



**COMPANY  
NUMBER**

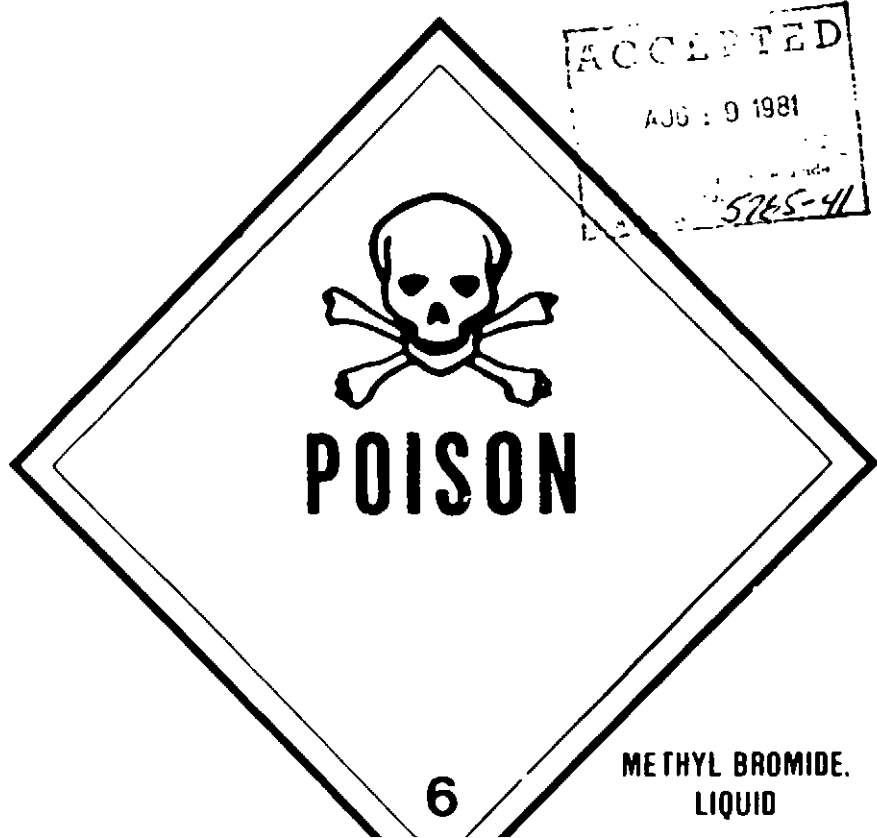
5785

**PRODUCT  
SERIAL NO.**

41

**LABEL  
APPROVAL  
DATE**

8-19-81



METHYL BROMIDE.  
LIQUID

**RESTRICTED USE PESTICIDE**  
For retail sale to and use only by Certified Applicators or persons under their direction and only for those uses covered by the Certified Applicator's certification

# METH-O-GA

SOIL, SPACE AND COMMODITY FUMIGANT

ACTIVE INGREDIENT:  
Methyl bromide

**☠ DANGER ☠**  
**KEEP OUT OF REACH OF CHILDREN**  
**POISON**

Statement of Practical Treatment

- IF INHALED** Remove victim to fresh air immediately • Keep victim lying down and breathe oxygen if breathing has stopped • Call a physician at once
  - SKIN CONTACT** Remove all contaminated clothing and shoes at once • Wash exposed areas with soap and water • If a rash or blisters develop get medical attention
  - EYE CONTACT** Flush eyes with running water for at least 15 minutes • Get medical attention
- SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

bulk grain storages. Do not fumigate if grain moisture is high or if grain temperature is low (below 60 F) or if there is excessive dockage. See GLK 159 for specific information on dosages, uses, pests, procedures, and additional safety precautions.

## STORAGE AND DISPOSAL

### PROHIBITIONS

DO NOT CONTAMINATE WATER, FOOD OR FEED BY STORAGE OR DISPOSAL. OPEN DUMPING IS PROHIBITED. DO NOT REUSE EMPTY CONTAINER.

