

95.03.16  
[[LABEL]]

CLEAN CROP

METHYL BROMIDE FUMIGANT

Liquid Fumigant  
RESTRICTED

DANGER

POISON

READ THE LABEL AND ATTACHED BOOKLET BEFORE USING

GUARANTEE:

Methyl Bromide.....100%

REGISTRATION NO. 12088  
PEST CONTROL PRODUCTS ACT

NET 454 G

UNITED AGRI PRODUCTS  
R.R.#2  
Dorchester, Ontario  
N0L 1G5

#### DIRECTIONS FOR USE

The following directions are of necessity, brief and general in nature. Consult the Label Booklet for further details. Dosages within the Label Booklet refer to commodity temperatures of 21°C or above. If below 21°C increase dosage by 25%. Do not fumigate below 5°C.

Notice to user -- This control product is to be used only in accordance with the directions on this label. It is an offense under The Pest Control Products Act to use a control product under unsafe conditions:

Nature of Restriction -- This product must be stored away from lodging for humans, animal quarters and normal work areas to avoid inadvertent exposure.

Restricted Uses -- General space fumigation, enclosed space fumigation and gas tight coverings (for detailed use directions, see the attached booklet).

All persons working with Methyl Bromide must be trained or licensed in the use of Methyl Bromide.

#### PRECAUTIONARY STATEMENTS

##### DANGER POISON

Highly volatile causes burns, vapour extremity hazardous. Keep out of reach of children. Do not breathe vapour. Keep away from heat. Do not get in the eyes or skin or clothing. Caution -- Extinguish all flames such as pilot lights and glowing heating units. Failure to do so may cause odour, taste, corrosion problems or spontaneous combustion.

Wear NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied respirator/ SCBA during all operations (introduction of the fumigant, initiation of aeration, after aeration when testing for re-entry, attending to spills and leaks, removing warning signs) until the concentration of methyl bromide is at or below 3 ppm using sensitive detectors. If a beard or long sideburns interfere with the respirator fit, they must be shaven.

Methyl Bromide has an adverse affect on the ozone layer and is now controlled under the Montreal Protocol. All efforts should be made to prevent emissions and , where feasible, to recover and recycle.

This produce is toxic to fish and wildlife. Keep out of lakes, streams and ponds.

#### PESTS CONTROLLED

Anthropods, micro-organisms, molds, nematodes, plant pathogens, plant pests, stored product pests, structural pests and wood destroying insects. For further details on specific pests controlled, refer to Label Booklet.

#### FIRST AID

In all cases of overexposure, get medical attention

immediately. Take person to a doctor or emergency treatment facility.

IF INHALED: Remove exposed person from contaminated area. Keep warm. Make sure person can breathe freely. If breathing has stopped, apply artificial respiration. If not unconscious, rinse mouth out with water. 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. Seek medical attention immediately.

#### TOXICOLOGICAL INFORMATION:

Early symptoms of overexposure are dizziness, headaches, 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. Nausea and vomiting are most distressing symptoms and require an anti-emetic drug such as Compazine or Thorazine. Support of the respiratory system dictates a semi-reclining position, maintenance of airway and possible tracheotomy. Oxygen should be used. If respiration fails, artificial respiration by an appropriate means may be necessary. Central nervous system effects are extremely difficult to control. Hyper-excitability and convulsions may require parontoral barbiturates such as Pentothal. Respiratory depression must be guarded against. Circulatory failure may be combated by intravenous solutions and levarterenol bitartrate. Burns resulting from skin contact with the liquid material should be treated in a manner similar to thermal burns following decontamination.

#### STORAGE

Store upright in a locked, dry, cool, well-ventilated area away from dwellings. Do not remove cylinder safety caps until

prior to use. Ensure container is closed completely. Do not contaminate water, food or feed by storage.(see booklet for additional information).

#### DISPOSAL

Open dumping is prohibited. Do not discharge this product, or material containing this product, into natural waterways or municipal wastewater collection systems. For information on the disposal of unused, unwanted product, contact the regional office of Environmental Protection, Environment Canada(1-416-675-1638). For specific details for the disposal of cylinders and cans, refer to the booklet.

#### LIMITATION OF WARRANTY STATEMENT

Seller's guarantee shall be limited to the terms set out on the label and in the Label Booklet 12.2 and subject thereto. The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

NOTE -- Seller warrants that this product complies with the specifications expressed in this label and the Label Booklet.

Seller makes no other warranties and disclaims all other warranties express or implied, including but not limited to warranties of merchantability and fitness for the intended purpose. Seller's liability for default breach or failure under this label and Label Booklet shall be limited to the amount of purchase price. Seller shall have no liability for consequential dangers.

95.03.16

[[BOOKLET]]

#### RESTRICTED USE PESTICIDE DUE TO ACUTE TOXICITY

For retail sale to and use only by Licensed Applicators or persons under their direct supervision, and only for those uses covered by the Licensed Applicator's certification and in accordance with Provincial Regulations and Local Ordinances

#### DIRECTIONS FOR USE OF THE PRODUCT

METHYL BROMIDE  
FUMIGANT

Registration No. 12088 Pest Control Products Act

DANGER POISON

DO NOT GET IN EYES ON SKIN, ON CLOTHING.  
DO NOT INHALE VAPOURS

Read this label booklet and entire label carefully prior to use.

Use this product according to label instructions.

