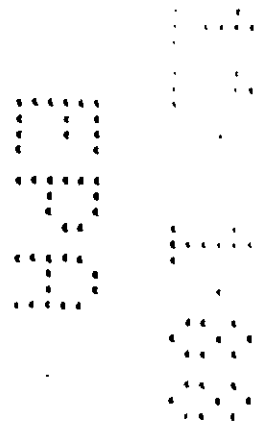
Oct. 1987

**ACCEPTED**

**11220-17**


**SEP 6 1989**

UNDER THE FEDERAL INSECTICIDE  
FUNGICIDE AND RODENTICIDE ACT  
FOR ECONOMIC POISON REGISTER  
ED UNDER NO. .... SUBJECT  
TO ATTACHED COMMENTS.



FRONT PANEL

**KEEP OUT OF REACH OF CHILDREN**

**DANGER**  **PELIGRO**

**POISON**

**PRECAUCION AL USARIO:** Si usted no lee Ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

**IN ALL CASES OF OVEREXPOSURE, GET MEDICAL ATTENTION IMMEDIATELY. TAKE PERSON TO A DOCTOR OR AN EMERGENCY TREATMENT FACILITY**

**STATEMENT OF PRACTICAL TREATMENT**

**IF INHALED:** Get exposed person to fresh air. Keep warm. Make sure person can breathe freely. If breathing has stopped, give artificial respiration. Give oxygen if needed. Do not give anything by mouth to any unconscious person. Seek medical attention.

**IF ON SKIN:** Immediately remove contaminated clothing, shoes and other items covering the skin. Wash contaminated skin area thoroughly with soap and water.

**IF IN EYES:** Hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes.

**NOTE TO PHYSICIAN:** Early symptoms of overexposure are dizziness, headache, nausea and vomiting, weakness and collapse. Lung edema may develop in 2 to 48 hours after exposure, accompanied by cardiac irregularities; these effects are the usual cause of death. Repeated overexposures can result in blurred vision, staggering gait and mental imbalance, with probable recovery after a period of no exposure. Blood bromide levels suggest the occurrence, but not the degree, of exposure. Treatment is symptomatic.

See Side Panel For Additional Precautionary Statements

*Red*

*Red*

*Red Headings*

*Red Border*

# TRICAL

P.O. BOX 1327 • HOLLISTER, CA 95024

FRONT PANEL

E.P.A. EST. 11220-CA-1,2,3,4;FL-1  
E.P.A. REG. NO. 11220-RT

NET CONTENTS..... LBS.:

**PRECAUTIONARY STATEMENTS  
HAZARD TO HUMANS  
AND DOMESTIC ANIMALS:**

**DANGER**

**EXTREMELY HAZARDOUS LIQUID AND  
VAPOR UNDER PRESSURE.**

**INHALATION MAY BE FATAL OR CAUSE  
SERIOUS ACUTE ILLNESS OR DELAYED LUNG  
OR NERVOUS SYSTEM INJURY.**

**DO NOT BREATHE VAPORS.**

**LIQUID OR EXCESSIVE VAPOR CAN CAUSE  
SERIOUS SKIN OR EYE INJURY WHICH MAY  
HAVE A DELAYED ONSET.**

**DO NOT GET LIQUID ON SKIN, IN EYES,  
OR ON CLOTHING.**

**THIS PRODUCT CONTAINS CHLOROPICRIN AS A WARNING  
ODORANT. CHLOROPICRIN MAY BE IRRITATING TO THE UPPER  
RESPIRATORY TRACT, AND EVEN AT LOW LEVELS CAN CAUSE  
PAINFUL IRRITATION TO THE EYES, PRODUCING TEARING.  
IF THESE SYMPTOMS OCCUR, LEAVE THE FUMIGATION  
AREA IMMEDIATELY.**

**OBSERVE THE FOLLOWING PRECAUTIONS:**

### GENERAL PRECAUTIONS

1. Do not get in eyes, on skin, or on clothing.
2. Do not spill or discharge contents outside of areas confined for treatment.
3. Comply with all local regulations and ordinances.
4. It is advisable to supply your physician with information on Methyl Bromide. Literature is available from your dealer or distributor.
5. Obtain medical assistance at once in case of illness after exposure, and do not allow conditions which could accidentally cause further exposure until recovery is complete. (See Note to Physician.)

### RESPIRATORY PROTECTION

If the concentration of methyl bromide in the working area, as measured by a direct-reading detector device (such as a Dräger gas detector) does not exceed 5 ppm (20 mg/cu.m), no respiratory protection is required. If this concentration is exceeded at any time, all persons in the fumigation area must wear protective clothing and a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator (such as a U.S. Bivets' Survivor or comparable device).

Under normal soil fumigation conditions, the concentration of methyl bromide in the working area will not generally exceed 5 ppm as a time-weighted average and no respiratory protection is required. However, there is the possibility of a spill or leak during soil fumigation. Therefore, a SCBA or combination air-supplied/SCBA respirator must be available and will be required for entry into an affected area in the event of a leak or spill.