### PESTICIDE STORAGE

Store upright in a cool, well-ventilated place away from dwellings. Do not remove cylinder safety caps until just prior to use.

### CONTAINER DISPOSAL

1. Close valve by turning clockwise until hand tight.
2. Disconnect lines.
3. Replace safety caps and bonnet.
4. Empty cylinders. Return freight collect to the Great Lakes Chemical Corporation's location from which shipment was made.
5. Return partial cylinders only after consulting Great Lakes Chemical Corporation for proper shipping instructions.

### Space Fumigation

**Dosage:** The usual dosage rate for each 1000 cu. ft. will range from 1 to 3 lbs. 12 to 24 hours exposure depending on tightness of structure and kind and amount of commodity in storage.

Remove the following materials from building before fumigation as they may develop undesirable odors: furs, high protein flour and cereals, horsehair articles, iodized salt, patent leather articles, rubber goods, sulfur-containing compounds or synthetic detergents.

### SOIL FUMIGATION DIRECTIONS

The following are general instructions on the use of Meth-O-Gas for soil fumigation to be used as a preplant soil treatment in seed beds or transplant beds for the production of transplants (except as described in GLK 159).

**Soil Fumigant Uses:** Meth-O-Gas is an effective soil fumigant for the control of nematodes, weed seeds and certain soil-borne disease-causing fungi. In seed beds and potting soils it contributes to a maximum production of healthy, vigorous tobacco and vegetable transplants, nursery and forest tree seedlings. Where "slips," "cuttings," "spuds" or seeds are used as in greenhouses, nurseries, golf greens, lawns and ornamental gardens, healthy and vigorous rooting is established quickly.

**Soil Preparation:** Plow or otherwise work soil to a fine tilth. Add fertilizer, manure or compost, work in well. Soil should be moist and friable for best results. Do not fumigate when soil is dry or excessively wet.

**NOTE:** Do not fumigate when soil temperature is below 50 F.

**Exposure Periods:** Expose for 48 hours when soil temperature is between 50 F and 60 F and for 24 hours when above 60 F.

**Dosage:** For most purposes use 1 lb. of Meth-O-Gas for each 100 sq. ft. of soil to be treated. See GLK 159 for specific pest/site dosages and additional precautions.

**When to Plant:** After the exposure, aerate soil for 3 days before seeding or 5 to 7 days before setting out vegetative growth.

EPA EST. NO. E785-AR-01

Woodburn Prtg.—18678--GLK

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**RESTRICTED USE PESTICIDE**

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

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**DIRECTIONS FOR USE OF THE PRODUCT**

**METH-O-GAS® AND TERR-O-GAS®**

**EPA REGISTRATION NUMBERS**

5785-11  
5785-21  
5785-41

**READ THIS BOOKLET AND ENTIRE LABEL CAREFULLY PRIOR TO USE. USE ONLY PRODUCTS ONLY ACCORDING TO INSTRUCTIONS.**

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GLK 159 150M 6/81

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**STATEMENT OF WARRANTY  
AND LIABILITY**

Seller warrants that this product complies with specifications expressed in this label. SELLER MAKES NO OTHER WARRANTIES, AND DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE INTENDED PURPOSE. Seller's liability for default, breach, or failure under this label shall be limited to the amount of the purchase price. Seller shall have no liability for consequential damages.

Many pesticidal chemicals are poisonous and may leave a toxic residue on the plants to which they are applied. The U.S. Food and Drug Administration has established maximum amounts of such pesticidal chemicals that may remain on raw agricultural products at harvest, and it is the user's responsibility to see that there is no residue on such crops at harvest in excess of these amounts. The "Directions for Use" are based on the best available information, and if followed carefully should not leave excessive residues at harvest. However, Great Lakes Chemical Corporation assumes no responsibility as to their accuracy nor for any loss due to excessive residues.

Meth-O-Gas and Terr-O-Gas 100 may be used to control insects infesting various grains and non-food materials. Grains and other raw agricultural commodities which may be treated and dosage rates are

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given in Table I. Processed foods are found in Table II. Treatment rates for soil fumigations may be found in Table III. Dosage rates for structural fumigation and other pest sites are found in Table IV.