UNITED AGRI PRODUCTS  
RR#2  
Dorchester, Ontario  
N0L 1G5

Emergency#: 1-800-561-8273

FUMIGANTS-EQUIPMENT-INSECTICIDES

Label Booklet 12.2

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#### STATEMENT OF WARRANTY AND LIABILITY

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

Many pesticidal chemicals are poisonous and may leave a toxic residue in the area to which they are applied. Health and Welfare Canada has established maximum residue limits of such pesticidal chemicals that may remain on raw agricultural products, and it is the user's responsibility to see that there is no residue on such crops in excess of these amounts. The "Directions for Use" are based on the best available information, and if followed carefully, should not leave excessive residues.

## PRECAUTIONS

Extremely hazardous liquid and vapour. Do not breathe vapour. Inhalation may be fatal or cause serious acute illness or delayed lung or nervous system injury. Liquid or vapour can cause serious skin or eye injury which may have a delayed onset. Do not get liquid on skin, in eyes or on clothing.

Methyl Bromide vapour is odourless and nonirritating to skin and eyes during exposure. Exposure to toxic levels may occur without warning or detection by the user.

All persons working with Methyl Bromide must be trained or licensed in the use of Methyl Bromide and be knowledgeable regarding the proper use of protective equipment, detector devices and emergency procedures.

Wear NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied respirator/ SCBA during all operations (introduction of the fumigant, initiation of aeration, after aeration when testing for re-entry, attending to spills and leaks, removing warning signs) until the concentration of methyl bromide is at or below 3 ppm. If a beard or long sideburns interfere with the respirator fit, they must be shaven.

Methyl bromide may be trapped inside clothing and cause skin injury. Wear a loose fitting long sleeved shirt, long pants, shoes and socks that are cleaned after each wearing. Do not wear protective coveralls, gloves, boots, jewellery, bandages or carry cigarettes, wallets, etc. After exposure, immediately remove clothing, shoes and socks. Do not reuse clothing or shoes until thoroughly washed. Wash all clothing separately from household laundry in detergent and hot water before reuse. If clothing or shoes are extremely contaminated they should be disposed of.

At least two persons trained or licensed in the use of methyl bromide must be present at the fumigation site during all operations which may involve exposure to methyl bromide.

Do not allow any person into the treated area until the level of methyl bromide is at or below 3 ppm.

This product is toxic to fish and wildlife. Do not discharge this product, or material containing this product into natural waterways or municipal wastewater collection systems. Recent scientific assessment has indicated that emissions of Methyl Bromide may contribute to the destruction of the stratospheric ozone layer. A constructive effort should be made to either recapture or filter the Methyl Bromide contaminated air before it is released into the environment during aeration.

#### PLACARDING OF FUMIGATED AREAS

The applicator must placard or post all entrances to the fumigated area with signs bearing in English and French:

1. The signal word DANGER and the skull and crossbones symbol.
2. The statement, "Area under fumigation. DO NOT ENTER."
3. The date of fumigation.
4. Name of fumigant used.
5. Name, address, and telephone number of applicator.

The placard should be removed by the applicator only when the concentration of methyl bromide is below detection limits (3 ppm) in the treated area.

#### FIRST AID

In all cases of overexposure, get medical attention immediately. Take person to a doctor or emergency treatment facility.

IF INHALED: Remove exposed person from contaminated area. Keep warm. Make sure person can breathe freely. If breathing has stopped, apply artificial respiration. If not unconscious, rinse mouth out with water. 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. Seek medical attention immediately.

#### TOXICOLOGICAL INFORMATION:

Early symptoms of overexposure are dizziness, headaches, 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. Blood bromide levels suggest the occurrence, but not the degree of exposure. Treatment is symptomatic.

#### SPILL AND LEAK PROCEDURES

Evacuate immediate area of spill or leak. Use a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator for entry into affected area to correct problem. Allow spill to evaporate. Do not permit entry into spill area by persons without appropriate respiratory protection, until concentration of Methyl Bromide is determined to be less than 3 ppm. Remove leaking containers to an isolated area and cover with a polyethylene sheeting of 6 mil or greater thickness. Seal by placing the outside edges of tarpaulin in a trench and cover with soil. Tamp soil down so edges will not pull loose. Discharge the contents under the tarpaulin.

Contaminated soil, water and other cleanup debris is a toxic hazardous waste. For information on the cleanup of spills contact the regional office of Environmental Protection, Environment Canada.

#### STORAGE, HANDLING AND DISPOSAL

##### STORAGE

Store in a locked, dry, cool, 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.

##### 1. Cylinders

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.

## 2. Cans

Store 454 gram cans upright and in a manner that the cans will not fall.

## DISPOSAL

### 1. Product

Pesticide wastes are toxic. Open dumping is prohibited. Do not discharge this product, or material containing this product, into natural waterways or municipal wastewater collection systems. For information on the disposal of unused, unwanted product, contact the regional office of Environmental Protection, Environment Canada.

### 2. Cylinders

When cylinder is empty, close valve, screw safety cap on to valve outlet, and replace protection bonnet before returning to shipper. Only the registrant, or his designee, is authorized to refill cylinders. Do not use cylinders for any other purpose. Return empty cylinders freight prepaid to the Chemicals Ltd. location from which shipment was made. Return partial cylinders only after consulting UNITED AGRI PRODUCTS for proper shipping instructions. In either case, use delivering carrier when possible.

### 3. Cans

Do not reuse empty cans. Close valve by turning clockwise until hand tight. Disconnect lines. Dispose of the cans in accordance with provincial requirements.

