

PANEL 1

METHYL BROMIDE FUMIGANT

Liquid
RESTRICTED

Any of the authorized uses under the *Pest Control Products Act* must comply with applicable requirements under the *Ozone-depleting Substances Regulations, 1998* under the authority of the *Canadian Environmental Protection Act (CEPA, 1999)*. For further information, contact Environment Canada.

**FOR USE IN THE CONTROL OF COMMON INSECTS AND OTHER ARTHROPODS, SNAILS, SNAKES,
MICRO-ORGANISMS AND RODENTS.**

GROUP	8A	INSECTICIDE
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GUARANTEE: Methyl Bromide 100%

READ THE ENTIRE LABEL
AND ATTACHED BOOKLET BEFORE USING

REGISTRATION NO. 16495 PEST CONTROL PRODUCTS ACT

DANGER



POISON

Forms odourless gas
DO NOT INHALE

NET CONTENTS ___ kg

Manufactured for:
ICL-IP America Inc.
95 MACCORKLE AVE SW,
SOUTH CHARLESTON WV 25303-1411

Tel: (304) 720-3950
Fax: (304) 746-3101

Canadian agent:
MacIsaac & Associates
440 Gloucester Street, Suite 2111
Ottawa, Ontario CANADA K1R 7T8

Tel: (613) 236-2250
Fax: (613) 236-5739

IN CASE OF EMERGENCY CONTACT: CHEMTREC 1-800-424-9300

121-050/Rev.6

12/05

PANEL 2

NOTICE TO USER - This pest control product is to be used only in accordance with the directions on the label. It is an offense under *The Pest Control Products Act* to use this product in a way that is inconsistent with the directions on the label. The user assumes the risk to persons or property that arises from any such use of this product.

NATURE OF RESTRICTION – Any of the authorized uses under the *Pest Control Products Act* must comply with applicable requirements under the *Ozone-depleting Substances Regulations, 1998* under the authority of the *Canadian Environmental Protection Act (CEPA, 1999)*. For further information, contact Environment Canada. 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 attached booklet). All persons working with Methyl Bromide Fumigant must be trained or licensed in the use of Methyl Bromide.

DIRECTIONS FOR USE - The following directions are of necessity, brief and general in nature. Consult the ICL-IP America Label Booklet 12.2 for further details. Dosages within the ICL-IP America Label Booklet 12.2 refer to commodity temperatures of 21°C or above. If below 21°C, increase dosage by 25%. Do not fumigate below 5°C.

RESISTANCE MANAGEMENT RECOMMENDATIONS - For resistance management, please note that Methyl Bromide Fumigant contains a Group 8A insecticide. Any insect population may contain individuals naturally resistant to Methyl Bromide Fumigant and other Group 8A insecticides. The resistant individuals may dominate the insect population if this group of insecticides are used repeatedly in the same fields. Other resistance mechanisms that are not linked to site of action but are specific for individual chemicals, such as enhanced metabolism, may also exist. Appropriate resistance-management strategies should be followed.

To delay insecticide resistance:

- Where possible, rotate the use of Methyl Bromide Fumigant or other Group 8A insecticides with different groups that control the same pests in a field.
- Use tank mixtures with insecticides from a different group when such use is permitted
- Insecticide use should be based on an IPM program that includes scouting, record keeping, and considers cultural, biological and other chemical control practices.
- Monitor treated pest populations for resistance development.
- Contact your local extension specialist or certified crop advisors for any additional pesticide resistance-management and/or IPM recommendations for the specific site and pest problems in your area.
- For further information or to report suspected resistance contact ICL-IP America Inc. Customer Service at 1-877-661-4272 (Toll Free).

PRECAUTIONS

KEEP OUT OF REACH OF CHILDREN

DANGER POISON

Highly volatile causes burns, vapour extremely hazardous. 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 effect 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 product is toxic to fish and wildlife. Keep out of lakes, streams and ponds.

PANEL 3

PESTS CONTROLLED

Arthropods, 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 ICL-IP America Label Booklet 12.2.

FIRST AID

In all cases of overexposure, get medical attention or contact a poison control centre **IMMEDIATELY**. Take person to a doctor or emergency treatment facility. Take container, label or product name and Pest Control Product Registration Number with you when seeking medical attention.