## I. METHODS OF SPACE FUMIGATION

### A. Chamber Fumigation

Meth-O-Gas and Terr-O-Gas 100 may be used to control stored product pests listed in the treatment tables.

Load the chamber with the material to be fumigated, close exhaust ports, turn on circulating fan and close chamber door. Determine the proper dosage of fumigant 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.

NOTE: Before introducing the fumigant, place warning signs and a red warning light on the door. Two people wearing full-faced gas masks with a MSHA/NIOSH approved black canister for organic vapors should be present when introducing the fumigant and opening the door after fumigation. All controls should be outside the chamber.

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.

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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 insure complete vaporization).
3. Dosage: See Table IV for specific commodities and dosage rates.
4. Aeration: 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 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 fumiga-

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tion, name of the 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. Do not fumigate while strong winds are blowing.
5. Dosage. Consult Tables I and II for specific commodity treatments and rates.
6. After 12 to 18 hours, open the unit and aerate for 1 to 1½ hours. The truck, van or trailer may then be resealed for shipment.
7. Advise consignee to check the truck, van or trailer for proper aeration on arrival. Do not move trucks, vans or trailers during fumigation. They must be completely aerated before movement is allowed.

#### **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 signs contain-

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ing 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 the 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. Do not fumigate while strong winds are blowing.
5. Dosage. Consult Tables I and II for specific commodity treatments and rates.
6. After 12 to 18 hours, open the unit and aerate for 1 to 1½ hours. The car may then be resealed for shipment.
7. Advise consignee to check the car for proper aeration on arrival. Do not move railcars during fumigation. They must be completely aerated before movement is allowed.

#### **E. Grain Elevator Fumigation**

The recirculation method is best for grain elevator fumigation since it allows more time for gas penetration in high resistance areas.

1. Seal structure carefully, using a masking tape for small openings and polyethylene sheeting secured with masking tape for large openings.
2. Fumigated areas must be placarded on all entrances with signs containing at least the signal

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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 the 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.

3. Dosage. Use the rate and exposure time shown in Table I or II for specific grains to be treated.
4. Fumigate by using a fan or blower to recirculate the methyl bromide through perforated pipes or ducts at the bottom of the bin, up through the return duct. Or discharge the fumigant through polyethylene tubing in the head space at intervals of 100 ft. or less.
5. Check periodically for leaks with a halide gas detector.
6. To aerate after fumigation, disconnect return air at the fan and discharge into outside air. Continue aeration until halide detector shows the fumigant has dissipated. Use halide detector to check the elevator head space for possible pockets of methyl bromide.

#### F. Tarpaulin Fumigation

The stocked 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 5 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. Dosage. Use rate and exposure time shown in Table I or III. When fumigation is complete, partially remove the tarpaulin and leave it for 30 minutes. This allows partial aeration before the cover is completely removed.

#### G. Warehouse, Structural and 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 fumigating.
2. Dosage. See Table IV for dosages and pests controlled (Use only methyl bromide products containing .25%, .5%, and 1% chloropicrin, and 100% methyl bromide.)
3. Seal the building by closing all external openings, including roof ventilators, chimneys, drain pipes, tunnels, etc. Fumigating 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 the fumigant used, emergency telephone number for contact, 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 the 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. If possible, 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.

#### **H. Shipboard, In Transit Ship Or Shiphold Fumigation**

**IMPORTANT:** Shipboard, in transit ship or shiphold fumigation is also governed by U.S. Coast Guard Regulations. Refer to and comply with these 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.
2. The person responsible for the fumigation must notify the master of the vessel, or his representative, of the requirements relating to personal

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protection equipment", detection equipment and 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. 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 the 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. During the 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 adjacent to spaces containing fumigated cargo and all regularly occupied spaces for fumigation leakage. If

\*Personal protection equipment means a full-faced, black canister gas mask or respirator for the fumigant, jointly approved by the Mine Safety and Health Administration and the National Institute of Occupational Safety and Health.

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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.