### CLOTHING PRECAUTIONS

1. Wear loose clothing and socks that are cleaned after each wearing. Do not wear jewelry, gloves, or tight clothing when handling. Methyl Bromide is heavier than air and may be trapped inside clothing and cause skin injury. If full-face respiratory protection is not required, wear goggles or full face shield for eye protection when handling liquid.
2. Following application, immediately remove clothing, shoes, and socks. Do not reuse contaminated clothing or shoes until thoroughly cleaned and aerated. Drenched clothing cannot be adequately decontaminated.
3. Do not wear gloves of any type, or rubber protective clothing or rubber boots.

### WARNING SIGNS

(Structural, Transportation, Space Fumigation)

1. The applicator must placard or post all entrances to the fumigated area with signs bearing in English and Spanish:
  - (1) The signal word DANGER/PELIGRO and the skull and crossbones symbol.
  - (2) The statement, "Area under fumigation. DO NOT ENTER/NO ENTRE".
  - (3) The date of fumigation.
  - (4) Name of fumigant used.
  - (5) Name, address, and telephone number of the applicator.
2. Do not remove a placard until the treated space is completely aerated. To determine whether aeration is complete, each fumigated site must be monitored and shown to contain less than 5 ppm methyl bromide. If less than 5 ppm methyl bromide is detected, the placard may be removed.
3. Boilers must be placarded with S.O.T. specified warning signs. Warning signs are available from your dealer or distributor.

### SPILL OR LEAK PROCEDURE

1. Evacuate the immediate area of the spill or leak. Use SCBA or combination air-supplied/SCBA respirator for entry into the 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 unprotected persons until concentration of methyl bromide is determined to be less than 5 ppm (20 mg/cu.m).
2. Contaminated soil, water, and other cleanup debris is a toxic hazardous waste. Report spill to the National Response Center (800-424-8802) if the reportable quantity of 1000 lbs. is exceeded.

SEE PRECAUTIONS CONTINUED THIRD COLUMN

**PRECAUTIONS FOR STRUCTURAL,  
TRANSPORTATION, OR SPACE FUMIGATION USE**

**GENERAL PRECAUTIONS:**

1. Keep animals, children and unauthorized people away from area under treatment until area is certified free of Methyl Bromide. (See aeration statement.)
2. When used for fumigation of enclosed spaces, (houses and other structures, warehouses, vaults, chambers, greenhouses, trucks, vans, boxcars, ships, and other transport vehicles, and tarpaulin-covered areas) two persons trained in the use of this product must be present during introduction of the fumigant, initiation of aeration, and after aeration when testing for reentry. Two persons do not need to be present if monitoring is conducted remotely (outside the area being fumigated).
3. Do not fumigate with this product when temperature is below 40 degrees F.
4. Whenever possible, apply Methyl Bromide from outside of structure or car being fumigated. Make sure the fumigated area is properly sealed and posted. Do not move trucks, trailers, or vans during fumigation. They must be completely aerated before movement is allowed.

**AERATION AND REENTRY:**

1. After fumigation, treated areas must be aerated until the level of methyl bromide is below 5 ppm (20 mg/cu.m).
2. Do not allow entry into the treated area by any person before this time unless loose clothing and a respiratory protection device (SCBA or combination air-supplied/SCBA) is worn.

**PRECAUTIONS FOR SOIL FUMIGATION USE****PRIOR TO FUMIGATION:**

1. Comply with all local regulations and ordinances. Obtain an application permit from Agricultural Regulatory Agencies as required.
2. Never fumigate alone. It is imperative always to have an assistant and proper protective equipment in case of accidents.
3. Drivers of application equipment must advise other workers of all precautions and procedures. In addition, drivers must instruct their helpers in the mechanical operation of the tractor and how to safely work with the tractor and driver while fumigating.
4. Handle this fumigant in the open, with the operator "up wind" from the container where there is good ventilation.
5. Check fumigant pressure system for leaks before beginning operation.
6. Two trained persons must be present during introduction of the fumigant.
7. When fumigating soil from a tractor, 5 gallons of water must be carried on the tractor and placed where it is readily accessible. In addition to water available on the tractor, at least 5 gallons of additional water must be available from the service truck. This water must be potable and in containers marked "Decontamination water not to be used for drinking."
8. Field should be reasonably free of trash before starting the fumigation.

**DURING FUMIGATION:**

1. This fumigant should not be applied when there is an atmospheric inversion. Since uncomfortable concentrations of chloropicrin may drift to nearby areas, immediately cover treated area with plastic tarpaulin for a minimum of 48 hours when the injection depth is less than 10".
2. Do not lift injection shanks to turn at the end of a pass until fumigant has drained from system following closure of shutoff valve.
3. If trash is inadvertently pulled by the shanks to the ends of the field when fumigating, it must be covered by lifting the shanks, then covering the trash with polyethylene film before making the turn for the next pass.
4. When changing the cylinders, be certain they are turned off and fumigant system is not under pressure. Do not open the system when there are people or structures downwind where exposures above the permissible exposure levels could occur.

**FOLLOWING FUMIGATION:**

1. Post all treated areas with warning signs, available from your dealer.
2. No children, unauthorized people, or animals should be in the fumigation area for 48 hours.
3. When tarpaulin is used, two trained persons must be present during removal of the tarpaulin.