T.D.G.A. SHIPPING DIRECTIONS

Shipping of full cylinders must be accompanied by a Dangerous Goods Bill of Lading with the proper shipping name: Methyl Bromide Class 2.3 UN 1062. Any quantity requires placarding.

Return of empty cylinders must be accompanied by a Bill of Lading with the proper shipping name: Empty Void Last Contained Class 2.3 UN 1062.

Note: Full or empty containers of Methyl Bromide may not be transported in a passenger vehicle (car, van, etc.), where the passenger seating area is not separated from the pesticide storage area.

#### DIRECTIONS FOR USE

It is a violation of the P.C.P. Act to use this product in a manner inconsistent with its labelling

Methyl Bromide is a highly hazardous material and must be used only by individuals trained or licensed in its proper use. Before using, you must read and obey all label and label booklet precautions and directions.

All persons working with Methyl Bromide must be knowledgeable about the hazards, trained or licensed in the use of required respiratory protection equipment and detector devices, emergency procedures, and proper use of the fumigant.

#### PESTS CONTROLLED:

Alfalfa weevil, Anastrepha spp. angoumois grain moth, ants, aphids, apple curculio, apple ermine moth, apple maggot, army worms, Baris lepidi, bean leaf beetle, bean weevils, blister beetle, blueberry maggot, bollweevil, Brachycera spp, Brevipalpus spp., brown wheat mite, bruchids, cabbage looper, cabbage maggot, cadelle beetle, california orange dog butterfly, carob moth, carpet beetle, carrot rust fly, cereal leaf beetle, cheese maggot, cheese mite, cheese skipper, cherry fruit fly, cigarette beetle, citrus mite, cockroaches, coco moth, codling moth, Colorado potato beetle, common grain mite, confused flour beetle, Conoderus spp., copra beetle, corn earworm, cucumber beetle, darkling beetle, dermestids, diabrotica beetle, dried fruit beetle, drugstore beetle, Dyspessa ulula, earwigs, european corn borer, Exosoma

lusitanica, granary weevil, fabric pests, false chinch bug, flatgrain beetle, flies, fruit flies, fungus beetle, hessian fly, house fly, Indian Meal moth, Japanese beetle, khapra beetle, larder beetle, leaf hoppers, leaf rollers, Leptoglossus spp., lesser grain borer, Listroderes spp., lygus bug, meal worms, mealy bugs, mediterranean flour moth, mediterranean fruit flies, Megalometis spp., melon fruit flies, merchant grain beetle, mice, mites, molds, Naupactus spp., nematodes, onion maggot, orange tortix moth, oriental fruit fly, oriental fruit moth, pecan weevil, Pectinophora spp., pepper maggots, pickle worm, pink boll worm, pill bugs, plant pathogens, pod borers, potato beetle, Proeulia spp., psyllids, rats, red flour beetle, red legged ham beetle, rice weevils, rodents, rusty grain beetle, sawtoothed grain beetle, scale insects, slugs, snails, snakes, snout-nose weevil, sowbugs, spider beetle, spider mites, squash bugs, squash vine borer, strawberry root weevil, stink bug, tarnish plant bugs, termites, thrips, tobacco beetle, tobacco-moth, twig borer, warehouse beetle, warehouse moth, weevils, white fly, wood destroying beetles.

#### PRECAUTIONARY PROCEDURES:

The following precautionary procedures must be followed for all uses:

When used for general space fumigation (eg. warehouses, grain elevators, and food processing plants), enclosed spaces (eg. vaults, bins, vacuum chambers, chambers, tractor trailers, buses, ships, vans, silos, and railroad cars) and gas tight coverings (eg. tarpaulin-covered commodities), two persons trained or licensed in the use of this product must be present during introduction of the fumigant, 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 below 5'C except in the case of Christmas tree fumigation (Table VI).

When using Methyl Bromide, placard or post all entrances to the fumigated area with Warning signs in accordance with Provincial regulations.

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 3 ppm Methyl Bromide in the air space around and, when feasible, in the mass of the commodity. Since Methyl Bromide is heavier than air, the monitoring should take place in low areas (ie). floor level behind electrical plates, desk drawers, closets. If less than 3 ppm Methyl Bromide is detected, the placard may be removed.

## EFFECTIVE FUMIGATION

### Concentration Times Time Product

For Methyl Bromide to be effective, it is necessary to maintain a specific concentration of the gas within the confined space. In order to meet this requirement, the dosage of Methyl Bromide must be monitored to establish a concentration times time (C x T) product. For example, it is known that in order to kill 99 percent of the Cadelle beetle larvae in stored grain at 20EC a concentration of 33.2 mg/L times 5 hours equals 166 mg/L x hours which is the C x T product (also expressed as 166 gram hours/cubic metre). By monitoring the methyl bromide levels during the fumigation and plotting these levels as a function of time, a cumulative C x T product can be obtained by integrating the area beneath a curve. It is only by monitoring the methyl bromide during the fumigation that it is possible to assure that the correct levels of fumigant are present.

### Monitoring Equipment

The method of properly detecting potential fumigant leaks, and of making a quantitative determination of the methyl bromide concentration within a structure during fumigation and outside a structure during aeration is required during the use of Methyl Bromide as a space fumigant. A halide leak detector is suitable for determining leaks around doors, windows and other difficult to seal areas, but is unsuitable for quantitative determination or assessing safe re entry. Thermal conductivity analyzers or meters, when properly calibrated, are suitable for monitoring Methyl Bromide levels during the fumigation in order to obtain a cumulative C x T product. Interference refractometers and infra-red analyzers can also be used for

this purpose. Gas detector tubes are available that measure low level concentrations of methyl bromide gas but are considered inaccurate below 3 ppm. Portable gas chromatograph units provide accurate quantitative analysis of indoor levels in order to determine safe reentry and for monitoring outdoor levels during aeration in order for the fumigator to control unacceptable levels of methyl bromide from moving to inhabited areas.