5. If the fumigation is not completed and the vessel aerated before the manned vessel leaves port, the person in charge of the vessel shall insure that at least two units of personal protection equipment\* and one gas vapor detection device, and a person qualified in their operation be on board the vessel during the voyage.
6. Dosage. See Table I or IV for specific rates.

#### **Precautions and Procedures During Voyage**

Using appropriate gas detection equipment, monitor spaces adjacent to areas containing fumigated cargo and all regularly occupied areas for fumigant leakage. If leakage is detected, the area should be evacuated of all personnel, ventilated, and action taken to correct the leakage, before allowing the area to be occupied. Do not enter fumigated areas except under emergency conditions. If necessary to enter a fumigated area, appropriate personal protection equipment\* must be used. Never enter fumigated areas alone. At least one other person, wearing personal protection equipment\*, should be available to assist in case of an emergency.

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### Precautions and Procedures During Discharge

If necessary to enter holds prior to discharge, test spaces directly above grain surface for fumigant concentration, using appropriate gas detection and personal safety equipment\*. Do not allow entry to fumigated areas without personal safety equipment\*, unless fumigant concentrations are at safe levels, as indicated by a suitable detector.

## II. SOIL FUMIGATION

Pests controlled are: Nematodes, including root-knot spp., *Tylenchulus*, *Pratylenchus*, *Xiphinema*, *Cricanemoides*, and *Paratylenchus* on almonds, apples, apricots, cherries, citrus, grape vineyards, peaches, pecans, pistachios, plums, prunes, strawberries, tomatoes and walnuts

Soil-borne fungi, including: *Pythium*, *Rhizoctonia*, *Phytophthora*, *Pyrenochaeta*, *Sclerotinia*, *Sclerotium*, *Asmillaria*, 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.

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### 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. 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. to 90°F. at the depth of 6 inches. Use the higher labelled rates for muck and heavy clay soils.

### Field Fumigation

For overall application of Meth-O-Gas or Terr-O-Gas 100 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 6-8 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 III for proper dosage. For row applications use the same dosage rates per acre as suggested in Table III. 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 applicator 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 applicator 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. Position the cover with its edges in a prepared furrow or trench.
6. Seal six to ten inches of the outside edges with dirt. Tamp the dirt down so edges will not pull loose.
7. **A.** Connect applicator tubes to methyl bromide dispensers and puncture the cans. Any of the numerous dispensers available on the market may be used for application of methyl bromide. If the applicator is transferred from tube to tube, plug or crimp the end of the tube to prevent escape of methyl bromide from under the tarp. Another procedure is to place the cans in

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Simplex® openers spaced evenly over the area to be treated. After the cover is in place and sealed around the edge, push down on the cans, opening them to release the gas. These openers eliminate the need for evaporator pans and tubing.

- B.** Cylinders. Attach a polyethylene tube to the cylinder and open the fumigant. 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. Meth-O-Gas in 1 and 1½ pound cans may be vaporized by submerging the punctured can in hot water while applying. Puncture the can in the conventional manner, immediately turning it upside down and submerging the punctured can with applicator attached into the hot water. Keep submerged until empty.

Additional hot water should be available or provisions made to reheat the water. The rapid vaporization of the fumigant will cool the original supply. Never apply heat directly to the can except by water baths. These methods may be useful where large amounts of fumigant are required and rapid vaporization is advantageous.

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### Dosage

Use one to two pounds of Meth-O-Gas and Terr-O-Gas 100 per 100 square feet for an exposure period 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 period to 48 hours. Do not treat when soil temperature is below 50°F.

### A. TREE SITE 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 culipacker following immediately behind chisels. Apply Meth-O-Gas or Terr-O-Gas 100 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

#### Preparation for Application

To obtain the maximum control of *Armillaria mellea* with Meth-O-Gas and Terr-O-Gas 100, 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 harvestable fruit for a period of at least 24 months. Methods and dosage of application are as follows. See Table III.

