

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

JUL 8 1992

Ethyl Corporation
Ethyl Tower
451 Florida Street
Baton Rouge, LA 70801

Attn: Louise L. Wen, Ph.D.

Subject: Revised Labeling for Aeration and Reentry Statements
M-B-R-98
EPA Registration No. 3377-7

Your product labeling package revised in accordance with your company's May 18, 1992 letter of commitment has been reviewed and the following comments apply.

Product Labeling

The labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable subject to the comments listed below. A stamped copy is enclosed for your records. Two copies of the finished printed labeling must be submitted to EPA before you distribute or sell the product. All products distributed or sold after August 1, 1992 must bear labeling which contains the revisions detailed in this letter.

1. In the "Directions for Use" statement on page 2 of the draft labeling, after the third paragraph, insert the following statement: "For residential and commercial structural fumigation uses, specific USEPA instructions for aeration and reentry must be strictly followed. (Consult instructions detailed elsewhere in this product label and applicators manual.)".

2. In the Table of Contents of the Applicator's Manual provide a listing for the "Methyl Bromide Fact Sheet" to allow the reader easy reference.

CONCURRENCES

SYMBOL	M2501C						
SURNAME	Trangino						
DATE	JUL 8 1992						

3. All products distributed or sold by the registrant after August 1, 1992, and distributed or sold by any other person after September 1, 1992, must bear the approved labeling, revised in accordance with EPA's comments. Distribution or sale of methyl bromide pesticide products for commercial or residential structural fumigation after these dates without the revised labeling will be a violation of FIFRA §12(a)(1)(E).

Additionally, the following conditions, as set forth in your May 18, 1992 letter of commitment, have been added to the above referenced registration:

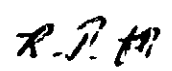
1. Ethyl Corporation will notify all its customers by certified mail that distribution or sale of methyl bromide pesticide products bearing EPA Registration No. 3377-7 for residential or commercial structural fumigation, will be prohibited after September 1, 1992 unless the product's labeling includes the July 1992 revised use directions. Such notification will include a copy of the approved revised labeling. Ethyl Corporation will keep a copy of each notification and return receipt for two (2) years.

2. Ethyl Corporation will offer to relabel methyl bromide pesticide products for its distributors, and if the distributors agree, Ethyl Corporation will relabel such products.

3. All products bearing EPA Registration No. 3377-7, distributed or sold by registrant after August 1, 1992, will bear the July 1992 revisions concerning aeration and reentry and the fact sheet for commercial and residential structural fumigation.

If you should have any questions concerning this letter, you may call Robert Travaglini on (703) 305-6909.

Sincerely,



Ruth G. Douglas
Product Manager (32)
Antimicrobial Program Branch
Registration Division (H7504C)

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.

Amended change highlighted

PRECAUTION AL USUARIO

Si usted no lee Ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

M-B-R 98

FUMIGANT

FOR USE AS A PRE-PLANT SOIL TREATMENT
AND A STRUCTURAL FUMIGANT

ACCEPTED
with COMMENTS
to EPA Letter Dated:
JUL 8 1982

Under the Federal Insecticide, Fungicide, and Herbicide Act as amended, for the pesticide registered under EPA Reg. No.

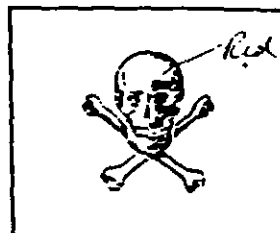
3377-7

ACTIVE INGREDIENT:
 METHYL BROMIDE 98%

INERT INGREDIENT:
 CHLOROPICRIN 2%

KEEP OUT OF REACH OF CHILDREN

DANGER



POISON

PELIGRO

IN ALL CASES OF OVER EXPOSURE, GET MEDICAL ATTENTION IMMEDIATELY. TAKE PERSON TO A DOCTOR OR EMERGENCY TREATMENT FACILITY.

IF INHALED — Get exposed person to fresh air. Keep warm. Make sure person can breathe freely. If breathing has stopped, apply artificial respiration. Do not give anything by mouth to an unconscious person.

IF ON SKIN — Immediately remove contaminated clothing, shoes, and any other item on 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.

ETHYL CORPORATION
451 Florida Street
Baton Rouge, LA 70801



In case of an emergency endangering life or property involving this product, call collect (504) 344-7147

EPA Reg. No. 3377-7
EPA Est. No. 3377-AR-1

NET CONTENTS LBS.

RIGHT

DIRECTIONS FOR USE

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

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 product 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.

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 or commodities), two persons trained in the use of this product must be present at all times 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).

Keep animals, children and unauthorized people away from area under treatment until area is certified free of M-B-R 98.

CYLINDER HANDLING

Use copper or polyethylene tubing to connect cylinder to fumigation chamber, etc. Check all connections with halide leak detector during fumigation to make certain no leaks appear. If leaks occur, shut off main cylinder valve and tighten or replace all loose fittings. When empty, replace valve cap and dome, check for leaks with a suitable detector and return empty cylinder to your vendor. Do not reuse container.

SOIL FUMIGATION

M-B-R 98 Fumigant is effective for the control of root-knot nematodes, cyst nematodes, wireworms and weeds. It is also effective for treatment of bulk soil in greenhouses, hotbeds, and cold frames. Treated soil should be used for non-food plants only, except for the growing of ornamentals or the propagation of transplants of asparagus, broccoli, cauliflower, eggplants, lettuce, peppers, muskmelons, onions (dry bulb), peppers, pineapples, tomatoes and strawberries. The dosage is 1 to 2 pounds per 100 square feet. Expose to fumigation for at least 48 hours at 60°F and above for 3 to 4 days under 60°F. Aerate until odor is gone. Allow 3 to 4 days before seeding and 2 to 3 weeks before setting transplants. Field dosage for strawberry or tomato soil is 240 pounds per acre. Expose to fumigation for at least 48 hours at 60°F. Aerate two weeks before setting transplants. For fruit-tree planting soil in nurseries use 412 pounds per acre. Expose to fumigation for 48 hours at 60°F. Allow 3 to 4 days exposure time for lower temperatures. Aerate 7 to 10 days before planting. All fumigation should be done under a gas-tight tarpaulin.

PRIOR TO FUMIGATION

Comply with all local regulations and ordinances. Obtain an application permit from Agricultural Regulatory Agencies as required.

Never fumigate alone. It is imperative always to have an assistant and proper protective equipment in case of accidents.

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.

Handle this fumigant in the open, with the operator "up wind" from the container where there is good ventilation. Check fumigant pressure system for leaks before beginning operation.

Two trained persons must be present during introduction of the fumigant.

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 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."

All tractors should be cleaned from the field before starting fumigation.

DURING FUMIGATION

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.

Do not lift injection shanks to turn at the end of a pass until fumigant has drained from system following closure of shutoff valve.

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.

When changing the cylinders, be certain they are turned off and fumigant system is not under pressure.

AFTER FUMIGATION

Post all treated areas with warning signs.

Keep all animals, children and unauthorized people away from area under fumigation for 48 hours after fumigation and during removal of tarpaulin.

Two trained persons must be present during removal of the tarpaulin.

FOR SPILL OR LEAK DURING FUMIGATION

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 problem. Approach from upwind to make necessary repairs. Do not reenter area without respiratory protection until a spill has evaporated or a leak has been fixed.

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STRUCTURAL FUMIGATION**(NOT REGISTERED
FOR USE IN CALIFORNIA)**

M-B-R 98 is for use only by pest control operators as a structural fumigant. M-B-R-98 Fumigant is widely used for household fumigation in the control of the drywood termite. The normal dosage for control of drywood termites is 2 1/4 pounds per 1000 cubic feet at 60° F. or above for 24 hours. It should be remembered however, that although M-B-R 98 Fumigant will destroy the insects in a given structure, it will not kill the subterranean termite in its tunnels and underground nests. Comply with all local ordinances and State regulations pertaining to fumigation. Post warning signs at all entrances before fumigation. Before fumigation of structures, remove all materials made of rubber, synthetic rubber, horsehide, furs, and any articles containing sulfur compounds. Remove foods such as vegetable oils, butter, and iodized table salt as they may develop an unpleasant taste or odor. All open flames and electric heaters should be extinguished to avoid corrosion of metallic parts. The structure should be entirely enclosed in a plastic gas-proof tarpaulin. Windows and doors should be left open to improve circulation within the cover. After fumigation, covers are drawn back from doors to permit aeration and later removal. If necessary to enter fumigation area before aeration, wear an approved, full-face gas mask. Check completion of aeration with suitable gas detector.