IF INHALED - Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control centre or doctor for further treatment advice.

IF ON SKIN OR CLOTHING -Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control centre or doctor for treatment advice.

IF IN EYES - Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice.

TOXICOLOGICAL INFORMATION

Early symptoms of overexposure are dizziness, headache, nausea, and vomiting, weakness and collapse. Lung oedema 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. Hyperexcitability and convulsions may require parenteral 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 cool, well-ventilated locked storage 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 disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for cleanup of spills. For specific details for the disposal of cylinders, refer to the booklet.

NOTE - Seller warrants that this product complies with the specifications expressed in this label and in the ICL-IP America Label Booklet 12.2. 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 ICL-IP America Label Booklet 12.2 shall be limited to the amount of the purchase price. Seller shall have no liability for consequential dangers.

**RESTRICTED USE PESTICIDE
DUE TO ACUTE TOXICITY**

GROUP

8A

INSECTICIDE

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**

LIQUID

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 THESE PRODUCTS ACCORDING TO
LABELING INSTRUCTIONS.

RESTRICTED

Any of the authorized uses under the *Pest Control Products Act* must comply with applicable requirements under the *Ozone-depleting Substances Regulations, 1998* under the authority of the *Canadian Environmental Protection Act (CEPA, 1999)*. For further information, contact Environment Canada.

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SNAKES, MICRO-ORGANISMS AND RODENTS.**

**METHYL BROMIDE
FUMIGANT**

REGISTRATION NO. 16495 *PEST CONTROL PRODUCTS ACT*
GUARANTEE: Methyl Bromide 100%

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FUMIGANTS - EQUIPMENT - INSECTICIDES

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- Where possible, rotate the use of Methyl Bromide Fumigant or other Group 8A insecticides with different groups that control the same pests in a field.
- Use tank mixtures with insecticides from a different group when such use is permitted.
- Insecticide use should be based on an IPM program that includes scouting, record keeping, and considers cultural, biological and other chemical control practices.
- Monitor treated pest populations for resistance development.
- Contact your local extension specialist or certified crop advisors for any additional pesticide resistance-management and/or IPM recommendations for the specific site and pest problems in your area.

For further information or to report suspected resistance contact ICL-IP America Inc. Customer Service at 1-877-661-4272 (Toll Free).

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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 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

KEEP OUT OF REACH OF CHILDREN
DANGER POISON

Highly volatile causes burns, vapour extremely hazardous. 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 effect 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 product is toxic to fish and wildlife. Keep out of lakes, streams and ponds.

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 non-irritating 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 Fumigant 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.

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.

Wear a full-face shield or safety glasses with brow and temple shields (Do **NOT** wear goggles.) 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 re-use. 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 Fumigant must be present at the fumigation site during all operations which may involve exposure to Methyl Bromide.

If this pest control product is to be used on a commodity that may be exported to the U.S. and you require information on the acceptable residue levels in the U.S., visit CropLife Canada's web site at: www.croplife.ca

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove personal protective equipment immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.

PLACARDING OF FUMIGATED AREAS

The applicator (or supervisor of the application) must placard all entrances to the fumigated area with signs bearing:

- skull and crossbones symbol
- "DANGER"
- "Area under fumigation, DO NOT ENTER"
- "Methyl Bromide Fumigant in use"
- the date and time of fumigation, and
- the name, address, and telephone number of the applicator.

Do not allow entry by unprotected persons into the fumigated area until the signs are removed. Such signs must only be removed when the air concentration level of Methyl Bromide is measured to be less than 3 ppm. Signs must remain legible during entire posting period.

Only a certified applicator (or someone under his/her supervision) may remove warning signs at entrances to fumigated structures.

FIRST AID

In all cases of overexposure, get medical attention or contact a poison control centre IMMEDIATELY. Take person to a doctor or emergency treatment facility. Take container, label or product name and Pest Control Product Registration Number with you when seeking medical attention.

IF INHALED - Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control centre or doctor for further treatment advice.

IF ON SKIN OR CLOTHING - Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control centre or doctor for treatment advice.

IF IN EYES - Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice.