**SPILL AND LEAK PROCEDURE:**

1. In case of a rupture of hose or fitting while applying fumigant immediately stop tractor and motor. Evacuate immediate area of spill or leak. Use SCBA or combination air-supplied/SCBA respirator for entry into affected area to correct the problem. Approach from upwind to make necessary repairs.
2. Do not reenter area without respiratory protection until spill has evaporated or leak has been fixed.

**NOTE CAREFULLY:**

Fumigation may temporarily raise the level of ammonia nitrogen and soluble salts in the soil. This is most likely to occur when heavy rates of fertilizer and fumigant are applied to soils that are either cold, wet, acid, or high in organic matter. To avoid injury to plant roots, fertilize as indicated by soil tests made after fumigation. To avoid ammonia injury and/or nitrate starvation to crops, avoid using fertilizers containing ammonium salts and use only fertilizers containing nitrates until after the crop is well established and the soil temperature is above 65 degrees F. Liming highly acid soils before fumigation stimulates nitrification and reduces the possibility of ammonia toxicity.

### ENVIRONMENTAL HAZARD

This pesticide is toxic to wildlife. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public waters unless this product is specifically identified and addressed in an NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

For space fumigation use, monitor area immediately surrounding the fumigation site with a halide detector during exposure and aeration periods to establish that dangerous levels of the fumigant are not present (see aeration statement for halide detector use).

The high volatility of the fumigant permits it to be vented from space being fumigated and to dissipate rapidly with no hazard to surrounding areas with correct monitoring.

### CHEMICAL HAZARD

Methyl Bromide is practically nonflammable. There is no danger from fire or explosion in use concentrations. However, flame can change the chemical to produce some corrosive damage to items in the space being fumigated. Pilot lights and glowing wire heaters should be turned off.

Do not apply gas directly to metal surfaces because of possible corrosive effect on certain metals.

Do not use containers or application equipment made of magnesium, aluminum or their alloys.

The following materials can develop undesirable odor when encountered in structural fumigation and should be removed from the space being fumigated:

1. Foodstuffs: (a) Iodized salt (b) Full-fat soya flour (c) Any kinds of materials that contain reactive sulfur compounds, such as some soap powders, some baking sodas and some salt blocks used for cattle licks.
2. Certain rubber goods: (a) Sponge rubber (b) Foam rubber, as in rug padding, pillows, cushions, and mattresses (c) Rubber stamps and other similar forms of reclaimed rubber.
3. Furs, horsehair and pillows (Especially feather pillows).
4. Leather goods--particularly white kid or any other leather goods tanned with sulfur processes.
5. Woolens--extreme caution should be used in the fumigation of any angora woolens, and some adverse effect has been noted on the fumigation of woolen suits, coats, blankets, hand-knit woolen socks, sweaters, shawls and woolen yarn.
6. Viscose rayons--those rayons processed or manufactured by a process in which carbon bisulphide is used.
7. Paper: (a) Silver-polishing papers (b) Certain writing papers cured by sulphide processes (c) Carbonless paper (d) Blue-prints.
8. Photographic chemicals as used in photo processing darkrooms. (does not include camera film).
9. Rug padding.
10. Cinder blocks.
11. Mixed concrete, which occasionally picks up odors.
12. Any materials that may contain reactive sulfur compounds.  
THESE PRODUCTS MAY HINDER EFFECTIVENESS OF THE FUMIGANT:  
Charcoal materials--charcoal absorbs the Methyl Bromide reducing the effective concentration and contaminating the charcoal.
13. If there is a question whether a material may develop an odor, a test fumigation may be run with a small quantity of the material.

### DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in any manner inconsistent with its labeling.

### STORAGE AND DISPOSAL

#### STORAGE AND HANDLING:

Store in dry, cool, well-ventilated area under lock and key. Post as a pesticide storage area. Do not contaminate water, food, or feed by storage. 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. Store cylinders upright, secured to a rack or wall to prevent tipping. 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 the registrant is authorized to refill cylinders. Do not use cylinders for any other purpose. Follow registrant's instructions for return of empty or partially empty cylinder.

#### RETURN OF CYLINDERS:

Cylinders are the property of:

Trical 6770 Hwy. 25 Hollister, CA 95023	Trical 1029 Railroad St. Corona, CA 91720
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and should be returned promptly by collect auto freight. Do not ship cylinders without safety caps or valve protection bonnets. When a cylinder is partially full and there is no further requirement for the product, contact TRICAL for return instructions.

#### SHIPPING:

This fumigant is classified in the U.S. Department of Transportation Hazardous Materials Regulations as Methyl Bromide Liquid or Methyl Bromide and Nonflammable, Non-liquefied compressed gas mixture, Liquid, class "B" poison (inhalation hazard) and no exemptions from specifications, packaging, marking or labeling are allowed. Describe empty cylinders as having last contained Methyl Bromide Liquid or Methyl Bromide and Nonflammable, Non-liquefied compressed gas mixture, Liquid (inhalation hazard). Do not ship with foods, feeds, or clothing.

#### DISPOSAL:

Do not contaminate water, food or feed by storage or disposal. 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.