#### GENERAL SPACE FUMIGATION

##### A. Warehouse, Grain Elevator, Food Processing Plant, Restaurants

All precautionary procedures as outlined previously must be followed:

Check with appropriate provincial, municipal and county authorities before fumigating to be completely familiar with local regulations. Ordinances may require watchmen or locks during fumigation and/or notification of the nearest fire station and police department.

1. Preparation for Fumigation - Remove the following items from the structure to be fumigated: 1 ) all food and feed commodities not included in Tables I and II; 2) medicinals not sealed in metal or glass; 3) seeds, bulbs and live plants; 4) pets (including fish and birds); 5) furs; 6) horsehair articles; 7) rubber goods (natural latex); 8) carbonless carbon forms and blueprints; 9) automobiles; 10) cinder blocks; 11) articles containing sulfur; 12) iodized salt; 13) leather goods; 14) charcoal; 15) photographic chemicals; 16) any foods or materials that contain reactive sulfur compounds. Do not fumigate unfinished basements (cinder blocks) in dwellings.

Methyl Bromide liquid reacts with aluminum in the absence of oxygen to form methyl aluminum bromide which, in the presence of oxygen ignites spontaneously with the development of intense heat.

Extinguish all open flames including pilot lights. Turn off electric heating elements. Open all interior doors, opening into attics and crawl spaces. Open cabinet doors and drawers. Employ ventilation, such as fans, when tarpaulins are used.

2. Sealing the Building - The most important part of the fumigation is the preparation and sealing of the structure. A thorough sealing job is necessary. It is not recommended to fumigate under windy conditions. Sealing of the building begins with the closing of all external openings to the building. Wrap roof ventilators, chimneys and other large openings with a tarpaulin or plastic sheet and seal with duct or other appropriate tape. Screened openings may also be sealed with a wide, commercial duct or masking tape. Cleaning of the surfaces to be taped and the use of commercial spray-on adhesives will improve sealing.

For masonry or metal structures, seal all cracks and other air leaks with caulking material or tape, and seal cracks around doors, windows, vents and other openings. Wooden structures and others that cannot be readily sealed may be completely enveloped with an impervious tarpaulin. Seal securely all seams between tarps and seal the lower edges of the tarp to the ground with moist soil or with sand or water snakes. To prevent escape of gas through the ground and avoid injury to nearby plants, wet the soil to a depth of 15 cm for a distance of .3 m outward from the edge of the tarp.

Exterior doors and windows should be wedged tight, locked and sealed. Large exterior doors may require additional efforts to seal properly. Broken window panes should be replaced. Check for cracks around the eaves, in the floor and roof, and seal them.

Special care should be taken to seal off adjacent areas in a building that are not to be fumigated. Adjoining buildings sharing a common wall should be cleared of occupants before fumigation and area monitored for methyl bromide prior to re-entry.

Doors or hatches on milling machinery should be opened prior to fumigation. These include elevator boots, conveyor lids, settling chamber doors, dust trunks, and other openings that will allow fumigant into the equipment. Inside doors, cabinets, lockers and drawers should also be opened to facilitate treatment and aeration. "Dead" spouts are particularly difficult to penetrate and should be opened before the fumigation.

See Table III for rate of application.

3. Fumigating the Structure - INSIDE RELEASE - Inside release is a dangerous method of application. It is strongly advised that outside release methods be used whenever possible. Cylinders should be placed by a team of two people and the location of each cylinder in the building should be mapped. The cylinders should be arranged so that the fumigators can walk away from the released gas as they open each subsequent cylinder.

Because Methyl Bromide is heavier than air, it is advisable to increase slightly the amount of fumigant released on the top floor. Cylinders should be placed within a room for best distribution into all areas. Cylinders should be placed in an upright position and the shipping caps removed. Because Methyl Bromide is heavier than air, it is sometimes advisable to attach standpipes or swirlets (or curved pipes directed slightly upward) to the cylinder valves in order to reduce stratification at lower levels. If standpipes are used, they should be equipped with T fittings to direct the gas laterally and to prevent direct contact with the ceiling. Fans are recommended to distribute the Methyl Bromide more quickly and to aid in aeration of the structure after the exposure period. The choice of fan for a given situation may depend upon experience or research data. Generally, one 40 cm fan for every 1,400 m<sup>3</sup> of space will be sufficient. It is often possible to use heating system fans or other installations already in the building for improved circulation or distribution of the Methyl Bromide. All fans should be running while the gas is being released, and left running until uniform distribution has been accomplished. They may be turned off from outside the building or by using timers.

Prior to fumigation, extinguish all open flames and turn off all high temperature electrical equipment including laboratory ovens, pilot lights, gas refrigerators, oil burners, etc.

Methyl Bromide in the presence of intense heat from such sources may generate some hydrobromic acid which may be injurious to commodities and equipment.

Place warning signs or placards on all entrances to the building. Signs and placards should conform to all local, provincial and federal regulations. It is best to inform police, fire and health officials that a fumigation process is about to begin and may be required under provincial regulations. Observe the location of the nearest outside



telephone for use in case of an emergency.