Do not move trucks, vans, or trailers during fumigation. They must be completely aerated before movement is allowed.

Do not fumigate sites which may be used for storage or treatment of raw agricultural commodities.

AERATION AND REENTRY FOR FUMIGATED RESIDENTIAL OR COMMERCIAL STRUCTURES

At the end of the exposure period, after all tarpaulins or seals are removed from the structure, open all interior and exterior doors, windows, and vents that are operational. No person shall be allowed to reenter the structure unless wearing protective clothing and a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator until the following criteria are met:

1. If non-mechanical or natural ventilation is used:

A) The structure must be aerated for a minimum of seven days from the time the tarpaulins are removed.

B) After aeration is completed, the level of methyl bromide in the structure must be measured using a gas detector device with a minimum detection limit of 3 ppm for methyl bromide. Measurements must be taken from an interior electrical outlet by inserting the detection device in the ground receptacles, or from other enclosed space within the wall on an interior and a perimeter wall; and

C) (i) The level of methyl bromide is less than 3 ppm from each area measured; or

(ii) If the level of methyl bromide is 3 ppm or greater, the structure shall be aerated for an additional 24 hours. At the end of the 24 hour period, the level of methyl bromide must be measured from the areas previously sampled. These procedures must be repeated until the level of methyl bromide is below 3 ppm.

2. If mechanical aeration is used:

A) For structures without attics, an aeration fan(s) must be inserted in a window or other exterior opening and sealed so that the air inside the structure is exhausted out of the structure. The aeration fan(s) must be capable of displacing 5,000 cubic feet of air per minute. To facilitate aeration, exterior openings, such as windows, vents or an access door to the sub-area, should be utilized. The structure must be aerated with the fan(s) operating for a minimum of 72 hours;

B) After aeration is completed, the level of methyl bromide in the structure must be measured using a gas detector with a minimum detection limit of 3 ppm for methyl bromide. Measurements must be taken from an interior electrical outlet by inserting the detection device in the ground receptacles, or from other enclosed space within the wall on an interior and a perimeter wall; and

C) (i) The level of methyl bromide is less than 3 ppm from each area measured; or

(ii) If the level of methyl bromide is 3 ppm or greater, the structure must be aerated for an additional 12 hours. At the end of the 12 hour period, the level of methyl bromide must be measured from the areas previously sampled. These procedures must be repeated until the level of methyl bromide is below 3 ppm.

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3. For structures with attics:

A) An aeration fan must be inserted in the attic access door and a window or other exterior opening, and both sealed so that air inside the structure is exhausted outside the structure. The aeration fans must be capable of displacing a minimum of 5,000 cubic feet of air per minute. To facilitate aeration, exterior openings, such as windows, vents or an access door to the sub-area should be utilized. The structure must be aerated with the fans operating for a minimum of 72 hours;

B) After aeration is completed, the level of methyl bromide in the structure must be measured using a Gas detector device with a minimum detection limit of 3 ppm for methyl bromide residues. Measurements must be taken from within an interior electrical outlet by inserting the detection device in the ground receptacles, or other enclosed space within an interior on a perimeter wall; and

C) (i) The level of methyl bromide is less than 3 ppm from each area measured; or

(ii) If the level of methyl bromide is 3 ppm or greater, aeration must continue for an additional 12 hours. At the end of the 12 hour period, the level of methyl bromide must be measured from the areas previously sampled. These procedures must be repeated until the level of methyl bromide is below 3 ppm.

4. For structures with basements:

In addition to the requirements of paragraph 1, 2, and 3 above, the windows, vents and interior doors of the basement must be open, and

A) After aeration is completed, the level of methyl bromide in the basement must be measured using a gas detector device with a minimum detection limit of 3 ppm for methyl bromide residues. A measurement must be taken from an interior electrical outlet by inserting the detection device in the ground receptacle, or from other enclosed space within the wall on an interior wall. In the absence of an interior wall, a measurement must be taken of the ambient air in the basement; and

B) (i) The level of methyl bromide is less than 3 ppm; or

(ii) If the level of methyl bromide is 3 ppm or greater, the structure must be aerated for an additional 24 hours for natural ventilation or an additional 12 hours for mechanical aeration. At the end of the additional ventilation period, the level of methyl bromide must be measured from the area in the basement previously sampled. These procedures must be repeated until the level of methyl bromide is below 3 ppm.

STRUCTURAL FUMIGATION FACT SHEET

The applicator must obtain a structural fumigation fact sheet which has been signed by, and provided to, the following persons:

- (1) An adult occupant of a single family dwelling prior to the parties entering into a fumigation agreement,
- (2)(A) The owner, manager, or designated agent of the building for multiple-family dwellings, provided he or she acknowledges in writing to the applicator that a copy of the Structural Fumigant Fact Sheet has been provided to an adult occupant of each unit prior to the parties entering into a fumigation agreement; or
- (B) An adult occupant of each unit in a multiple family dwelling prior to the parties entering into a fumigation agreement, or
- (3) The owner, manager, or designated agent for all structures or businesses other than family dwellings.

Refer to the Methyl Bromide Applications Manual for specific required language which must be included in the Methyl Bromide Fact Sheet. Fact sheets are also available from your supplier.

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

DANGER

EXTREMELY HAZARDOUS LIQUID AND VAPOR UNDER PRESSURE. DO NOT BREATHE VAPOR. INHALATION MAY BE FATAL OR CAUSE SERIOUS ACUTE ILLNESS OR DELAYED LUNG, NERVE OR BRAIN INJURY. LIQUID OR 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.

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 overexposure can result in blurred vision, staggering gait and mental imbalance, with probable recovery after period of no exposure. Blood bromide levels suggest the occurrence, but not the degree, of exposure. Treatment is symptomatic. See the product MSDS for additional information.

RESPIRATORY PROTECTION

If the concentration of methyl bromide in the working area, as measured by a suitable detector, does not exceed 5 ppm. (20 mg/m³), no respiratory protection is required.

This detection method requires a small hand held pump and methyl bromide detector tubes. The air sample is drawn through two small chemical reagent tubes in which the methyl bromide is decomposed by an oxidizing agent to liberate bromine. The bromine concentration is then indicated by color formed in reaction with O-tolidine. The detector tubes are capable of measuring methyl bromide concentrations of 2.5-500 ppm. Methyl bromide detector tubes and pumps listed below are available from safety supply distributors.

1. Sensidyne Gastec pump, part number F-7010657, detector tube #136.
2. Draeger pump, part number CH 304, detector tube #67-28211.
3. Matheson-Kitagawa pump, part number 801-K, detector tube #157Sb.

If the 5 ppm. concentration is exceeded at any time, all persons in the fumigation area must wear a [NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied SCBA respirator].

PROTECTIVE CLOTHING

Wear loose cotton long sleeve shirts and pants, shoes and socks that are cleaned after each wearing. Do not wear jewelry, gloves or boots 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. After application, immediately remove clothing, shoes and socks. Do not reuse contaminated clothing or shoes until cleaned. Drained clothing cannot be adequately decontaminated.

PLACARDING OF FUMIGATED AREAS

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.

Do not remove a placard until the treated commodity is completely aerated. To determine whether aeration is complete, each fumigated site or vehicle must be monitored and shown to contain less than 5 ppm methyl bromide in the air space around and, when feasible, in the mass of the commodity. If less than 5 ppm methyl bromide is detected, the placard may be removed. However, if 5 ppm or greater methyl bromide is detected, the placard must be transferred with the commodity to the new site. Workers who transfer or handle incompletely aerated commodity must be informed and appropriate measures must be taken (i.e., ventilation or respiratory protection) to prevent exposures from exceeding 5 ppm or greater methyl bromide.

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8 of 45

STORAGE AND DISPOSAL

STORAGE AND HANDLING

Store in secure manner either outdoors under ambient conditions or indoors in a well ventilated area. Post as a pesticide storage area.

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

DISPOSAL

Pesticide wastes are toxic. Improper disposal of excess pesticide 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 representatives at the nearest EPA Regional Office for guidance.