**GENERAL INSTRUCTIONS**

THIS FUMIGANT IS A HIGHLY HAZARDOUS MATERIAL AND SHOULD BE USED ONLY BY INDIVIDUALS TRAINED IN ITS PROPER USE. BEFORE USING, READ AND FOLLOW ALL LABEL PRECAUTIONS AND DIRECTIONS, INCLUDING THE ATTACHED MANUAL. ALL PERSONS WORKING WITH THIS FUMIGANT MUST BE KNOWLEDGEABLE ABOUT THE HAZARDS, AND TRAINED IN THE USE OF REQUIRED RESPIRATOR EQUIPMENT AND DETECTOR DEVICES, EMERGENCY PROCEDURES, AND PROPER USE OF THE FUMIGANT.

**SPACE****FUMIGATION DIRECTIONS**

When using methyl bromide as a space fumigant, the applicator must placard or post all entrances to the fumigated area with signs bearing, in English and Spanish:

1. The signal word DANGER/PELIGRO and the skull and crossbones symbol.
2. The statement, "Area under fumigation, DO NOT ENTER/NO ENTRE".
3. The date of fumigation.
4. Name of fumigant used.
5. Name, address, and telephone number of the applicator.

Any person who transfers a treated commodity to another site without aeration must ensure that the new site is placarded until the commodity is aerated below the threshold concentration.

Only a certified applicator may remove placards, and only when the concentration of methyl bromide in the treated site or commodity is below 5 ppm.

**A. CHAMBER FUMIGATION**

Before introducing the fumigant, place warning signs on all doors. Two people should be present when introducing the fumigant and opening the door after fumigation. All controls should be outside the chamber.

Load the chamber with the material to be fumigated, close exhaust ports, turn on circulating fan and close chamber door. Determine the proper rate of application and exposure time from the appropriate table. Vaporize the liquid in the chamber by spraying it into the air stream in front of a blower or fan, passing it through a vaporizer, or allowing it to evaporate from a shallow pan.

At the end of the exposure period, aerate by opening the exhaust port, turning on the exhaust fan and opening the chamber door slightly to permit fresh air to enter. NOTE: Always check completeness of aeration with detection devices before allowing unprotected persons to enter the chamber.

**B. VACUUM CHAMBER FUMIGATION**

1. Place material to be fumigated in the steel chamber and draw the desired vacuum.
2. Release fumigant into the chamber (usually through a heating unit to ensure complete vaporization).
3. See Table II for specific commodities, rate of application and exposure time.
4. At the end of the exposure time, release the vacuum and change the air in the chamber at least two times. A vacuum of 15 in. Hg. should be drawn for this purpose.

**C. TRUCK, VAN OR TRAILER FUMIGATION**

1. Seal the off-side door, ventilators and other openings from the inside.
2. Use a closed-ended, perforated tube to distribute fumigant evenly. Secure the tube to the ceiling so the perforations direct fumigant toward the floor and prevent it from spraying the ceiling. Always apply fumigant from outside the truck, van or trailer.
3. Seal the door and place warning signs on both sides of the truck, van or trailer. Fumigated areas must be placarded on all entrances. Do not remove warning signs until the fumigated area is completely aerated and safe for entry, as indicated by a suitable detector.
4. Do not fumigate while strong winds are blowing.
5. Consult Table II for specific commodities, rate of application and exposure time.
6. After 12 to 18 hours, open the unit and aerate 1 to 1½ hours. The truck, van or trailer may then be resealed for shipment. **DO NOT MOVE TRUCKS, VANS OR TRAILERS DURING FUMIGATION. THEY MUST BE AERATED TO BELOW 5 PPM BEFORE MOVEMENT IS ALLOWED.**
7. Advise consignee to check the truck, van or trailer for proper aeration on arrival.

**D. RAILROAD CAR FUMIGATION**

1. Seal the off-side door, ventilators and other openings from the inside.
2. Use a closed-ended perforated tube to distribute fumigant evenly. Secure the tube to the ceiling so the perforations direct fumigant toward the floor and prevent it from spraying the ceiling. Always apply fumigant from outside the car.
3. Seal the door and place warning signs on both sides of the car. Fumigated areas must be placarded on all entrances with warning signs. Do not remove warning signs until the fumigated area is completely aerated and safe for entry, as indicated by a suitable detector.
4. Do not fumigate while strong winds are blowing.
5. Consult Table II for rate of application and exposure time.
6. After 12 to 18 hours, open the unit and aerate for 1 to 1½ hours. The car may then be resealed for shipment. **DO NOT MOVE RAILCARS DURING FUMIGATION. THEY MUST BE AERATED TO BELOW 5 PPM BEFORE MOVEMENT IS ALLOWED.**
7. Advise consignee to check the car for proper aeration on arrival.

**TARPAULIN FUMIGATION**

The stacked material should be placed on a concrete floor or other air-tight surface. If the floor is not air-tight, it may be made so by laying Sisal Kraft paper, tar paper or additional tarpaulin or polyethylene sheeting on it. Center 4 or 8 sacks on top of the stack to provide space for gas expansion. Place an evaporating pan with an anchored applicator tube in the center of the expansion dome. Cover and seal the stack with a gas tight tarpaulin or polyethylene sheeting of 4 mil or greater thickness. Connect the tube to the gas cylinder. Release the fumigant. Use rate and exposure time shown in Table. // When fumigation is complete, partially remove the tarpaulin and leave it for 30 minutes. This allows partial aeration before the cover is completely removed.