Practice or review the shooting procedure so that the operation will be done efficiently and safely. Respiratory protection equipment should be checked for leaks and other problems before the "practice session." While wearing respiratory protection, quickly open and close the cylinder valves to make certain they are in working order and, thus, avoid delay during the actual release. Opening or "cracking" cylinders should be conducted outside.

Fumigators should not be in the building longer than 30 minutes while releasing the gas. If it is impossible for one crew to do it within this time period, additional experienced crews should be used. Two people should work together while the gas is being released and when clearing the structure.

Fumigators should always ensure that no other person is in the building and they should remain in sight of each other from the time they open the first cylinder until the time they leave the building together. While the Methyl Bromide is being released, it is advisable to have additional people with respiratory protection equipment ready, waiting outside to assist if necessary. One member of the team should record the release of the Methyl Bromide from each cylinder so that none are missed. Lock and seal the last exit. If guards are used, they should remain on duty during release, exposure, and aeration periods to prevent unauthorized entry and may be required under provincial regulations. The master fumigator or person in charge should remain at the fumigation site for one hour following release of the fumigant.

4. Fumigating the Structure - OUTSIDE RELEASE - Releasing the Methyl Bromide from outside the space to be fumigated is possible in some situations and will minimize applicator exposure to the fumigant. Prepare the building as outlined previously.

Secure the ends of each "shooting" line or hose to each point where the Methyl Bromide is to be released, using evaporating pans or plastic sheeting to prevent possible damage to some surfaces. Run each line to the cylinder(s) located outside the area to be treated. Connect each line to the cylinder(s) or manifold.

Lock and seal the last exit. If guards are used, they should

remain on duty during release, exposure, and aeration periods to prevent unauthorized entry and may be required under provincial regulations.

Open the valves to release the Methyl Bromide. Respiratory protection equipment must be available in the event of a major leak or equipment failure.

5. Aerating the Building - When the exposure period is complete, aeration generally should be started by opening previously sealed doors and windows on the ground floor. Ensure that appropriate respiratory equipment is worn during the procedure. Ventilators accessible from the outside should be opened at this time.

After partial aeration, a team of at least two licensed people with appropriate respiratory protection (ie. SCBA), should begin opening windows, starting at the lower floors and working upward. Fans should be on to assist aeration. Refer to Tables for appropriate aeration times. No one should be allowed inside the building without respiratory protection until the Methyl Bromide concentration is at or below 3 ppm in the worker area. After the aeration is completed, the licensee or master fumigator shall use a detector device with a minimum detection limit of three parts per million to measure air levels of methyl bromide after the structure has been closed. Additionally, measurements shall be taken periodically from low lying areas (ie). interior electrical outlets, desk drawers and closets by inserting the monitoring apparatus in the enclosed space. If the level of methyl bromide is greater than three parts per million, aeration of the structure should be continued until such time as levels measured do not exceed three parts per million.

Contact the police, fire and health officials previously notified of the fumigation and inform them that it has been completed. Remove all placards or warning signs.

#### ENCLOSED SPACES

##### B. Chamber and Vault Fumigation

All precautionary procedures as outlined previously must be followed.

Load the chamber with the material to be fumigated, close exhaust ports, turn on circulating fan and close chamber door. Determine the proper rate of application and exposure time from Tables I and II.

Introduce the Methyl Bromide into the chamber by releasing it into the air stream in front of a blower or fan, passing it through a vaporizer, or allowing it to evaporate from a shallow pan. All controls should be outside the chamber.

At the end of the exposure period, aerate by opening the exhaust port, turning on the exhaust fan and opening the chamber door slightly or an inlet port to permit fresh air to enter. At the end of the aeration period, check Methyl Bromide concentration with a detection device before allowing unprotected persons to enter the chamber.

#### C. Vacuum Chamber Fumigation

All precautionary procedures as outlined previously must be followed.

1. Place articles to be fumigated in the steel chamber and draw the vacuum down to 63.5 cm-68.5 cm (25-27 inches) Hg.
2. Release Methyl Bromide into the chamber (usually through a heating unit to insure complete vaporization).
3. See Tables I and II for specific articles, rates of application and exposure times.
4. At the end of the exposure time, release the vacuum and change the air in the chamber at least two times. A vacuum of 38 cm (15 inches) Hg should be drawn for this purpose. After purging the chamber, check the Methyl Bromide concentration with a monitoring apparatus before allowing unprotected person(s) to enter.

#### D. (Railroad Car, Truck, Van, Tractor Trailer, Bus or Sea Container)

All precautionary procedures as outlined previously must be followed.

1. Railroad car should be placed on seldom used trackage or siding so that it will not be moved while under fumigation.

Park trailer, van, truck or bus out of traffic area; if possible on the lee side of a building to protect from winds. It is not recommended to fumigate while strong winds are blowing. Do not treat a tractor trailer, truck, van, or bus in a garage or other structure.

2. Seal the off-side door, ventilators and other openings. Seal from the inside, if possible.

3. Secure a perforated tube with the end closed, to the ceiling to distribute fumigant evenly, or use evaporating pan(s). Always apply Methyl Bromide from outside the vehicle.

4. Seal the door, lock and placard vehicle.

5. Consult Tables I and II for specific articles, rates of application and exposure times.

6. For railroad car, truck, van or bus, open the unit and aerate 1 to 1 1/2 hours after the appropriate exposure. Reseal vehicle for 1 hour to allow for possible desorption of gas from seats and insulation material. Resample fumigated area to verify if levels are at or below 3 ppm. Repeat above aeration procedure until levels are at or below 3 ppm. The vehicle must be aerated to a level at or below 3 ppm before movement is allowed. DO NOT MOVE VEHICLES DURING FUMIGATION. Remove placard after aeration is complete.