SPILL OR LEAK PROCEDURE

Evacuate immediate area of spill or leak. Use 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 upward 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.

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 is exceeded.

ENVIRONMENTAL HAZARD

The successful use of M-B-R 98 depends upon its containment during the fumigation exposure period. Monitor the area immediately surrounding the fumigation site with a halide detector during exposure and aeration periods to establish that dangerous levels of M-B-R 98 are not present.

The high volatility of M-B-R 98 permits it to be vented from spaces being fumigated and to dissipate rapidly with no hazard to surrounding areas with correct monitoring.

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.

CHEMICAL HAZARD

M-B-R 98 is 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 odors 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 leather 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, handknit 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.
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

Return empty containers for reuse.

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9 of 45
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**METHYL BROMIDE
LIQUID
UN 1062**

INHALATION HAZARD



POISON GAS

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WARRANTY

Seller makes no warranty, expressed or implied, concerning the use of this product other than indicated on the label. Buyer assumes all risk of use and/or handling of this material when such use and/or handling is contrary to label instructions.

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BASIC IN BROMINE



Bromine Chemicals Group

ACCEPTED
with COMMENTS
in EPA Letter Datab

JUL 8 1992

Under the Federal Insecticide,
Fungicide, and Rodenticide Act as
amended, for the pesticide
registered under EPA Reg. No.

3377-7

METHYL BROMIDE

APPLICATIONS MANUAL

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**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.

APPLICATIONS MANUAL

This product manual covers seven registered products containing methyl bromide, manufactured and sold by the Ethyl Corporation. Please read this entire manual and consult the product labels for specific directions for use. Material Safety Data Sheets are available upon request.

PRECAUCION AL USARIO: Si usted no lee Ingles, no use este producto hasta que la etiqueta y este manual de aplicacion le hayan sido explicados ampliamente.

Registrations covered by this product manual include:

PRODUCT*	EPA REG. NO.	COMPOSITION (%)	
		MeBr	CHLOROPICRIN
M-B-R 98	3377-7	98	2
Methyl Bromide Technical	3377-9	100	0
MBR-2	3377-16	98	2
MBR-33	3377-17	67	33
M-B-R 33 Technical	3377-26	67	33
M-B-R 98 Technical	3377-27	98	2
M-B-R 75	3377-30	75	2

*The Environmental Protection Agency requires that chloropicrin at a concentration between 0.5% and 2.0% be present as a warning agent in methyl bromide formulations used for all outdoor sites including soil fumigation and fumigation in enclosed spaces, except commodity fumigation.

**IN CASE OF EMERGENCY
ENDANGERING LIFE OR PROPERTY INVOLVING THIS PRODUCT,
CALL COLLECT (504) 344-7147**

TABLE OF CONTENTS

- CHEMICAL AND PHYSICAL PROPERTIES.....
- ENVIRONMENTAL HAZARDS.....
- HAZARDS TO HUMANS.....
- PRACTICAL TREATMENT.....
- STORAGE AND HANDLING.....
- PESTICIDE DISPOSAL.....
- SPILL AND LEAK PROCEDURES.....
- DIRECTIONS FOR USE.....
 - A. RESPIRATORY PROTECTION.....
 - B. PROTECTIVE CLOTHING.....
 - C. AERATION, AND RE-ENTRY.....
 - D. DETECTION.....

STRUCTURAL, TRANSPORTATION AND SPACE FUMIGATION

- A. GENERAL DIRECTION.....
- B. CHEMICAL HAZARDS.....
- C. PLACARDING REQUIREMENTS.....
- D. USE PROCEDURES.....
 - I. WAREHOUSE, STRUCTURAL, AND FOOD PLANT FUMIGATION.....
 - II. GRAIN ELEVATOR FUMIGATION.....
 - III. TARPULIN FUMIGATION.....
 - IV. TRUCK, VAN, OR TRAILER FUMIGATION.....
 - V. RAILROAD CAR FUMIGATION.....
 - VI. SHIPBOARD, IN TRANSIT, OR SHIPHOLD FUMIGATION.....

SOIL FUMIGATION

- A. GENERAL DIRECTIONS.....
- B. RESPIRATORY PROTECTION.....
- C. CLOTHING PRECAUTIONS.....
- D. EQUIPMENT.....
- E. PRECAUTIONS BEFORE FUMIGATION.....
- F. PRECAUTIONS DURING FUMIGATION.....
- G. PRECAUTIONS AFTER FUMIGATION.....
- H. SPILL OR LEAK PROCEDURE.....
- I. AERATION.....
- J. USE PROCEDURES.....
 - I. BROADCAST OR OVER-ALL TREATMENT FUMIGATION.....
 - II. BED OR ROW FUMIGATION.....
 - III. SITE FUMIGATION.....
 - IV. GREENHOUSE FUMIGATION.....
 - V. TREE SITE FUMIGATION.....
 - VI. COMPOST, MANURE, SOIL PILES.....

STATEMENT OF WARRANTY AND LIABILITY

Ethyl Corporation warrants that its methyl bromide products comply with the specifications expressed in their labels. Ethyl makes no other warranties, and disclaims all other warranties, expressed or implied, including but not limited to warranties of merchantability and fitness for the intended purpose.

The information presented herein is believed to be accurate and reliable, but is presented without guarantee. The user has an independent obligation to determine methods for safe use of this product.

CHEMICAL AND PHYSICAL PROPERTIES OF METHYL BROMIDE

Formula.....	CH ₃ Br
Color.....	Colorless to light yellow
Physical State.....	Gas at 25°C, Liquid under pressure
Odor.....	Odorless
Flammability.....	Nonflammable
Explodability.....	Nonexplosive
Boiling Point.....	3.6°C (38.5°F)
Freezing Point.....	-93.°C (-135.4°F)
Density of Liquid.....	1.732 gm/ml at 0°C (32°F)
Weight per Gallon.....	14.4 lb at 0°C (32°F)
Volume per Pound.....	262 cc/lb at 0°C (32°F)
Specific Gravity of Gas.....	3.27 at 0°C and 760 mm Hg (Air = 1.00)
Vapor Density.....	0.247 lb/cu.ft at 20°C (68°F)
Vapor Pressure.....	1400 mm Hg at 20°C (68°F)
Solubility in Water.....	Very slight; forms a voluminous white precipitate with ice water

ENVIRONMENTAL HAZARDS

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 (National Pollutant Discharge Elimination System) permit. Do not discharge effluent containing this product to sewer without previously notifying the sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

HAZARDS TO HUMANS

DANGER: Extremely hazardous liquid and vapor under pressure. Do not breathe vapor. Inhalation may be fatal or cause serious acute illness or delayed lung or nervous system injury (such as dizziness, nausea, vomiting, headache, drowsiness, and dimming of vision). Liquid or 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.

IF THE PRODUCT IS 100% METHYL BROMIDE: Methyl bromide vapor is odorless. Exposure to toxic levels may occur without warning or detection by the user.

IF THE PRODUCT CONTAINS CHLOROPICRIN: 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. Do not rely on the absence of a chloropicrin odor as an indication that methyl bromide is no longer present.

PRACTICAL TREATMENT

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

IF INHALED: Get exposed person to fresh air. Keep warm. Make sure person can breathe freely. If breathing has stopped, apply artificial respiration. Do not give anything by mouth to an unconscious person.

IF ON SKIN: Immediately remove contaminated clothing, shoes, and any other item on 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 PHYSICIANS: 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 overexposure 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.

STORAGE AND HANDLING

Store in dry secure manner either outdoors under ambient conditions or in a well-ventilated area. Post as a pesticide storage area.

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

PESTICIDE DISPOSAL

Pesticide wastes are toxic. Improper disposal of excess pesticide 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.

SPILL AND LEAK PROCEDURES

Evacuate immediate area of spill or leak. Use SCBA (Self Contained Breathing Apparatus) 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 unprotected persons until concentration of methyl bromide is determined to be less than 5 ppm.

Contaminated soil, water, and other cleanup debris are a toxic hazardous waste. Report spill to the National Response Center (800-424-8802) if the reportable quantity of 1000 lbs. is exceeded.

DIRECTIONS FOR USE

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 and manual precautions and directions.

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.

A. RESPIRATORY PROTECTION:

If the concentration of methyl bromide in the working area, as measured by a direct reading detector device (such as a Draeger, Kitagawa, or Sensidyne), does not exceed 5 ppm (3ppm for structural fumigation), wearing of respiratory protection is not required (see Aeration Statement). However, such equipment is required on the premises in case of an emergency situation.