**WAREHOUSE, STRUCTURAL & FOOD PLANT FUMIGATION**

Check with appropriate municipal and county authorities before fumigating to be completely familiar with local regulations. Ordinances may require watchmen, padlocks, or warning posters during and after fumigation and/or notification of the nearest fire station. Notify anyone who would normally be in the area before fumigating.

1. Remove food and feed commodities before fumigation.
2. See Table II for rate of application and pests controlled.
3. Seal the building by closing all external openings, including roof ventilators, chimneys, drain pipes, tunnels, etc. Fumigated areas must be placarded on all entrances with signs containing at least the signal word DANGER and the Skull and Crossbones, and the words "Area under fumigation, do not enter until completely aerated", the date of fumigation, name of fumigant used, emergency telephone number for contact, and the name and address of the fumigator. Do not remove warning signs until the fumigated area is completely aerated and safe for entry, as indicated by a suitable detector.
4. Seal all floor and roof cracks and around eaves.
5. Take special care to seal partitions to adjacent storage or work areas in the building. When using tarps, the soil surface should be sealed by using sand or water snakes or by trenching and burying the edge of the tarp in the trench and covering with soil or sand followed by the application of water. When using sand snakes, the soil surface should be premoistened if necessary.
6. Doors and hatches on milling machinery should be opened prior to fumigation. These include elevator boots, conveyor lids, settling chamber doors, dust trunks, and any other openings that will allow fumigant into the equipment.
7. Clear adjoining buildings sharing a common wall. If they cannot be cleared, check frequently with an approved detector to insure the safety of the occupants.

**SHIPBOARD, IN-TRANSIT SHIP OR SHIPHOLD FUMIGATION**

**IMPORTANT.** Shipboard, in-transit ship or shiphold fumigation is also governed by the U.S. Coast Guard Regulations. Refer to and comply with those regulations prior to fumigation.

**PREFUMIGATION PROCEDURES**

1. Prior to fumigating a vessel for in-transit cargo fumigation, the master of the vessel or his representative, and the fumigator must determine whether the vessel is suitably designed and configured so as to allow for safe occupancy by the ship's crew throughout the duration of the fumigation. If it is determined that the design and configuration of the vessel does not allow for safe occupancy by the ship's crew throughout the duration of the fumigation, then the vessel will not be fumigated unless all crew members are removed from the vessel. The crew members will not be allowed to reoccupy the vessel until the vessel has been properly aerated and a determination has been made by the master of the vessel and the fumigator that the vessel is safe for occupancy (5 ppm or below).
2. The person responsible for the fumigation must notify the master of the vessel, or his representative: 1) of the requirements relating to the use of gas masks or respirators for the fumigant jointly approved by NIOSH/MSHA; 2) detection equipment; and 3) that a person qualified in the use of this equipment must accompany the vessel with cargo under fumigation. Emergency procedures, cargo ventilation, periodic monitoring and inspections, and first aid measures must be discussed with and understood by the master of the vessel or his representative.
3. During fumigation, or until a manned vessel leaves port or the cargo is aerated, the person in charge of the fumigation shall insure that a qualified person using gas or vapor detection equipment tests spaces for fumigation leakage. If leakage of the fumigant is detected, the person in charge of the fumigation shall take action to correct the leakage, or shall inform the master of the vessel, or his representative, of the leakage so that corrective action can be taken.
4. If the fumigation is not completed and the vessel aerated before the manned vessel leaves port, the person in charge of the vessel shall (ensure that: 1) at least two NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirators; 2) one gas or vapor detection device; and 3) a person qualified in their operation, be on board the vessel during the voyage.

Using the appropriate gas detection equipment, monitor spaces adjacent to areas containing fumigated cargo and all regularly occupied areas for fumigant leakage. If leakage above 5 ppm is detected, the area should be evacuated of all personnel, ventilated, and action taken to correct the leakage, before allowing the area to be reoccupied. Do not enter fumigated areas except under emergency conditions. If necessary to enter a fumigated area, wear a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator (personal protection equipment). Never enter fumigated areas alone. At least one other person, wearing personal protection equipment, should be available to assist in case of an emergency.

If necessary to enter holds prior to discharge, test spaces directly above cargo surface for fumigant concentration, using appropriate gas detection and personal protection equipment. Do not enter without respiratory protection, unless fumigation concentrations are at or below 5 ppm, as indicated by a suitable detector.

5. See Table I or III for specific commodities, rate of application and exposure time.

## II. SOIL FUMIGATION

**Parts controlled:** Nematodes, including root-knot spp., *Tylenchulus*, *Paratylenchus*, *Xiphinema*, *Cricanemoides*, and *Paratylenchus*.

**Soil-borne fungi, including:** *Pythium*, *Rhizoctonia*, *Phytophthora*, *Pyrenochaeta*, *Sclerotium*, *Amillaria*, and the clubroot organism, *Plasmodiophora*.

**Weeds and weed seed:** seeds, roots, stolons, and bulbs of broadleaf weeds and grasses including quackgrass, annual bluegrass, broomrape, common lambsquarters, torpedograss and bermudagrass. Not effective against mallow, dodder, and some species of clover.

**Insects in the soil at the time of treatment including:** wireworms, June beetle larvae, white grubs, and garden symphylan.