TOXICOLOGICAL INFORMATION:

Early symptoms of overexposure are dizziness, headache, nausea, and vomiting, weakness and collapse. Lung oedema 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. Early symptoms of overexposure, in addition to those noted above, are intense lachrimation and irritation of mucous membranes. There are no known antidotes for Methyl Bromide.

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. Hyperexcitability and convulsions may require parenteral 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.

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 are a toxic hazardous waste. For information on the cleanup of soils, contact the Provincial regulatory agency or the manufacturer.

PESTICIDE STORAGE, HANDLING AND DISPOSAL

PESTICIDE STORAGE AND HANDLING: Store in a dry, cool, well-ventilated area under lock and key. 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.

DISPOSAL:

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 manufacturer or the provincial regulatory agency. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for cleanup of spills.

CONTAINER DISPOSAL: When cylinder is empty, close valve by turning clockwise until hand tight, 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.

RETURN OF CYLINDERS:

- (1) Cylinders are the property of the manufacturer or distributor where purchased and should be returned promptly by collect freight.
- (2) Do not ship cylinders without safety caps or valve protection bonnets.
- (3) When a cylinder is partially full and there is no further requirement for the product, contact the manufacturer or distributor for return instruction.
- (4) Containers should never be refilled by the consumer or used for any other product or purpose.

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 Fumigant, 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 Fumigant 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 *Pest Control Products Act* to use this product in a manner inconsistent with its labelling.

Methyl Bromide Fumigant 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, boll weevil, *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, cocoa 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, flat grain 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 tortrix moth, oriental fruit fly, oriental fruit moth, pecan weevil, *Pectinophora spp.*, pepper maggots, pickle worm, pink boll worm, pill bugs, plant pathogens, pod borders, potato beetle, *Proeulia spp.*, psyllids, rats, red flour beetle, red legged ham beetle, rice weevils, rodents, rusty grain beetle, saw-toothed grain beetle, scale insects, slugs, snails, snakes, snout-nose weevil, sow bugs, 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 (e.g. warehouses, grain elevators, and food processing plants), enclosed spaces (e.g. vaults, bins, vacuum chambers, chambers, tractor trailers, buses, ships, vans, silos, and railroad cars) and gas tight coverings (e.g. 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 re-entry. 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 (i.e.), 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 Fumigant 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 Fumigant 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 20°C 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 Fumigant 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 infrared 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 re-entry 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

Check with appropriate municipal and county authorities before fumigating to be completely familiar with local regulations. Ordinances may require watchmen, padlocks, or warning posters during and after fumigation and/or notification of the nearest fire station and police department. Notify anyone who would normally be in the area before fumigating. Several types of buildings can be fumigated with Methyl Bromide Fumigant. 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 warehouses, grain storage buildings and coffee warehouses.

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) medicinal 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), sponge rubber, foam rubber, as in pillows, cushions, mattresses, and some car seats. Rubber stamps and other similar forms of reclaimed rubber; 6) Paper; a. Silver polishing papers; b. Certain writing and other papers cured by sulfide processes; c. Photographic prints and blueprints stored in quantity; d. Carbonless carbon paper; e. Blueprint papers; 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; 17) Full fat soya flour; 18) Rug padding, Foam rubber, felt, etc.; 19) Woolens (Extreme caution should be used in the fumigation of Angora woolens. Some adverse effects have been noted on woolen socks, sweaters, shawls and yarn; 20) Viscose Rayon, Rayon processed or manufactured by a process in which carbon bisulfide is used; 21) Vinyl; 22) Cellophane, (In the event of uncertainty about the possible presence of reactive sulfur compounds, conduct a trial fumigation of a small quantity of the material in question); 23) Mixed Concrete (Occasionally picks up odors); 24) Mixtures of mortar and/or soil used for chinking log cabins. Do not fumigate unfinished basements (cinder blocks) in dwellings.

Methyl Bromide Fumigant 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.

SEALING THE BUILDING

The most important part of the entire fumigation job lies in the preparation and sealing of the structure. The properties of penetration and diffusion that make Methyl Bromide Fumigant an ideal fumigant also make it difficult to confine-and for that reason, a good sealing job is necessary. High winds, for example, increase fumigant loss and cause fumigant to drift to the leeward side of the building.