1. Non-Tarp Chisel Application (Not for Use in California). After the soil has been properly prepared, inject 400-870 pounds of Meth-O-Gas or Terr-O-Gas 100 per acre by chisel application with 2 chisels spaced 66 inches apart to a depth of 24-30 inches. For non-tarp applications be sure to properly seal the chisel line which may be accomplished by the following equipment modifications.

Weld a wing behind the chisel 2 to 4 inches above the chemical outlet to break the chisel

mark. Place a shovel behind the chisel at the soil surface to push dirt into the upper chisel mark. Follow with a cone-shaped press wheel with a shovel to pull additional soil into the chisel line. This is followed by a flat roller to press the soil even with the adjacent soil surface. This treatment will treat a strip 96 inches wide.

2. **Tarp Chisel Application.** After the soil has been properly prepared, apply 400-870 pounds of fumigant per acre by chisels spaced 48-66 inches apart and cover with adequate polyethylene film seal.
3. **Deep Injection Auger-Probe Treatment.** Use one pound of Meth-O-Gas or Terr-O-Gas 100 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. Meth-O-Gas or Terr-O-Gas 100 will not usually control weed seeds under very dry conditions. However, some control may be observed on deep-

rooted perennials such as morningglory (bind-weed) and rhizomes of Johnsongrass.

#### **C. NON-TARP NEMATODE CONTROL**

For control of nematodes (including *Meloidogyne* spp., *Xiphinema* spp., *Criconeimoides*, *Pratylenchus*, and *Paratylenchus*) on almonds, apples, apricots, cherries, citrus, grape vineyards, peaches, pecans, pistachios, plums, prunes, strawberries, tomatoes and walnuts.

#### **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. For best results soil should be kept moist for at least four days prior to treatment. Do not fumigate when soil temperature is below 50°F. For best results, fumigate when soil temperature is 60°F. to 90°F. at the depth of 6 inches. Use the higher labelled rates for muck and heavy clay soils.

#### **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 dosage of application are as follows:

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Application. After the soil has been properly  
 inject 400-872 pounds of Meth-O-Gas  
 Gas 100 per acre by chisel application  
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 h the adjacent soil surface. This treat-  
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tion Auger-Probe Treatment Use one  
 Meth-O-Gas or Terr-O-Gas 100 per in-  
 in lighter soils; two pounds of Meth-  
 Terr-O-Gas 100 in line textured soils.  
 ection site per 100 square feet (on a 10  
 grid pattern) with the injection in the  
 ne area to be treated. Tamp or compact  
 he point of injection.

or Terr-O-Gas 100 used without a tarp  
 ly control most weed seeds. However,  
 may be observed on deep-rooted peren-  
 morningglory (bindweed) and rhizomes

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**TABLE I**  
**APPLICATION SUMMARY:**  
**METH-O-GAS AND TERR-O-GAS 100**  
**FOR STORED PRODUCTS PESTS INFESTING RAW AGRICULTURAL**  
**COMMODITIES (NOT PROCESSED FOOD)**

Commodity	Insects Controlled	Tolerance (ppm)	Dosage (lbs./1000 cu. ft)	Exposure Time (hrs.)
Almonds	confused flour beetle, saw toothed grain	200	3.5	24
Brazil Nuts	beetle, dermestids, Indian meal moth, rice	200	3.5	24
Bushnuts	worm, Khapra beetle, drugstore beetle,	200	3.5	24
Butternuts	cigarette beetle, warehouse moth, rusty	200	3.5	24
Cashews	grain beetle, cadelle, groundnut bruchid	200	3.5	24
Chickpeas		200	6	6
Chickpeas		200	3.5	24
Filberts		200	3.5	24
Hickory Nuts		200	3.5	24
Peanuts		200	3.5	24
Pecans		200	3.5	24
Pistachio Nuts		200	3.5	24
Walnuts		200	3.5	24

TABLE I (Continued)