### PRETREATMENT SOIL PREPARATION

Plow or rip the soil to the depth to which effective treatment is required. The soil should be worked until free of clods or large lumps. Residue from previous crops should be worked into the soil to allow for decomposition prior to fumigation. Soil moisture should be optimum for seed germination. Coarse texture soils can be fumigated with higher moisture content than fine textured soils. For best results, soil should be kept moist for at least four days prior to treatment. Do not fumigate if the soil temperature is below 50°F. For best results, fumigate when soil temperature is 60°F. at the depth of 8 inches.

**NOTE:** Fumigation may temporarily reduce nitrification in the soil thus increasing levels of ammonium nitrogen and soluble ammonium salts to potentially phytotoxic levels. Accumulation of ammonium is most likely to occur when maximum rates of fumigant and fertilizer are applied to soils that are acidic, wet, cold, or high in organic matter. Apply only fertilizer containing at least 30% nitrate until the crop is well established and soil temperature is above 65°F. then fertilize as indicated by soil test. To stimulate nitrification and to reduce possible ammonium toxicity, acid soils should be limed before fumigation.

### FIELD FUMIGATION

For overall application of Methyl Bromide 98Z inject the product with a chisel type applicator having the chisels spaced no more than 12 inches apart and injecting the fumigant to a depth of 8-8 inches below the soil surface. The soil surface must be covered immediately after treatment with simultaneous film laying equipment or by sealing with a roller or cultipacker and covered within 20 minutes with polyethylene film or other suitable cover. Consult Table II for proper rate of application. For row applications use the same rate of application per acre as suggested in Table I. The actual amount used per acre, however, will be proportional to the actual area treated.

**RAISED TARP FUMIGATION METHOD**

Support the center of the cover to provide a small gas dome. Inflated plastic bags, crumpled fertilizer bags, burlap bags stuffed lightly with hay or straw, inverted baskets, flowerpots or bottles placed in the soil may be used for support.

Evaporating pans are essential for the volatilization and uniform dispersion of fumigant. Shallow pans or basins made of plastic or tin are satisfactory for this purpose.

1. Use one evaporator pan for each 300 to 400 square feet of area.
2. Anchor one end of each polyethylene tube into an evaporating pan with tape or a suitable weight. This insures that the liquid will be directed into the evaporating pan.
3. Extend the free ends of the polyethylene tubes outside of the area to be covered.
4. After the supports and tubing are in place, cover the area to be fumigated with a gasproof cover of polyethylene or coated fabric film.
5. Seal the outside edges with 6 to 10 inches of soil. Tamp the soil down so edges will not pull loose.
6. Attach a polyethylene tube to the cylinder valve outlet and open. Use a cylinder dispenser or scale to meter small amounts.

**HOT GAS METHOD**

The "hot gas method" consists of using a commercially manufactured heat exchanger, or a copper coil immersed in a vessel containing hot water, to vaporize the fumigant before introduction.

This method may be useful where large amounts of fumigant are required and rapid vaporization is advantageous.

**DOSAGE**

Use one to two pounds of Methyl Bromide 98% per 100 square feet for an exposure time of 24 hours when soil temperature is 60°F. or higher. Methyl Bromide penetrates the soil to the depth it has been plowed or ripped. When soil temperature is between 50°F. and 60°F., extend the exposure time to 48 hours. Do not treat when soil temperature is below 50°F.

**A. TREESITE FUMIGATION DIRECTIONS (For Use in Florida Only)**

Preplant or replant fumigation of citrus soil for control of *Phytophthora* and citrus nematodes in Florida sandy soils. Trees which are planted in this treated soil will not bear harvestable fruit for a period of at least 24 months. Apply with chisels spaced 12 inches apart to a depth of 6 to 8 inches. Seal fumigant with a drag or cultipacker following immediately behind chisels. Apply Methyl Bromide 98Z at the rate of 1 pound per 100 square feet. Immediately cover with a 4 mil. tarp and expose to fumigation for 96 hours. This treatment will control disease to a depth of 4 feet. Remove cover and aerate 2 weeks before setting transplants in treated area.

**B. SPECIAL INSTRUCTIONS FOR THE CONTROL OF ARMILLARIA MELLEA (OAK ROOT FUNGUS) ON DECIDUOUS FRUITS AND NUTS, CITRUS AND VINEYARDS****Pre-treatment Soil Preparation**

To obtain the maximum control of *Armillaria mellea* with Methyl Bromide 98Z, soil must be dry to a depth requiring treatment. This can be accomplished by: a) planting sudangrass in the spring, irrigating until the grass has established itself, then withholding further irrigation; b) naturally, by allowing plants to grow without irrigation. When soil is dry, cut and remove grass, plants and debris. Rip soil to a depth of 36 inches and disc to smoothness.