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 where the 5 ppm (20mg/m³) concentration is exceeded at any time.

The minimum requirements of an acceptable respirator program include:

1. Written program.
2. Respirator selection for a given task.
3. Employee training on how to use a SCBA or combination air-supplied/SCBA respirator.
 - a. Training on the limitations of each respirator.
 - b. Periodic training thereafter.
4. Respirator fit testing (no facial hair between the face-piece-to-face seal).
5. Inspection and maintenance of respirators.

- 6. Standby persons present when a SCBA or combination air-supplied/SCBA respirator is used in IDLH (immediately dangerous to life and health) atmosphere.
- 7. Random inspection of the respirator program by a qualified individual.

B. PROTECTIVE CLOTHING:

Wear loose clothing and socks that are cleaned after each wearing. Do not wear jewelry, gloves, or boots 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. After application, immediately remove clothing, shoes and socks. Do not reuse contaminated clothing or shoes until cleaned. Drenched clothing cannot be adequately decontaminated.

C. AERATION, AND RE-ENTRY

SOIL FUMIGATION

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 protective clothing and SCBA or combination air-supplied/SCBA respirator are worn.

STRUCTURAL FUMIGATION FOR RESIDENTIAL OR COMMERCIAL BUILDINGS

At the end of the exposure period, after all tarpaulins or seals are removed from the structural, open all interior and exterior doors, windows, and vents that are operational. No person shall be allowed to reenter the structure unless wearing protective clothing and a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator until the following criteria are met:

- 1. If non-mechanical or natural ventilation is used:
 - A) The structure must be aerated for a minimum of seven days from the time the tarpaulins are removed.
 - B) After aeration is completed, the level of methyl bromide in the structure must be measured using a gas detector

device with a minimum detection limit of 3 ppm for methyl bromide. Measurements must be taken from an interior electrical outlet by inserting the detection device in the ground receptacles, or from other enclosed space within the wall on an interior and a perimeter wall; and

C) (i) The level of methyl bromide is less than 3 ppm from each area measured; or

(ii) If the level of methyl bromide is 3 ppm or greater, the structure shall be aerated for an additional 24 hours. At the end of the 24 hour period, the level of methyl bromide must be measured from the areas previously sampled. These procedures must be repeated until the level of methyl bromide is below 3 ppm.

2. If mechanical aeration is used:

A) For structures without attics, an aeration fan(s) must be inserted in a window or other exterior opening and sealed so that the air inside the structure is exhausted out of the structure. The aeration fan(s) must be capable of displacing 5,000 cubic feet of air per minute. To facilitate aeration, exterior openings, such as windows, vents or an access door to the sub-area, should be utilized. The structure must be aerated with the fan(s) operating for a minimum of 72 hours;

B) After aeration is completed, the level of methyl bromide in the structure must be measured using a gas detector with a minimum detection limit of 3 ppm for methyl bromide. Measurements must be taken from an interior electrical outlet by inserting the detection device in the ground receptacles, or from other enclosed space within the wall on an interior and a perimeter wall; and

C) (i) The level of methyl bromide is less than 3 ppm from each a measured; or

(ii) If the level of methyl bromide is 3 ppm or greater, the structure must be aerated for an additional 12 hours. At the end of the 12 hour period, the level

of methyl bromide must be measured from the areas previously sampled. These procedures must be repeated until the level of methyl bromide is below 3 ppm.

3. For structures with attics:

- A) An aeration fan must be inserted in the attic access door and a window or other exterior opening, and both sealed so that air inside the structure is exhausted outside the structure. The aeration fans must be capable of displacing a minimum of 5,000 cubic feet of air per minute. To facilitate aeration, exterior openings, such as windows, vents or an access door to the sub-area should be utilized. The structure must be aerated with the fans operating for a minimum of 72 hours;
- B) After aeration is completed, the level of methyl gas bromide in the structure must be measured using a Gas detector device with a minimum detection limit of 3 ppm for methyl bromide residues. Measurements must be taken from within an interior electrical outlet by inserting the detection device in the ground receptacles, or other enclosed space within an interior an a perimeter wall; and
- C) (i) The level of methyl bromide is less than 3 ppm from each area measured; or
(ii) If the level of methyl bromide is 3 ppm or greater, aeration must continue for an additional 12 hours. At the end of the 12 hour period, the level of methyl bromide must be measured from the areas previously sampled. The procedures must be repeated until the level of methyl bromide is below 3 ppm.

4. For structures with basements:

In addition to the requirements of paragraph 1, 2, and 3 above, the windows, vents and interior doors of the basement must be open, and

- A) After aeration is completed, the level of methyl bromide in the basement must be measured using a gas detector device with a minimum detection limit of 3 ppm for methyl bromide residues. A measurement must be taken

from an interior electrical outlet by inserting the detection device in the ground receptacle, or from other enclosed space within the wall on an interior wall. In the absence of an interior wall, a measurement must be taken of the ambient air in the basement; and

- B) (i) The level of methyl bromide is less than 3 ppm; or
- (ii) If the level of methyl bromide is 3 ppm or greater, the structure must be aerated for an additional 24 hours for natural ventilation or an additional 12 hours for mechanical aeration. At the end of the additional ventilation period, the level of methyl bromide must be measured from the area in the basement previously sampled. These procedures must be repeated until the level of methyl bromide is below 3 ppm.

D. DETECTION

Treated areas should be monitored by a suitable detector device, such as a detector tube system, to determine that the level of methyl bromide is below 5 ppm. Air containing methyl bromide is pulled through a detector tube, resulting in a color change. The change in color is related to the methyl bromide concentration. These tubes are sensitive enough to detect methyl bromide down to 2.5 ppm. Methyl bromide tubes are available from the following manufacturers: Sensidyne, Draeger, Matheson-Kitagawa.

Although halide leak detectors are sometimes used to determine the presence of methyl bromide, they cannot safely be used for re-entry purposes because they cannot detect methyl bromide below 25-50 ppm.

**STRUCTURAL, TRANSPORTATION, SPACE,
AND COMMODITY FUMIGATION**

This section applies to MBR-98.

PLEASE NOTE THAT WHENEVER FOOD COMMODITIES ARE BEING FUMIGATED, ONLY 100% METHYL BROMIDE MAY BE USED. CONSULT PRODUCT LABEL FOR SPECIFIC REGISTERED USES.

A. GENERAL DIRECTIONS:

Methyl bromide has demonstrated its effectiveness by killing every species of insect it has encountered anywhere in the world. Methyl bromide kills all stages of insect's life cycle including egg, larva, pupa, and adult. Listed below are some of the pests against which methyl bromide has proven to be effective.

Raisin Moth	Silverfish	Fleas
Dried Fruit Beetle	Carper Beetles	Indian Meal Moth
Pin Worm	Cockroaches	Saw-Toothed Grain Beetle
Plum Moth	Bedbugs	Mediterranean Flour Moth
Leaf Miner	Book Lice	Rice Weevil
Vegetable Weevil	Mealworms	Granary Weevil
Mealybug	Tobacco Beetle	Tobacco Moth
Potato Tuber Moth	Confused Flour Beetle	Drugstore Beetle
Pink Boll Worm	Red Flour Beetle	Khapra Beetle
Olive Scale	Golden Nematode	Mites
Bean Weevil	Cadelle	Earwigs
Aphids	Flat Grain Beetle	Corn Borer
Bull Files	Thrips	Oriental Fruit Moth
White Fringed Beetle	Japanese Beetle	Sweet Potato Weevil

In addition, methyl bromide kills rats, mice, and the parasites they carry.

Methyl bromide penetrates readily. This property is demonstrated by the fact that complete kill has been consistently achieved in the center of 140 pound bags of flour and between blocks of wood.

Methyl bromide vents rapidly. For large scale fumigations, the whole job from application through aeration can usually be accomplished in a single weekend, thus enabling the plant to resume normal operations the following Monday.

When methyl bromide is used for fumigation of enclosed spaces (houses and other structures, warehouses, grain bins or elevators, vaults, chambers, greenhouses, trucks, vans, boxcars, ships and other transport vehicles and tarpaulin-covered areas or commodities) 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.)