Commodity	Insects Controlled	Tolerance (ppm)	Dosage (lbs./1000 cu. ft.)	Exposure Time (hrs.)
Apples	Oriental fruit moth, codling moth, apple maggot, apple curculio, twig borer,	5	5	2
Apricots	melon fruit fly, Mediterranean fruit fly,	20	5	2
Cherries	Oriental fruit fly, cherry fruit fly, brown	20	5	2
Nectarines	mite, green peach aphid, scales, thrips	20	5	2
Peaches		5	5	2
Pears		20	5	2
Quinces		5	5	2
Peas	coffee bean weevil, Australian spider beetle, saw toothed and merchant grain beetles, dried fruit beetles, Indian meal moth, confused flour beetle, drugstore beetle, warehouse moth, common grain mite	20	5	2
Barley	granary weevil, lesser grain borer, rusty	50	5	12
Corn	grain beetle, anagomis grain moth,	50	2	24
Oats	Indian meal moth, confused flour beetle,	50	3	24
Popcorn	rice weevil, saw toothed grain beetle,	240	1.5	2(a)

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TABLE I (Continued)

Commodity	Insects Controlled	Tolerance (ppm)	Dosage (lbs./1000 cu. ft.)	Exposure Time (hrs.)
Rice	lesser grain borer, codelle, Khapra	50	6	12(b)
Rice	beetle, drugstore beetle, Australian	50	3	24
Rye	spider beetle, cigarette beetle, warehouse	50	3	24
Rye	moth, common grain mite, flat grain	50	6	12(b)
Sorghum (grain)	beetle, Mediterranean flour moth, red	50	4	24
Dried Peas	flour beetle, common bean weevil, copra	125	4	24
Wheat	beetle	50	3	24
Copra		100	2.5	24
Beans (all)	armyworms, cabbage looper, European	50	3.5	24
Beets (roots)	corn borer, Japanese beetle, pod borers,	30	3	4
Cabbage	Oriental fruit fly, Mediterranean fruit fly,	50	4	4(d)
Cantaloupe	corn earworm, green stink bug, sawbugs,	20	2.5	2
Carrots	spider mites, cabbage maggots, lygus	30	4	4
Citron	bug, melon aphid, pickleworm, carrot rust	30	3	2
Cucumbers	fly, stink bug, bean leaf beetle, Mexican	30	2.5	4
Eggplant	bean beetle, diabrotica beetle, cucumber	20	3	4
Honeydew Melons	beetle, squash bug, false chinch bug,	20	2.5	2
Jerusalem	loopers, symphylans, blister beetles,			
Artichokes	onion maggot, onion thrips, mealybugs,	30	3.5	4



TABLE I (Continued)

Commodity	Insects Controlled	Tolerance (ppm)	Dosage (lbs /1000 cu. ft.)	Exposure Time (hrs.)
Muskmelons	pepper maggot, Colorado potato beetle,	20	2.5	2
Okra	potato psyllid, squash bug, squash vine borer, earwigs, darkling beetle	30	3.5	2(c)
Onions		20	3	4
Parsnips (roots)		30	3	4
Peas (with pods)		50	3	2
Sweet Corn		50	3	4
Peppers		30	4	2
Pimientos		30	2.5	3
Pineapples		20	2	4
Potatoes		75	3	6
Pumpkins		20	2.5	2
Radishes		30	3	4
Rutabagas		30	3	6
Squash (summer)		30	4	2
Squash (winter)		20	4	2
Squash (zucchini)		20	2.5	3
Sugar Beets (roots)		30	3	4
Sweet Potatoes		75	3.5	4
Tomatoes		20	3	4

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TABLE I (Continued)

Commodity	Insects Controlled	Tolerance (ppm)	Dosage (lbs /1000 cu. ft.)	Exposure Time (hrs.)
Ternips (roots)		30	3	4
Watermelons		20	2.5	2
Yams		30	3.5	4
Cipolini Bulbs	<i>Erosoma lusitanica</i>	50	4	4
Cocoa Beans	cocoa moth, cigarette beetle, confused flour beetle, warehouse moth, flat grain beetle, coffee bean weevil	50	1.5	12(a)
Cotton Seed	<i>Pectinophora</i> spp., Khapra beetle, boll weevil, saw toothed grain beetle	200	8	24(b)(c)
Garlic	<i>Brachycera</i> spp., <i>dyspessa ulula</i> , brown wheat mite, onion maggot, onion thrips	50	3	4
Horseradish (roots)	<i>boris lepidi</i>	30	3	4