### DOSAGE AND METHOD OF APPLICATION

This is a preplant or replant treatment. Crops which are planted in this treated soil will not bear harvest for a period of at least 24 months. Methods and rate of application are as follows:

1. Non-tarp Chisel Application (not for use in California). After the soil has been properly prepared, inject 400-870 pounds of Methyl Bromide 98% per acre by chisel application with chisels spaced up to 66 inches apart to a depth of 24-30 inches. In the row strip, treatments may be made by using a single shank. Chisels should have a wing welded on the back 2-4" above the chemical outlet to partially break the chisel mark. To fill in the chisel mark and seal the surface, disc and ringroll immediately after fumigant injection. Be sure that the disc and ringroller cover an area sufficiently beyond the chisel lines to effect a good seal.
2. Tarp Chisel Application. After the soil has been properly prepared, apply 400-870 pounds of fumigant per acre by chisels spaced up to 66 inches apart, as described above, and cover with adequate polyethylene film seal.
3. Deep Injection Auger-Probe Treatment. Use one pound of Methyl Bromide 98% in light soils (two pounds in fine-textured soils) to a depth of 36 inches or more below the soil surface. Assume one injection site per 100 square feet (on a 10 ft x 10 ft. grid pattern) with the injection in the center of the area to be treated.

### EXPOSURE AND AERATION PERIOD

1. To insure the proper time-concentration relationship to control oak root fungus for chisel applications, we recommend a seven day exposure period before removing the polyethylene film cover, and a one day interval with Deep Injection Auger-Probe Treatment after which planting or replanting of trees, vines or other deep-rooted crops may begin 14 days later.
2. Methyl Bromide 98% will not usually control weed seeds under very dry conditions. However, some control may be observed on deep-rooted perennials such as morningglory (bindweed) and rhizomes of Johnsongrass.

### C. NON-TARP NEMATODE CONTROL

For control of nematodes including *Meloidogyne* spp., *Xiphinema* spp., *Criconemoides*, *Paratylenchus*, and *Paratylenchus* on deciduous fruits, nuts, citrus and vineyards.

#### Pretreatment Soil Preparation

Plow or rip the soil to the depth to which effective treatment is required. The soil should be worked until free of clods or large lumps and residue from previous crops should be worked into the soil to allow for decomposition prior to fumigation. To insure maximum fumigant penetration the soil at the point of injection should not contain more than 5-15% moisture depending on soil type. However, to improve sealing, the soil surface may be moistened by means of a sprinkler application of 1/4-1/2 inch of water prior to final preparation and application.

For best results, fumigate when the soil temperature is above 50° at the depth of 8 inches. Do not fumigate when soil temperature is below 50°F.

**Dosage and Method of Application**

This is a preplant or replant treatment. Do not apply to soil where trees or vines will bear harvestable fruit within 24 months. A waiting period of at least 14 days should be observed between application and planting. Methods and rate of application are as follows:

1. Chisel Application. After the soil has been properly prepared inject 400-870 pounds of Methyl Bromide 98% per acre by chisel application with chisels spaced up to 66 inches apart to a depth of 18-24 inches. In the row strip, treatments may be made by using a single shank.

To fill in the chisel mark and seal the surface, disc and ringroll immediately after fumigant injection. Be sure that the disc and ringroller cover an area sufficiently beyond the chisel lines to effect a good seal.

2. Deep Injection Auger-Probe Treatment. Use one pound of Methyl Bromide 98% per injection site in lighter soils; two pounds in fine textured soils. Use one injection site per 100 square feet (on a 10 ft. x 10 ft. grid pattern) with the injection in the center of the area to be treated. Tamp or compact the soil at the point of injection.

Methyl Bromide 98% used without a tarp will not usually control most weed seeds. However, some control may be observed on deep-rooted perennials such as morningglory (bindweed) and rhizomes of Johnsongrass.

**D. POTTING MIX FUMIGATION DIRECTIONS**

Potting mixes including decomposed compost, soil mixes, and manure can be fumigated with Methyl Bromide 98%. Fumigation should take place outdoors or in a well ventilated area away from desirable plants or occupied buildings. The material to be treated should have a temperature of 60°F. or above, be loose, and moist enough for good seed germination. To insure a good seal, pile the material to a depth of 18 inches on a concrete floor or on wet ground. Piles two to three feet high can also be treated provided perforations are made in the pile surface at one foot intervals to assist penetration. Once the pile has been made, install supports to hold the cover a few inches above the pile surface to aid in proper fumigant diffusion. Place the outlet of the applicator tube or tubes in evaporating pans spaced about 30 feet apart on the pile surface. Cover with a polyethylene sheeting or other gas confining material of 4 mil. or greater thickness. Seal the edges by burying, covering with moist sand or soil or by means of sand snakes. Introduce the fumigant into the evaporating pans as a liquid or by means of the hot gas method. Consult Table II for proper dosage and exposure time. Aerate for 24-72 hours before planting.

Potting mixes in flats may also be treated. Arrange the flats in loose criss-cross stacks no more than 5 feet high, then cover and seal as described above. Introduce the fumigant at the top and in the center of the stack into evaporating pans or by means of the hot gas method at a rate of 4 pounds per 100 cubic feet. Use one injection point for each 100 cubic feet of volume. Expose for 24-48 hours. Aerate for 24 hours.