Do not fumigate with this product when commodity temperature is below 40°F (4°C).

Check with appropriate municipal and county authorities before fumigating in order 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.

Several types of buildings can be fumigated with methyl bromide. Frame, metal, and concrete buildings used for storage of agricultural products can be fumigated if they are in good repair and tight, or can be made tight by sealing or tarping. The buildings include packing plants, grain elevators, milling and baking plants, port warehouse, grain storage buildings, and coffee warehouses.

) The properties of penetration and diffusion that makes methyl bromide an ideal fumigant also makes it difficult to confine, and for that reason a good sealing job is necessary. Sealing of the building should begin with the closure of all external openings to the building. Roof ventilators and chimneys should be sealed by wrapping with a tarpaulin, or plastic sheet, or by stripping the screened openings with a wide commercial masking tape. Stairwells and interior doors should be closed. Doors and windows should have broken panes replaced, then wedged tight, and cracks caulked or taped. Check for cracks in the floor, and around the eaves, and seal them. Special care should be taken to seal partitions to adjacent storage or work areas in a building. Adjoining buildings sharing a common wall must be cleared before fumigation.

) It is recommended that all doors and hatches on milling machinery be opened. These include elevator boots and repair openings, conveyor lids, settling chamber doors, and dust trunks. This also applies to reels, purifiers, sifters, shorts and bran dusters, feeder gates on rolls, and purifiers, as well as other openings that will facilitate the entrance of gas to the equipment. "Dead" spouts are particularly difficult to penetrate and should be opened before the fumigation.

Dosage recommendations are made on the basis of cubic content. In square or rectangular buildings, simply multiply the length by width by height. In irregularly shaped building, determine the cubic content of each unit, then add the units together to determine the total. In the case of peaked roofs, the average height between the sidewall and top of the roof may be used as the third multiple in calculating the cubic content.

Consult product label for specific directions.

B. CHEMICAL HAZARDS:

All the listed registered methyl bromide fumigant formulations are non-flammable. There is no danger from fire or explosion in use concentrations. However, flame can change the chemicals 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 fumigant directly to metal surfaces because of possible corrosive effective on certain metals. Do not use containers or application equipment made of magnesium, aluminum, zinc or their alloys.

The following materials might develop undesirable odors 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 kind of material that contains 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 (such 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, handknit woolen socks, sweaters, shawls, and woolen yarns.
6. Viscose Rayons: those rayons processed or manufactured by a process in which carbon bisulphide has been used.

7. Paper:
 - a. Silver-polishing papers.
 - b. Certain writing papers cured by sulphide processes.
 - c. Blue print paper.
 - d. Photographic paper.
 - e. Some copying papers.
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.
13. Charcoal material: charcoal absorbs the methyl bromide reducing the effective concentration and contaminating the charcoal.
14. 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.

C. PLACARDING REQUIREMENTS:

The applicator must placard all entrances to the fumigated area when methyl bromide is used as a space, structural, transportation, or commodity fumigant. The placard must contain the following:

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

Any person who transfers a treated commodity from one site to another without aeration must ensure that the new site has been placarded until the commodity is aerated below 5 ppm. Use a direct reading detection device to confirm aeration.

Workers who transfer or handle incompletely aerated commodity must be informed and appropriate measures must be taken (i.e. ventilation or respiratory protection) to prevent exposures from exceeding 5 ppm methyl bromide.

Only a certified applicator or someone under his/her supervision may remove placards and only when the concentration of methyl bromide in the treated site of commodity is below 5 ppm. This person should be trained in the physical, chemical, and toxicological properties of methyl bromide and should know: (a) how to take gas readings; (b) the permissible exposure limits for methyl bromide and; (c) symptoms of poisoning and first aid treatment.

D. USE PROCEDURES

I. STRUCTURAL FUMIGATION

Always check with appropriate authorities in order to be familiar with local regulations. Local ordinances may require watchmen, padlocks, or warning signs during and after fumigation, as well as notification of the nearest fire station. Notify anyone who would normally be in the area before fumigating. Before fumigation, the following Methyl Bromide Fact Sheet must be provided to the owner/occupant of the building for signature:

METHYL BROMIDE FACT SHEET

The purpose of this handout is to give consumers information about possible health hazard associated with the use of the structural fumigant, methyl bromide. To make sure you have been given an opportunity to read this, applicators are required to obtain the signature of the owners and occupants of property to be fumigated with methyl bromide. You will also be given a copy of this fact sheet to keep.

Structural Fumigant: Methyl Bromide

• • • • • ATTENTION • • • • •

Read This Fact Sheet Completely Before Signing

Fumigation involves the introduction of poisonous gases into every part of the structure, including inside the walls. Because overexposure to these gases can be harmful to people, your building will be ventilated before you will be allowed to return.

This fact sheet provides basic information about the structural fumigant, methyl bromide, as well as information about why and how buildings are fumigated, methyl bromide health risks, how to know if you are exposed, ways to minimize your exposure, and several phone numbers to call for more information.

New rules for structural fumigation have substantially increased the time between fumigant use and when an occupant is allowed back into the building. Post-fumigation ventilation has also been improved significantly. These changes should be adequately protective, but you should know some basic facts about structural fumigants.

Why Buildings Are Fumigated -- House and other structures are fumigated to kill insect pests living in walls or wood. There are sometimes other ways to deal with these pests, and building owners should investigate them. However, fumigation is sometimes the only method for handling certain infestations of wood-destroying insects depending on the extent or location of infestation. You can discuss the possibility of alternatives with your pest control company.

How Buildings Are Fumigated -- There are two pesticides used for structural fumigation: methyl bromide and sulfuryl fluoride (known by the trade name, Vikar[®]). Each has advantages and disadvantages in terms of their effectiveness in killing pests which professional fumigators can discuss with you. Your fumigator should also provide you with a list of items you need to remove from your building before the fumigation starts.

Methyl bromide is a gas. Before fumigation starts, the building to be fumigated is completely sealed to keep the gas in the building so it can penetrate wood to kill the pest. Depending on a building's construction, the doors and windows may be sealed with tape and plastic sheet, or the structure may be completely covered with a tarp. The tarp or tarp is left on for one to two days. Warning signs are posted around the building notifying people to keep out because the levels of methyl bromide in the building during fumigation can kill a person.

After the tape or tarp is removed, a professional fumigator will go into the building wearing a compressed air tank and mask and open the doors and windows. Powerful fans may also be set up to pull fresh air into the building.

It is now required that building fumigated with methyl bromide be aired out for a minimum of 72 hours after the tape or tarp is removed. Then, the fumigators are required to measure the levels of methyl bromide inside the walls of buildings to make sure they are below the required level before you are allowed to go back in.

The ventilation procedures make it unlikely that any remaining fumigant in the living space will be a health hazard after the house is cleared for reoccupying. However, you should be aware of the symptoms of over exposure to methyl bromide, since it is sensible to be cautious when dealing with a potentially hazardous chemical.

Small pockets of fumigant can remain in dead air space between walls and inside cabinets, and in porous materials such as furniture, and may enter into the living space for a few days after fumigation. That's why a mandatory aeration period is required after the tape or tarp is removed. Your building should not be cleared for reoccupancy until it is safe for you to reenter. The pest control company will post a notice on your building indicating the day and time your building was considered safe to reenter.

How Do You Know Whether You Are Exposed? -- Methyl bromide is a colorless, odorless gas, so a warning agent is added which causes watery eyes and a scratchy throat. If you experience these symptoms in a building that has been recently fumigated, you should leave immediately and call the pest control company to have your building retested. You should also consult with your physician.

Methyl Bromide Health Risks -- Methyl Bromide enters your body as a gas when you breathe it. Exposure which may occur from touching treated surfaces is insignificant.

Nervous system, eyes, and respiratory irritations:

Overexposure to methyl bromide can cause blurred vision, headache, and nausea. At higher concentrations, it can cause tremors, sleepiness, convulsions, pneumonia, and excess fluid in the lungs. These symptoms may not appear for 12 to 24 hours. If you experience these symptoms in a recently fumigated building, you should leave immediately and call the pest control company to have the building retested. You should also call your personal physician. Physicians are encouraged to report suspected pesticide-related illnesses to EPA.