#### E. Shipboard, In-Transit Ship or Shiphold Fumigation

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

No person shall fumigate in-transit or permit fumigation in-transit in a Canadian flag ship.

#### Prefumigation Procedures

1. Prior to commencement of in-transit cargo fumigation, the Canadian Coast Guard must be prenotified and approval is required by the flag administration of the vessel in question. Prior to fumigating a vessel for in-transit cargo fumigation, the master of the vessel or his representative and the fumigator must determine whether the vessel is suitably

designed and configured so as to allow for safe occupancy by the ship's crew throughout the duration of the fumigation. If it is determined that the design and configuration of the vessel does not allow for safe occupancy by the ship's crew throughout the duration of the fumigation, then the vessel must not be fumigated unless all crew members are removed from the vessel. The crew members must not be allowed to reoccupy the vessel until the vessel has been aerated to 3 ppm or below and a determination has been made by the master of the vessel and the fumigator that the vessel is safe for occupancy.

2. The person responsible for the fumigation must notify the master of the vessel or his representative of the requirements: 1) relating to the use of respiratory protection equipment; 2) relating to the use of detection equipment; and 3) that a person qualified in the use of this equipment must accompany the vessel with cargo under fumigation. Emergency procedures, cargo ventilation, periodic monitoring and inspections, and first aid measures must be discussed with and understood by the master of the vessel or his representative.

3. During fumigation, or until a manned vessel leaves port or the cargo is aerated, the person in charge of the fumigation shall ensure that a qualified person, using a gas monitoring apparatus, tests spaces for Methyl Bromide leakage. If leakage of Methyl Bromide is detected, the person in charge of the fumigation shall take action to correct the leakage, or inform the master of the vessel or his representative of the leakage so that corrective action can be taken.

Using appropriate gas monitoring equipment (eg. low range gas detector tubes, portable gas chromatograph, thermal conductivity analyser), monitor spaces adjacent to areas containing fumigated cargo and all regularly occupied areas for Methyl Bromide leakage. If leakage above 3 ppm is detected, the area should be evacuated of all personnel, ventilated, and action taken to correct the leakage before allowing the area to be reoccupied. Do not enter fumigated areas except under emergency conditions. If necessary to enter a fumigated area, wear a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator (personal protection equipment). If necessary to enter a fumigated area, at least two persons should enter wearing the required breathing apparatus, and at least one other person wearing personal protective equipment should be available to assist in case of an emergency for each person

entering the space. Never enter fumigated area alone. At least one other person wearing personal protection equipment should be available to assist in case of an emergency.

If necessary to enter holds prior to discharge, test spaces directly above cargo surface for Methyl Bromide concentration, using an appropriate gas monitoring apparatus and while wearing personal protection equipment. Do not enter without respiratory protection unless Methyl Bromide concentrations are at or below 3 ppm as indicated by a suitable detector.

4. If the fumigation is not completed and the vessel aerated before the manned vessel leaves port, the person in charge of the vessel shall ensure that there be on board the vessel during the voyage: 1) at least four NIOSH/MSHA approved self-contained breathing apparatus (SCBA) and four additional air bottles or combination air-supplied/SCBA respirators are required; 2) two gas detection devices (when these devices require re-arming after use, the ship shall be equipped with 10% more spare tubes than are required to conduct the required testing for the duration of the voyage); and 3) a person qualified in their operation. It should be noted that no person shall fumigate in-transit or permit fumigation in-transit of a Canadian ship.

5. See Tables I and II for specific commodities, rates of application and exposure times.

## GAS TIGHT COVERINGS

### F. Tarpaulin Fumigation

All precautionary procedures as outlined previously must be followed. The article or stacked articles should be placed on a sealed concrete floor or other air-tight surface (avoid asphalt since this material will absorb the gas). If the floor is not air-tight, it may be made so by covering it with sisal (fibre made from the agave plant) kraft paper, tar paper, additional tarpaulin, polyethylene sheeting or a fumigation bubble. Provide a space on top of the stack for a gas expansion dome to facilitate distribution. Evaporating pans are essential for the volatilization and uniform dispersion of Methyl Bromide except where a vaporizer is used. Shallow pans or basins made of plastic or metal (except aluminum) are satisfactory for this purpose. Use one evaporator pan for each

28.3m<sup>3</sup> contained under the tarp. For delivery of Methyl Bromide Fumigant from outside the tarpaulin, polyethylene tubing is required. Anchor one end of each polyethylene tube into an evaporating pan with tape or a suitable weight. This ensures that the liquid will be directed into the evaporating pan. Place evaporating pan(s) with anchored applicator tubing in the centre of the expansion dome. Extend the free ends of the polyethylene tubes outside the area to be covered. Cover and seal the stack with a gas tight tarpaulin or polyethylene sheeting of 6 mil or greater thickness. Allow a margin of at least 60 cm at the base of the stack for sealing. Sweep around the stack to provide a clean surface for sealing the tarpaulin. Seal tarpaulin to floor by sand and/or water snakes, by taping or by means of moist soil. Attach each polyethylene tube to a can applicator or cylinder valve outlet and release fumigant. Use a cylinder dispenser or scale to meter small amounts from cylinders. Special units are available for use of 454 gram cans that combine opener and evaporating pan functions, and are designed to be used with all parts under the tarpaulin. Use rates and exposure times are shown in Tables I and II. At the end of the exposure period, unseal opposite ends of the tarpaulin and allow to aerate for at least 30 minutes before completely removing the tarp. Check Methyl Bromide concentration with a detection device before allowing unprotected persons to enter the area.