**TABLE I**  
**METHYL BROMIDE 98% SOIL FUMIGATION USES**

TREATMENT SITE	RATE (Lbs./A*)	EXPOSURE Time (hrs.)
Field soils to be plowed to: Asparagus, broccoli, cauliflower, eggplants, lettuce, muskmelons, onions (dry bulb), peppers, pineapples, strawberries, tomatoes	180-240	24-48
Citrus, deciduous fruits and nuts, and vineyards	400-870**	24-48
Nursery soils: Turf, ornamentals, floral crops, forest tree seedlings, strawberry (non-food)	435-870***	24-48
Greenhouse soils: Non-food crops Tomato	180-435	24-48
Seed or Transplant beds (non-food) Tobacco	180-240 872	24-48 24-48
Potting mix	1 g/Cu. Yd.	24-48

- \* Use the higher labelled rates for muck and heavy clay soils.
- \*\* Deep injection application.
- \*\*\* Topical application.

**TABLE II**  
**METHYL BROMIDE 98Z**  
**APPLICATION SUMMARY FOR STRUCTURAL CONTROL & OTHER SITES\***

Treatment Site	Pests	Volume	Rate (#/1000)	Exposure Time		
Warehouses (empty), Food Rooms (empty), Grain Bins (Empty)	cockroaches, confused flour beetle, rice weevil, granary weevil, saw toothed grain beetle, rusty grain beetle,	Less than 100,000 cu. ft.	1-3	24		
		100-500,000 cu. ft.	1-1 1/2	24		
		500-1,000,000 cu. ft.	1-1 1/2	24		
		over 1,000,000 cu. ft.	1	24		
	lesser grain borer, cadelle, khapra beetle, drugstore beetle, ladder beetle, carpet beetle, copra beetle, coffee bean weevil, groundnut bruchid, common bean weevil, dried fruit beetle, golden spider beetle, Australian spider beetle, cigarette beetle, angoumois grain moth, Mediterranean flour moth, warehouse moth, Indian meal moth, common grain mite, rats and mice.					
	Bags, Bales & Crates (empty)	cockroaches, confused flour beetle, rice weevil, granary weevil, saw toothed grain beetle, rusty grain beetle, lesser grain borer, cadelle, khapra beetle, drugstore beetle, ladder beetle, carpet beetle, copra beetle, coffee bean weevil, groundnut bruchid, common bean weevil, dried fruit beetle, golden spider beetle, Australian spider beetle, cigarette beetle, angoumois grain moth, Mediterranean flour moth, warehouse moth, Indian meal moth, common grain mite, rats and mice		4-5 oz. 1 1/2-3 (a) 2-3 (b)	12-18 24 2	
		Furniture	termites (drywood & dampwood), bedbugs, cockroaches, silverfish, powder post beetle, death watch beetle, carpenter ants, clothes moth, cigarette beetle, drugstore beetle, carpet beetle		4-5 oz. 1-3 (a) 2-3 (b)	12-18 24 2
			Lumber & Wood Products	termites (drywood & dampwood), powder post beetle, round and flat headed borers, carpenter ants and bark beetles	1-3 (a) 2-3 (b)	24 2
				Greenhouses (empty)	meshbugs, scale insects and mites	3
			Mushroom houses (empty)	mushroom flies	2	24
Poultry houses (empty)			poultry mites, bedbugs	2	24	
Bales Tobacco			drugstore beetle, cigarette beetle, tobacco beetle, tobacco moth	2-3 (a) 4	48-72 4	
Baled Cotton			pink bollworm, boll weevil	3 (a) 4 (b)	24 2	

\* At temperatures below 80°F., increase the dosage by 1/2 pound per 1,000 cu. ft. for every 10°F. drop in temperature or use an approved procedure to heat the fumigant. Do not fumigate when temperature is below 80°F.

(a) Atmospheric  
(b) Vacuum Chamber (26-27)

Remove food and food commodities before fumigating dwellings.

### AERATION AND REENTRY

At the end of the exposure period, remove all seals and open all doors and windows that are operational. Allow for complete ventilation. Use ventilation fans whenever possible to remove fumigant from dead air pockets.

After fumigation, treated areas must be aerated until the level of methyl bromide is below 5 ppm. Do not allow entry into the treated area by any person before this time unless provided with a respiratory protection device (SCBA or combination air-supplied SCBA).

Certain materials absorb Methyl Bromide during fumigation, and desorption during aeration may call for extended monitoring and aeration periods.

### DRAEGER GAS DETECTOR, BENDIX GASTECH DETECTOR

Hand Pump and Detector Tube: Methyl Bromide may be detected at the Threshold Limit Value (T.L.V.) of 5 ppm. Detectors are available from Soil Chemicals Corporation.

### HALIDE LAMP DETECTOR

Color of the flame is an index of the concentration of Methyl Bromide present. The following tabulated information provides an index of flame color and concentration of Methyl Bromide present:

METHYL BROMIDE P.P.M	LB/1000 CU. FT.	FLAME COLOR IN DAYLIGHT*
0	0	None
25	0.00625	None
50	0.0125	Moderate Green
125	0.031	Green
250	0.0625	Strong Green
500	0.125	Strong Blue-Green Fringe
900	0.20	Strong Blue-Green
1000	0.25	Blue

\* Nighttime color is identical, but allowance must be made for the bluish cast of the flame itself.

Halide lamp detector is suitable for locating leaks and for determining extent of aeration down to approximately 50 ppm. It is not suitable for clearing a structure for reentry.

**WARRANTY**

NOTICE: Seller warrants that the product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use, but neither this warranty nor any other warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE, express or implied, extends to the use of this product contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use.