Birth Defects: In recent animal studies, methyl bromide caused birth defects when pregnant animals were exposed under experimental conditions. There is no evidence that methyl bromide affects human reproduction, although some chemicals which cause birth defects in animals may also cause birth defects in humans. Any person, including pregnant women, should avoid unnecessary exposure.

Other Effects: Experiments in animals are underway to determine whether long term exposure to methyl bromide cause cancer. Test so far are negative. However, even if methyl bromide were shown to cause cancer over a lifetime of exposure in animals, it is unlikely your exposure from the one-time fumigation of your building would be high enough to cause a significant risk of cancer.

Ways To Reduce Your Exposure If You Are Having Your Building Fumigated --

- Carefully evaluate all you pest control alternatives.
- Talk over your treatment program in advance with the pest control company, so you fully understand what will be done, and what you need to do.
- Carefully follow the instructions you are given about items you are to remove from your building.
- Stay out of the treated building for at least three days after the tape or tarp is removed. If you have additional concerns, you may choose to be away for an extra period of time after the building is cleared for reoccupation.
- If you are interested or concerned, you can ask your pest control company to show you the records of the air monitoring it did before your building was cleared for reoccupation.
- You may wish to increase ventilation by opening doors and windows.
- If you have symptoms of exposure, or you believe that the aeration was not done properly, you should leave the building and contact the pest control company and your physician. You may also wish to call one of the phone numbers listed below.

For information about pesticides, the U.S. Environmental Protection Agency has a toll-free information service, the National Pesticide Telecommunications Network Hotline, which can be reached at 1-800-857-7378.

In a medical emergency, call 911, or contact the nearest Poison Control Center. See "Crisis Hotline" listed near the front of the white pages in your phone book.

If you feel uncomfortable entering the structure, or if you do not fully understand the potential hazards, you should call the company that performed the fumigation:

Name: _____

Address: _____

City: _____

Telephone: _____

I acknowledge receiving a copy of this methyl bromide fact sheet. (You will sign one copy for the company doing the fumigation, and get a second copy to keep for later reference.)

Signature: _____ Date: _____

Please print your name here: _____

Your address: _____

At least two trained persons wearing a SCBA or combination air-supplied/SCBA respirator must be present if releasing the gas from inside the structure. Do not allow anyone into the structure until the concentration of methyl bromide is below 3 ppm, as measured with a reading detection device.

1. Seal all exterior building openings. Roof ventilators and chimneys should be wrapped with a tarpaulin or polyethylene sheeting. Tape can be used to seal windows and doorways. Small structures can be sealed by tarpaulins.
2. Adjoining buildings sharing a common wall with the fumigated structure must be evacuated before the fumigation begins.
3. Open all milling machinery including roll stands, elevator boots, conveyors, purifiers, sifters, dust collectors, and spouting.
4. Placard all entrances with warning signs (see Placarding Requirements).
5. Calculate dosage required on the basis of total cubic content as indicated by the product label. Introduce gas.

SMALL STRUCTURES: Release methyl bromide from outside the structure through heat exchanger to convert from liquid to gaseous state, or introduce through a suitable leak proof tube (such as polyethylene) attached to an evaporating pan to prevent splashing over interior. Operate an electric fan during introduction and for a minimum of 30 minutes thereafter to accelerate distribution of the gas. For an average structure, the entire amount may be released in one place, but for large or complex structures, release the gas at two more locations, so chosen to ensure even distribution.

LARGE STRUCTURES: In large structures, cylinders can be placed inside the structure by a two-person team, using a clipboard to map the location of each cylinder in the building. The cylinders should be arranged so that in following a route in releasing the gas, the fumigator will start on the top floor and continue walking away from the released gas in the direction of the nearest exit.

- 6. Following the exposure period, commence aeration: See specific aeration and re-entry requirements under Directions for Use.

SMALL STRUCTURES: 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 3 ppm.

LARGE STRUCTURES: Once the exposure period is complete, aeration should be started by opening the previously prepared doors and windows. Ventilators which are accessible from the outside should be allowed to aerate until a suitable detector shows that the methyl bromide concentration has dropped below 3 ppm. At this time, at least two persons, wearing SCBA's, should begin opening windows, starting at the bottom of the building and working upward. They should not try to open all windows on any single floor the first time through.

The workers should not remain inside the building for prolonged periods (not more than 15 minutes per job site), and should open only those windows that are necessary for thorough ventilation, and then return to the outside as soon as possible. The fans which were used at the beginning of the fumigation to circulate the gas should once again be turned on and allowed to run until aeration is complete. After the building has been partially aerated, the workers, again wearing SCBA's, should open as many of the remaining windows as needed to complete the aeration. No one should be allowed inside the building until all parts of the building have been checked for methyl bromide concentration with suitable detector. Once the aeration has been completed (less than 3 ppm methyl bromide), the building can be returned to normal condition for operation.

- 7. Never allow persons not protected by SCBA or combination air-supplied/SCBA respirators to enter the structure until a direct reading detection device is used and indicates the gas concentration is below 3 ppm.

**II.
GRAIN ELEVATOR FUMIGATION**

The recirculation method is best for grain elevator fumigation since it allows better fumigant penetration through the grain mass.

1. Seal structure carefully using tape for small openings and polyethylene sheeting, secured with tape, for large openings.
2. Fumigate by using a fan or blower to recirculate methyl bromide through the aeration ducts at the bottom of the bin and then discharge back into the enclosed headspace over the grain through the return duct, or discharge the fumigant through polyethylene in the head space at intervals of 100 feet or less.
3. Fumigated areas must be placarded on all entrances with warning signs (see Placarding Requirements). Do not remove warning signs until the fumigated area is completely aerated and safe for entry, as indicated by a suitable detector (less than 5 ppm methyl bromide).
4. Determine dosage and exposure time from the product label.
5. Check periodically during exposure period for leaks in the system.
6. To aerate after fumigation, disconnect return air at the fan and discharge into outside air. Continue until detector shows the fumigant level is below 5 ppm.
7. Use suitable detector to check the elevator head space for possible pockets of methyl bromide.

**III.
TARPAULIN FUMIGATION**

Arrange the stacks, gas expansion dome, tubing and evaporating pans and tarpaulin. Follow these directions:

1. **THE STACK:** Stacks of stored commodities usually can be fumigated where they stand as long as the tarpaulin is large enough to cover the stack completely. Be sure to allow for a tarpaulin margin of at least two feet around the stack when the cover is laid over it. The stack should

be on a concrete floor or other airtight surface. Where floors are not airtight (such as on a loading dock), cracks should be caulked or otherwise sealed to prevent escape of the fumigant. Sisal kraft paper, tar paper, or additional tarpaulin laid on the floor under the material to be fumigated will provide a satisfactory seal.

2. **THE GAS EXPANSION DOME:** Center four or more sacks upright on top of the stacked material to form a gas expansion dome. This facilitates gas distribution .
3. **THE TUBING AND EVAPORATION PANS:** Copper, polyethylene, or saran tubing is used to inject the gas near the center of the expansion dome. The outlet of this tubing should be fastened to an evaporating pan to prevent liquid methyl bromide from dripping on the commodity being fumigated, or splashing on the tarpaulin.
4. **THE TARPAULIN:** Polyethylene or gas proof, impregnated, tarpaulins should be used. Water-proofed canvas tarpaulins are not satisfactory. Before spreading the tarpaulin, sweep around the stack to provide a clean surface for sealing. Unroll the tarpaulin over the stack, providing a margin on the floor of two feet. Run the applicator tubing out from under the tarpaulin by weighing it down with a row of bagged material or sand-filled tubes. (Canvas or plastic tubing about four inches in diameter may be used for these sandsnakes.)
5. Once the above preparations are completed, attach the applicator tubing to the cylinder of methyl bromide and apply the proper dosage. Place warning placards on tarpaulins under fumigation. These placards must be present during aeration. Leave the stack undisturbed for 24 hours after releasing the fumigant.
6. At the end of the fumigation period, pull back part of the tarpaulin and allow the stacked material to aerate. After about thirty minutes the tarpaulin can be completely removed. An SCBA or air supplied respirator should be worn for removal of the tarpaulin. Respiratory protection is no longer required once the airborne concentration of methyl bromide is at or below 5 ppm using a suitable direct reading monitoring device.