TABLE I (Continued)

Commodity	Insects Controlled	Tolerance (ppm)	Dosage (lbs./1000 cu. ft.)	Exposure Time (hrs.)
Salsify Roots	armyworm, flea beetle, leafhoppers, stink bugs, tarnished plant bug	30	3	4
Hay (alfalfa)	Alfalfa weevil, cereal leaf beetle	50	3	24
Grapefruit <sup>m</sup>	<i>anastrepha</i> spp., <i>proeulia</i> spp.,	30	3	2
Grapes	<i>leptoglossus</i> spp., <i>megalometis</i> spp.,	20	4	2
Kumquat	<i>naupactus</i> spp., <i>listroderes</i> spp.,	30	3	2
Lemons	<i>canoderus</i> spp., <i>brevipalpus</i> spp., ants,	30	3	2
Lime	aphids, citrus scale, citrus mites, leaf	30	3	2
Oranges	rollers, white flies, thrips, California	30	3	2
Tangelos	orange clog, mealybugs, orange tortrix	30	3	2
Tangerines		30	3	2

<sup>m</sup> Consult APHIS Treatment Manual for additional rates and commodities.

<sup>n</sup> Tolerance of fruit to methyl bromide may vary with different varieties. Check with local authorities or Great Lakes Chemical Corporation before treating.

(a) Chamber fumigation.

(b) Khopra beetle quarantine.

(c) Pink bollworm quarantine.

(d) Must be used in accordance with the plant quarantine program of the USDA.

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TABLE II  
PROCESSED FOOD METH.O-GAS AND TERR.O-GAS 100

Commodity	Insect Controlled	Tolerance (ppm)	Dosage (lbs./1000 cu. ft.)	Exposure Time (hrs)
Apples (dried)	saw toothed beetle, merchant beetle,	125	1	24
Apricots (dried)	dried fruit beetle, Indian meal moth,	125	1	24
Cherries (dried)	confused flour beetle, Australian spider	125	1	24
Dates	beetle, cigarette beetle, warehouse moth,	125	1	24
Figs (dried)	common grain mite, coffee bean weevil	250	1	24
Peaches (dried)		125	1	24
Prunes (dried)		125	1	24
Raisins (dried)		125	1	24
Cheese (parmesan and roquefort)	cheese mites, cheese skipper, cheese maggot	325	1-2	12-24
Eggs (dried)	larder beetle	400	1-2	12-24
Ham Houses	cheese skipper, larder beetle, red legged ham beetle, mites	325	1-2	12-24
Processed Foods	saw toothed beetle, flat grain beetle, flour beetle, cigarette beetle, Indian meal moth	125	1-2	12-24

TABLE II (Continued)

Commodity	Insect Controlled	Tolerance (ppm)	Dosage (lbs /1000 cu. ft.)	Exposure Time (hrs)
Processed Grain <sup>a1</sup>	confused flour beetle, rice weevil, granary weevil, saw toothed grain beetle, rusty grain beetle, lesser grain borer, cadelle, Khapra beetle, drugstore beetle, Australian spider beetle, cigarette beetle	125	1.5	24
Processed Grain <sup>a1</sup>	flour beetle, saw toothed grain beetle, Mediterranean flour moth	125	1-2	12-24
Processed Grain <sup>a1</sup>	flour beetle, grain beetle, mealworms, cigarette beetle, Indian meal moth	125	1.5	24
Spices And Herbs (dried)	saw toothed beetle, flat grain beetle, cigarette beetle, trooderma sp., Indian meal moth, dried fruit beetle, Australian spider beetle, warehouse moth, confused flour beetle, rusty grain beetle, lesser grain borer, drugstore beetle	400	3	12

- <sup>a1</sup> Corn grits and cracked rice.
- <sup>a2</sup> Processed grain from equipment fumigation.
- <sup>a3</sup> Processed grain used in production of fermented beverages.