#### G. Mulch (Hay or Straw)-Insects, Nematodes, Weed Seeds

USE: 1.1 kg per 10 bales

Soak hay or straw for several days. Pile the bales, support a gasproof cover several cms above material and seal the edges under earth. Evaporate the Methyl Bromide under the cover. Fumigate at least 48 hours and aerate at least 24 hours. See Table V for rates of application and exposure times.

Adhere to the following restrictions: Do not fumigate close to desirable vegetation. Keep the edge of the cover at least 30 cm away from the roots of desirable plants.

#### H. Christmas Trees

USE: 4-25 kg/100m<sup>3</sup>

QUARANTINE TREATMENT, ONTARIO-All trees to be shipped from quarantined counties in Ontario to points outside restricted

areas in Canada and the United States must be treated with Methyl Bromide (or other product registered for this use) under the supervision of Agriculture Canada, and must be provided with a Quarantine Movement Certificate issued by Agriculture Canada. Instructions for fumigation are as follows: Fumigate under gas-proof conditions at least 14 days after cutting. Verify gas concentration 30 minutes after starting and hourly thereafter. Take a final reading 15 minutes before the end of the exposure period. (Refer to Table VI for specific directions).

#### 1. Wood and Wood Products

Methyl Bromide may be used to treat all types of wood and wood products such as logs, poles and timbers, lumber, beams, and structural elements, furniture, crates and boxes, dunnage, firewood, chips, carvings, trim, decorative wood items, grape wreaths, and craft items, bamboo and wicker products, baskets and related woody materials. Target pests include all wood destroying insects and borers, quarantine pests (insects, nematodes, pathogens, etc.), pests subject to food and health regulations, and other incidental pests associated with wood and wood products. Some examples include termites (drywood, powder-post, subterranean, formosan, and dampwood), powder-post beetles, old house borer and other long-horned wood borers, metallic wood borers, bark beetles, wharf borer, furniture beetle, bamboo borer, deathwatch beetles, carpenter ants, wood wasps, foreign grain beetle, psocids, straw itch mite cockroaches, insect eggs, pupae and cocoons, spiders, sowbugs, millipedes, centipedes, rodents, snakes, snails and nematodes. See Table IV for rates and exposure times. All precautionary procedures and directions outlined in previous pertinent sections must be followed when fumigating wood and wood products. Relatively full spaces that are not well ventilated may need additional aeration time for off-gassing from the fumigated items.

#### FOOD COMMODITIES

After fumigating all food commodities, it is important to follow the aeration periods outlined in Tables I, II and III to avoid unacceptable residues in food. When fumigating food processing plants or restaurants, apply during close-down periods and, where possible, remove all food before fumigation. Aerate at least 48 hours after fumigation. If food commodities (wrapped or unwrapped) are exposed during



fumigation, aerate for 7 days before removal from treatment facility for sale. Bulk and/or unwrapped foods should be wrapped (packaged) only after recommended aeration period.

The following are directions for specific products:

- a) Only nuts in the shell should be fumigated. Unshelled nuts or nut meat should not be fumigated.
- b) Tolerance of fruit to methyl bromide may vary with varieties. Check with local authorities or the registrant for additional information.

The application rates, exposure times and aeration periods for food products are for ambient temperature (21°C) only. The aeration periods listed in Tables I, II and III are considered minimum figures.

TABLE I

APPLICATION SUMMARY(1) FOR STORED PRODUCT  
PESTS INFESTING RAW AGRICULTURAL COMMODITIES

COMMODITY	DOSAGE KG/100m <sup>3</sup>	EXPOSURE TIME (HRS.)	AERATION PERIOD (HRS.)
Almonds	5.7	24	168
Apples	8.2	2	48
Apricots	8.2	2	48
Barley	8.2	12	48
Beans (all)	5.7	24	48
Beets (roots)	4.8	4	48
Blueberries	1.8-3.2	3-4	48
Brazil Nuts	5.7	24	168
Bushnuts	5.7	24	168
Butternuts	5.7	24	168
Cabbage	6.4	4	48
Cantaloupe	3.2	2	48
Carrots	6.4	4	48
Cashews	5.7	24	168

Cherries	8.2	2	48	
Chestnuts	5.7	24	168	
Cipolini Bulbs	6.4	4	48	
Citron	5	2	48	48
Cocoa Beans	2.5	12	48	
Copra	3.9	24	48	
Corn	3.2	24	48	
Corn(sweet)	5	4	48	
Cotton Seed	12.9	24	48	
Cotton (baled)	5	24	48	
Cucumbers	3.9	4	48	
Eggplant	5	4	48	
Fiberts	5.7	24	168	
Garlic	5	4	48	
Grapefruit	5	2	48	
Grapes	6.4	2	48	
Hickory Nuts	5.7	24	168	
Honeydew Melons	3.9	2	48	
Horseradish (roots)	5	4	48	
Jerusalem Artichokes	5.7	4	48	
Kumquat	5	2	48	
Lemons	5	2	48	
Limes	5	2	48	
Muskmelons	3.9	2	48	
Nectarines	8.2	2	48	