IV.
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 the fumigant evenly. Secure the tube to the ceiling so the perforations direct fumigant toward the floor and prevent it from spraying the ceiling. The fumigant should always be applied from outside the truck 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 fumigation, name of the fumigant used, emergency telephone number for contact and the name and address of the fumigator.
4. Do not fumigate while strong winds are blowing.
5. Trucks, vans or trailers are not allowed to be moved during fumigation.
6. After 12 to 18 hours, open the unit and aerate 1 to 1.5 hours. Do not remove warning signs until fumigated area is completely aerated and safe for entry (less than 5 ppm) as indicated by a direct reading detector. The truck, van or trailer may then be resealed for shipment.
7. The consignee must be advised to check the truck, van or trailer for proper aeration on arrival.

V.
RAILROAD CAR FUMIGATION

1. Car should be placed on seldom used track or siding so that it will not have to be moved while under fumigation.
2. Methyl bromide must ALWAYS BE APPLIED FROM OUTSIDE the railroad car by means of a 0.25 inch copper or plastic tubing attached to a methyl bromide cylinder. The tube may be introduced into the car through a hole drilled in the floor near the center of

the car or through some other convenient hole, such as a crack in the door or some roof opening. The discharge end of the tube should be secured near the ceiling at the center of the car. The discharge end of the tube is plugged and a hole drilled through the opposite walls of the tube about 1 to 2 inches below the tip to permit escape of the methyl bromide mist above the commodity load and toward the opposite ends of the car.

3. All car openings should be carefully sealed. Particular attention should be given the space around doors, the eaves, and the floor. All openings used to introduce the gas tube should be tightly sealed up to and surrounding the tube. Any holes bored through the car structure should be of a minimum size and carefully sealed following fumigation. Masking tape, caulking compound or greased paper may be used as sealing materials.
4. Post warning signs conforming to Department of Transportation regulations on both doors before applying methyl bromide.
5. After application of the proper dosage, withdraw the tubing and seal the hose used for application. Keep the car sealed for 12 to 18 hours. A direct reading detector may be used to check sealed areas for leaks. The fumigated car should not be moved during the fumigation period.
6. At the end of the fumigation period, open all doors and vents to allow as much air circulation as possible. It will usually require about 30 minutes to aerate a car after fumigation but this must be determined by the use of a suitable detector. Aeration is complete when the air concentration is at or below 5 ppm. An SCBA or air supplied air respirator with an auxiliary SCBA must be worn for concentrations greater than 5 ppm.

VI.

SHIPBOARD, IN TRANSIT, OR SHIPHOLD FUMIGATION

Shipboard, in transit ship, or shiphold fumigation is also governed by United States Coast Guard Regulations. Refer to and comply with the regulations prior to fumigation.

PREFUMIGATION PROCEDURE: Prior to fumigating a vessel for in-transit cargo fumigation, the master of the vessel, or his/her representative, and the fumigator must determine whether the vessel is suitably designed and configured to allow 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 the safe occupancy of 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 (less the 5 ppm methyl bromide).

The person responsible for the fumigation must notify the master of the vessel, or his/her representative, of the requirements relating to personal protection equipment, and methyl bromide detection equipment. 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/her representative. Personal protection equipment means a self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator.

Follow placarding requirements previously outlined. Do not allow entry by anyone not wearing a SCBA or combination air-supplied/SCBA respirator until the level of methyl bromide is below 5 ppm.

DURING FUMIGATION: 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 detection equipment, tests spaces adjacent to area containing fumigated cargo and all regularly occupied 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/her representative, of the leakage so corrective action can be taken.

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 at least one detection device, and a person qualified in their operation will be on board the vessel during the voyage.

PRECAUTIONS AND PROCEDURES DURING VOYAGE: Using appropriate personal protection and methyl bromide 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 reoccupied. 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.

PRECAUTIONS AND PROCEDURES DURING DISCHARGE: If necessary to enter hold prior to discharge, test spaces directly above grain surface for fumigant concentration, using appropriate gas detection and personal safety equipment. Do not allow entry into fumigated areas without personal safety equipment unless fumigant concentration is below 5 ppm, as indicated by a suitable detector.

SOIL FUMIGATION

This section applies to M-B-R 2, M-B-R 33, M-B-R 98 and M-B-R 75

PLEASE CONSULT PRODUCT LABEL FOR SPECIFIC USES

A. GENERAL DIRECTIONS:

READ AND FOLLOW CAREFULLY ALL CURRENT LABEL DIRECTIONS AND PRECAUTIONS.

Methyl bromide is toxic to plants, so do not apply to areas containing roots of desirable vegetation. The edge of the cover should be at least two feet away from the roots of living plants.

Do not allow domestic animals to feed on crop residues unless a tolerance exists for such use. Do not feed hay or straw treated directly or harvested from treated soils to any animal.

Methyl bromide is designed to be applied under a gas proof cover for treating soil and certain other materials in which plants may be grown for non-food and non-feed crop uses, including seed and plant beds, nurseries, and permanent planting sites for tobacco, lawns, and other ornamental and recreational turf areas, forest and shade trees, ornamental flowers, vines, and shrubs, and other similar plants. It may also be used for treatment of vegetable planting sites (see Label for registered crops).

The use of methyl bromide is recommended for control of seeds of broadleaf and grass weeds and their roots, stolons and bulbs, as well as nematodes, insects in the soil at time of treatment including wireworms, green June beetle larvae, and other grubs, and certain soil-borne fungi which produce plant diseases. It is particularly useful for the eradication of patches of quickgrass, johnsongrass, nutgrass, garlic, wild onions, and certain other noxious plants.

Methyl bromide should be used when there is sufficient moisture for weed-seed germination and the soil is dry enough to work well. The best control of weed and grass seeds is obtained when the seeds have a high moisture content. Dry soil should be irrigated and kept moist for 3 to 4 days to treatment in order to raise the moisture of the seed. Wetting the soil immediately before treatment is not satisfactory because this does not allow time for the weed-seeds to pick up moisture.

Best results are obtained when the soil temperature is above 60°F. Temperature of the soil should always be taken at a depth of 4 inches.

When soil is to be treated, the soil should be worked into a fine, loose condition just prior to treatment. Soil should be free of clods and unpulverized pieces of crop residue. Best results are obtained when crop residues are allowed time to decompose. Methyl bromide fumigant will effectively penetrate only as deep as the soil is properly worked, except in loose soils. Deep tillage 12"-28" often improves results, especially in heavy or muck soils.

Fumigation with methyl bromide sometimes slows down the rate of nitrification (the conversion to nitrates from ammonia by bacterial action). Certain ammonia sensitive plants, such as tomatoes, may suffer growth inhibition or stand reduction when planted in fumigated soils containing high amounts of ammonia nitrogen. To lessen this hazard, at least one-half and preferably all the nitrogen fertilizer added immediately before or soon after fumigation should be in the form of nitrate nitrogen. This hazard may also be reduced by delaying planting until several months following the fumigation. If a nitrate form of nitrogen such as sodium or calcium nitrate is not readily available, ammonium nitrate, used sparingly, will supply the nitrogen needed without risk. Phosphorous, potassium, and other plant nutrients should be used according to soil needs.

B. RESPIRATORY PROTECTION:

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.

C. 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.

D. EQUIPMENT:

Methyl bromide is supplied in cylinders. Read "Directions for Use" for information on equipment to be used for information on equipment to be used for specific application.

Application equipment should be cleaned immediately after use by flushing with diesel oil or kerosene. (Note: Water will increase the corrosive action of soil fumigants and should not be used.)

Under certain conditions, soil fumigants may be highly corrosive to such metals as magnesium, aluminum, and zinc (galvanized iron). Soil fumigants, therefore, should not be used in application equipment or stored in containers made of these metals or their alloys.

E. PRECAUTIONS BEFORE 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 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." This water is to be used for personal decontamination in case of skin and/or eye contact with methyl bromide.
8. All trash should be cleaned from the field before starting fumigation.

F. PRECAUTIONS 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.

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.

G. PRECAUTIONS AFTER FUMIGATION:

1. Post all treated areas with warning signs until tarpaulin is removed.
2. Keep all animals, children and unauthorized people away from area under fumigation for 48 hours after fumigation and during removal of tarpaulin.
3. Do not contaminate fumigated areas by walking from unfumigated to fumigated soil. Clean your shoes thoroughly, if necessary. If the treated area is in a location where flooding or washing is possible after rains, plow a furrow or made a trench around the treated area for proper drainage.