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TABLE III  
METH-O-GAS/TERR-O-GAS 100 SOIL FUMIGATION USES

Treatment Site	Rate (Lbs/A)	Exposure Time
Field Soils to be Planted to:		
Tomato	180-240	24-48 hrs.
Strawberry	180-240	24-48 hrs.
Citrus & Deciduous fruits & nuts (non-load)	400-870 <sup>a</sup>	24-48 hrs.
& nuts (non-load)	435-870 <sup>a</sup>	24-48 hrs.
Nursery Soils:		
Turf	180-435	24-48 hrs.
Ornamentals	180-435	24-48 hrs.
Forest Tree Seedlings	180-435	24-48 hrs.
Strawberry (non-load)	180-435	24-48 hrs.
Greenhouse Soil (non-food crops, for Tomatoes, see rate above)	180-435	24-48 hrs.
Seed or Transplant Beds (non-load)	180-435	24-48 hrs.
Tobacco	872	24-48 hrs.
Planting mix	1#/Cu. Yd.	24-48 hrs.

- <sup>a</sup> Deep injection application.
- <sup>b</sup> Topical application.

**TABLE IV**  
**APPLICATION SUMMARY FOR STRUCTURAL PEST CONTROL AND OTHER SITES<sup>1</sup>**

Treatment Site	Pests	Rate		Exposure
		Volume	Dosage	
Dwellings <sup>2</sup> , Garages and Barns	termites, (drywood & dampwood), bedbugs, cockroaches, silverfish, powder post beetle, death watch beetle, carpenter ants, rats, mice	Less than 10 <sup>3</sup> cu. ft.	4.3g	24 hrs.
		100,000-500,000 cu. ft.	1 1/2 g	24 hrs.
		500,000-1,000,000 cu. ft.	1.1 g	24 hrs.
		Over 1,000,000 cu. ft.	1g	24 hrs.
Warehouses (empty) Feed Rooms (empty) Grain Bins Bags, Boxes and Crates (empty)	cockroaches, rats, mice, confused flour beetle, rice weevil, granary weevil, saw toothed grain beetle, rusty grain beetle, lesser grain borer, caddis, khapra beetle, drugstore beetle, larger beetle, carpet beetle, sawtooth 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		4.5 oz.	12-18 hrs.
			3g	24 hrs.
			3g	24 hrs.
			1 1/2 g	24 hrs.
			2.3g	2 hrs.

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**TABLE IV (Continued)**

Treatment Site	Pests	Rate		Exposure
		Volume	Dosage	
Furniture	termites, (drywood & dampwood), bedbugs, cockroaches, silverfish, powder post beetle, death watch beetle, carpenter ants, clothes moth, cigarette beetle, drugstore beetle, carpet beetle		1.3g	24 hrs.
			2.3g	2 hrs.
Lumber and Wood Products	termites (drywood & dampwood), powder post beetle, round and flat headed borers, carpenter ants and bark beetles		1.3g	24 hrs.
			2.3g	2 hrs.
Greenhouses (empty)	mealybugs, scale insects and mites		2g	4 hrs.
Mushroom houses (empty)	mushroom flies		2g	24 hrs.
Poultry Houses (empty)	poultry mites, bedbugs		2g	24 hrs.

TABLE IV (Continued)

Treatment Site	Pests	Rate (#/1000 cu ft)		Exposure
		Volume	Dosage	
Baled Tobacco	drugstore beetle, cigarette beetle, tobacco beetle, tobacco moth		2-3# <sup>1</sup>	48-72 hrs.
			4# <sup>2</sup>	4 hrs.
Baled Cotton	pink bollworm, boll weevil		3# <sup>3</sup>	24 hrs.
			4# <sup>3</sup>	2 hrs.

\*At temperatures below 60°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 50°F.

<sup>1</sup>For dwellings do not use methyl bromide formulations containing 2% or more chloropicrin.

<sup>2</sup>Atmospheric.

<sup>3</sup>Vacuum Chamber (25-27)

NOTE: Remove food and feed commodities before fumigating dwellings.

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