TABLE I  
APPLICATION SUMMARY(1) FOR STORED PRODUCT  
PESTS INFESTING RAW AGRICULTURAL COMMODITIES

COMMODITY	DOSAGE KG/100m3	EXPOSURE TIME (HRS.)	AERATION PERIOD (HRS.)
Oats	5	24	48
Okra	5.7	2	48
Onion	5	6	48
Oranges	5	2	48
Parsnips (roots)	5	4	48
Pea(dried)	6.4	24	48
Pea(pods)	5	2	48
Peaches	8.2	2	48
Peanuts	5.7	24	168
Pears	8.2	2	48
Pecans	5.7	24	168

Peppers	6.4	2	48	
Pimentos	3.9	3	48	
Pineapples	3.2	4	48	48
Pistachios	5.7	24	168	
Plums	8.2	2	48	
Popcorn	2.5	2	48	
Potatoes	5	6	48	
Prunes	8.2	2	48	48
Pumpkins	3.9	2	48	
Quinces	8.2	2	48	
Radishes	5	4	48	
Rice	5	24	48	
Rye	5	24	48	
Salisify Roots 5	3	48		
Sorghum (grain)	6.4	24	48	
Squash	6.4	2	48	
Squash (Zucchini)	4	3	48	
Strawberries	3.25	3-4	48	
Sugar Beets (roots)	4.8	4	48	
Sweet Potatoes	5.7	4	48	
Tangelos	5	2	48	
Tangerines	5	2	48	
Tobacco (baled)	3.2-5	48-72		48
Tobacco (processed)	6.4	4	48	
Tomatoes	4.8	4	48	
Turnips (roots)	4.8	4	48	
Walnuts	5.7	24	168	

TABLE I  
APPLICATION SUMMARY(1) FOR STORED PRODUCT  
PESTS INFESTING RAW AGRICULTURAL COMMODITIES

COMMODITY	DOSAGE KG/100m3	EXPOSURE TIME (HRS.)	AERATION PERIOD (HRS.)
Watermelons	4	4	48
Wheat	4.8	24	48
Yams	5.6	4	48

(1 ) The above application rates, exposure times and aeration periods are at an ambient temperature of 21'C.

TABLE II  
APPLICATION SUMMARY OF PROCESSED FOOD(1)

COMMODITY	DOSAGE KG/100M3	EXPOSURE TIME (HRS.)	AERATION PERIOD (HRS.)
Apples (dried)	1.8	24	168
Apricots (dried)	1.8	24	168
Cherries (dried)	1.8	24	168
Dates (dried)	1.8	24	168
Figs (dried)	1.8	24	168
Peaches (dried)	1.8	24	168
Prunes (dried)	1.8	24	168
Raisins (dried)	1.8	24	168
Cheese (Parmesan & Roqueford)	1.8	12	48
Eggs (dried)	1.8	12	168
Processed Foods	1.8	12	168
Spices & Herbs (dried)	5.0	12	48

(1) The above application rates, exposure times and aeration periods are at an ambient temperature of 21EC.

TABLE III  
APPLICATION SUMMARY FOR STRUCTURES(1)

TREATMENT SITE	VOLUME	DOSAGE KG/ 100 M3	EXPOSURE TIMES (HRS.)
Feed Room, Food Processing Plant, Grain	Less than 2.830 m3	1.6-4.8	24
Bin, Grain Elevator, Restaurant, Silos, Warehouse	2.830- 14,150 m3 14,150- 28,300 m3	1.6-2.4 1.6-2.0	24 24

(1) At temperatures below 15'C. increase the rate by 0.8 kg per 100 m3 for every 5'C drop in temperature. Use an approved procedure to heat the Methyl Bromide. Do not fumigate when temperature is below 5'C.

TABLE IV  
APPLICATION SUMMARY FOR WOOD & WOOD PRODUCTS\*

PEST GROUP	GENERAL	EXPOSURE
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	RATE (G/m3)	(HRS.)
Snakes and rodents	4.0	12
Insects & other arthropods	16-32(a)	
	18-24	
	33-48(b)	18-24
	49-64(c)	18-24
	65-80(d)	18-24
	32-48(e)	2-4
Snails & slugs	80-128	20-24
Nematodes	160-240	20-24
Plant Pathogens(Oak Wilt Disease)		160-240
	24-48	

\*Variations in rates & exposure times may be required by quarantine officials of Canada and other countries.

a) Wood temperatures of 21'C or above; b) Wood temperatures of 16'C to 20'C; c) Wood temperatures of 11'C to 15'C; d) Wood temperatures of 5'C to 10'C; e) Vacuum chamber

TABLE V  
APPLICATION SUMMARY (1)  
FOR PESTS OF MISCELLANEOUS COMMODITIES

COMMODITY OR PEST	DOSAGE KG/ 100 M3	EXPOSURE TIMES(HRS.)	AERATION TIME (HRS.)
Animal Feed (pet food)	5	12	168
Clothing	5	24	168
Furniture	5	24	168
Mulch (Hay, Straw)	5	24	48
Used Tires	3.2	24	72

(1) The above application rates, exposure times and aeration periods are at an ambient temperature of 21'C.

TABLE VI  
APPLICATION SUMMARY FOR CHRISTMAS TREES

AVERAGE COMMODITY 100 M3 TEMP. 'C	DOSAGE KG/ CONCENTRATION KG/100 M3	MINIMUM CONCENTRATION KG/100 M3	EXPOSURE TIME (HRS.)
-18 to -13	25	9.25	5
-12 to -07	17.5	7.00	4
-07 to -02	15	6.25	4
-01 to +04	11.25		4.50
+04 to +09	8	3.50	4
+10 to +15	5.5	3.25	3
+16 or higher	4	3.00	3

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