H. SPILL OR LEAK PROCEDURE:

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 problem. Approach from upwind to make necessary repairs. Do not reenter area without respiratory protection until a spill has evaporated or a leak has been fixed.

I. AERATION:

When tarpaulin is used, do not remove cover until the minimum exposure period has elapsed. Consult the label for guidelines on exposure and aeration time. For best results, a 14-day aeration period is recommended.

Be sure treated soils are free from fumigant before planting seed or setting out plants. If there is doubt as to complete aeration, working the soil after treatment will not help to aerate the fumigant, particularly when the soil is cool and/or wet.

J. USE PROCEDURES, SOIL FUMIGATION:

**I.
BROADCAST OR OVER-ALL TREATMENT FUMIGATION**

In most cases, application to large areas is made by means of tractor mounted chisels spaced approximately 12 inches apart and set to a depth of 6-8 inches. This equipment ideally will simultaneously inject the fumigant and lay 1 mil. (0.001 in.) polyethylene film over the treated area; otherwise, the treated soil must be sealed after application by rolling or cultipacking immediately behind the injection chisels as soon as possible, and then followed by tarp laying equipment. (See Dosage Table on label for application rates.)

**II.
BED OR ROW FUMIGATION**

Bed application can be done using equipment similar to that used in broadcast application. Use the same dosage rates per acre as suggested for broadcast treatment. The actual amounts used per acre, however, will be proportionately less and dependent upon the distance between rows and the width of the treated row area.

**III.
SITE FUMIGATION**

Prior to introduction of the fumigant, make a shallow trench around the fumigation site, cover the site with polyethylene, then bury the edges of the polyethylene cover in the trench. The gas can be introduced under this cover through a polyethylene tube.

The dosage of methyl bromide can be controlled by means of methyl bromide dispenser (see Tree Site Fumigation Equipment) or by placing a cylinder of methyl bromide on a scale and doing the following:

- a. Determine tare weight of the cylinder and its contents.
- b. Subtract from the above the weight of material required for the application.

- c. Set the scale to this calculated weight.
- d. Open cylinder valve.
- e. Close cylinder valve when balance arm of scale rises.

**IV.
GREENHOUSE FUMIGATION**

Follow directions for bed or broadcast application with doors open and fans running. After application and tarping, secure and post the structure to prevent unprotected persons and domestic animals from entering. After the 24 to 48 hour exposure period, open doors and turn on fans prior to removing tarpaulins.

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 protective clothing and a respiratory protection device (SCBA or combination air-supplied/SCBA) is worn.

**V.
TREE SITE FUMIGATION**

After removal of non-productive fruit trees or nut trees and prior to replacement, the tree site can be fumigated with methyl bromide.

Time of application will vary according to climatic conditions. In the northern United States, application of methyl bromide fumigant should be made in the fall before soil temperature drops below 50°F (10°C) and the acreage replanted the following spring. Where soil temperature remains 50°F or more throughout the year, allow at least 30 days between application and planting. Rain and/or cold weather will retard the dissipation of the fumigant from the replant site, and additional time must be allowed between application and planting to prevent injury to the replant trees from contact with the fumigant.

There are several methods available for application of methyl bromide fumigant; but regardless of the application method, the entire dosage for each 100 square foot tree site is to be released in one injection per site (See Dosage Table on label).

TECHNIQUES OF APPLICATION:

- a. **BACK HOEING:** Field tests have demonstrated that this is the most effective method for preparing the replant site for fumigation, especially in areas where a hardpan has developed through compaction of the soil. The size of the prepared site is dependent upon the degree of soil compaction. Deeply compacted soil requires preparation of a site large enough to accommodate the root system of full bearing trees. For stratified soils, a single cut the width of the back hoe, 5 feet deep (1 1/2 meters) and 6 feet long (1.8 meters), is satisfactory. Backfill site with 2 feet (about 60 cm) of soil; place applicator tube at this level; complete backfill; and release entire dose of fumigant for a 100 square foot tree site. When fumigant has been released, remove applicator and tamp soil lightly over opening to seal fumigant in the site.
- b. **AUGERING:** This method is suitable in noncompacted soils or soils that are lightly stratified. Dig hole 5 feet deep (1 1/2 meters) with auger; backfill hole two feet (about 60 cm); insert applicator tube; fill hole; and release entire dose of fumigant for a 100 square foot tree site. When fumigant has been released, remove applicator and seal hole to prevent too rapid an escape of the fumigant.
- c. **TREE SITE INJECTION IN UNDISTURBED SOIL:** This method is suitable for noncompacted light soils such as sand and sandy loam. Insert the injection probe as far as possible (at least 18 inches - 46 cm) into soil. Tamp soil tightly around probe to minimize escape of fumigant from soil. Release entire dose of fumigant for a 100 square foot tree site and move away from the probe until fumigant is completely released. Remove probe and seal hole with soil.
- d. **TARPING:** This method is suitable for noncompacted soil. Work up soil in an area of 10 x 10 feet (3 x 3 meters) to a depth of 3 feet (1 meter). Place the end of the applicator tube in an evaporating container in center of the site. Place several cover supports on the prepared site. Cover supports may be any handy object which will not puncture or tear the cover, such as inflated polyethylene bags, inverted flower pots, bottles, or cardboard boxes. Make sure applicator tube will direct the fumigant into the evaporating container and the other end extends outside the

cover. Seal edges of cover securely with soil. Attach applicator tube to cylinder dispenser. After fumigant has been released, remove applicator tube and seal edge. Leave cover in place for 4 days.

EQUIPMENT:

Cylinder dispensers are available from the Shore Chemical Company, P. O. Box 1632, Turlock, California, 95380.

VI. COMPOST, MANURE, SOIL PILES

PREFUMIGATION PREPARATION: Decomposed compost and manure should have a temperature above 60°F, the material should be loose, and contain sufficient moisture for good weed seed germination. Piles of these materials should be located on wet ground or on a concrete floor and then leveled to not more than 18 inches in depth before application. When fumigation is done on an impervious surface, the polyethylene cover should be weighted along the edges with a sand snake or similar device, not with soil. Piles two to three feet high can also be fumigated if perforated at 12 inch intervals. The gas should always be applied at the top of the pile. The polyethylene cover should be supported a few inches above the pile to allow for the diffusion of the gas. Materials in bulk or in flats and pots can also be treated in a gas tight vault or drum. Conduct such fumigations in a well ventilated area or outdoors.

Straw or hay bales should be thoroughly soaked several days prior to treatment since seeds must be moist during fumigation for best results. At the time of treatment, the bales are merely piled up and covered with a polyethylene cover with edges sealed in the same manner as recommended for soil treatment.

PLACEMENT OF COVER SUPPORTS: Since the gas must circulate freely under the polyethylene cover to give satisfactory control, the cover should be supported above the evaporating containers. Do not allow the cover to be flat on the surface of the material to be treated during fumigation. There is a variety of articles that can be used as cover supports: inflated plastic bags, crumpled fertilizer bags, burlap bags stuffed lightly with hay or straw, inverted baskets or flower pots, bottles placed in the soil, etc. One of the easiest methods is to pump air under the gasproof covers.

PLACEMENT OF EVAPORATING CONTAINERS: Evaporating containers are essential for the volatilization and uniform dispersion of the fumigant. These may be tin pans or basins made of plastic covering. Evaporators should be placed at intervals of approximately 30 feet. **NOTE:** Evaporating containers are not needed if vaporized methyl bromide is used.

DOSAGE REQUIREMENTS: Determine dosage from the product label. Methyl bromide can be released from cans or from cylinders. If cylinders are used, they can be placed on a scale for measuring the amount of methyl bromide needed (as described under Site Fumigation).

VAPORIZING METHYL BROMIDE: Commercially manufactured heat exchangers are available for vaporizing methyl bromide or you can immerse a copper coil in a vessel containing hot water. This method is useful where large amounts of fumigant are required and rapid vaporization is advantageous.

Methyl bromide is vaporized to insure maximum efficiency by obtaining a uniform concentration of gas throughout the treated areas as quickly as possible.

ETHYL CORPORATION
ETHYL TOWER, 451 FLORIDA
BATON ROUGE, LA 70801
U.S.A. (800) 526-3658
Telex 586441 or 586431

BRUSSELS
322-642-4411

SINGAPORE
(65)561-0455

Revised 6/92