Sealing of the building begins with the closing of all external openings to the building. Seal roof ventilators and chimneys by wrapping them with tarpaulin, or plastic sheet, or by stripping the screened openings with a wide commercial masking tape. Stairwells and interior doors should be closed. Any broken panes should be replaced, then exterior doors and windows should be wedged tight, locked, and cracks caulked or taped. Check for cracks in the floor, roof, and around eaves and seal them. Special care should be taken to seal partitions to adjacent storage or work areas in a building. Before fumigation adjoining buildings sharing a common wall must be cleared of personnel, animals, and items that will react to Methyl Bromide Fumigant or commodities which might-be damaged by Methyl Bromide Fumigant.

Because Methyl Bromide Fumigant gas can penetrate accumulations of trash and sweepings, necessary cleanups may be postponed until after the fumigation has been completed. 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 applied 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 interior length by width and height. In irregular shaped buildings, find the cubic content of each unit, and then add them together to find the total. In case of peaked roofs the average height between the sidewall and the top of the roof may be used as the third multiple in calculating the cubic content. In taking measurements, no deductions should be made for space occupied by machinery, commodities or furnishings. Exceptions to this rule apply to fresh fruits and vegetables.

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.

As Methyl Bromide Fumigant is heavier than air, it is advisable to increase slightly the amount of fumigant released on the top floor. In all cases, the size of cylinder can quite naturally follow the needed dosage for that particular cubic space. Cylinders should be located within a room so as to do the best job of diffusion into all areas. Cylinders should be set in an upright position and the shipping caps removed. Again, since Methyl Bromide Fumigant is heavier than air, in order to prevent stratification at the lower levels, it is sometimes advisable to attach standpipes (or curved pipes directed upward) to the cylinder valves. If standpipes are used, they should be equipped with T fittings to direct the gas laterally and prevent direct contact with the ceiling.

Fans are recommended to distribute the Methyl Bromide Fumigant 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 m³ 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 Fumigant. 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. Presence of intense heat from such sources may change Methyl Bromide Fumigant to hydrobromic acid which may be injurious to commodities and equipment. Place warning signs on all entrances to the building. Have lights to illuminate warning signs plainly. Inform police, fire and health officials that a fumigation process is about to begin. Observe location of nearest telephone for use in case of emergency. Make sure fumigators can recognize early symptoms of Methyl Bromide intoxication and that the appropriate physicians and hospitals have been provided a copy of "First Aid & Treatment for Methyl Bromide Exposure". Arrangements should be made to seal and bar the building entrances as soon as the job is complete. Watchmen should take up their stations to prevent any admittance during the fumigation.

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.

Thus, in case one should become incapacitated for any reason, such as an accidental fall that would result in an injury or unconsciousness, the other could move him to fresh air.

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 Fumigant 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 Fumigant 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.

Fumigating the structure – OUTSIDE RELEASE –

Releasing the Methyl Bromide Fumigant 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 Fumigant 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 Fumigant. Respiratory protection equipment must be available in the event of a major leak or equipment failure.

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 (i.e. SCBA), should begin opening windows, starting at the lower floors and working upward. These people should not try to open all windows on any single floor the first time through but should open only those windows that are necessary for thorough ventilation and return to the outside as soon as possible. They should not remain inside the building for prolonged periods (not more than 15 minutes).

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 working area.

For structures with attics:

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 140m³ 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.

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 (i.e.), interior electrical outlets, desk drawers and closets by inserting the monitoring apparatus in the enclosed space (i.e.), by inserting the detection device in the ground receptacle.

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.

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.

GRAIN ELEVATOR FUMIGATION

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

- a. Seal structure carefully, using masking tape for small openings and polyethylene sheeting secured with masking tape for large openings.
- b. Fumigated areas must be placarded on all entrances with signs containing at least the signal word DANGER and the "Skull and Crossbones" and the words "Area under fumigation, do not enter until completely aerated", the date of fumigation, name of fumigant used, emergency telephone number for contact, and the name and address of fumigator. Do not

remove warning signs until the fumigated area is completely aerated and safe for entry, as indicated by a suitable detector.

- c. Use the rate and exposure time shown in site entries for specific grains to be treated.
- d. Fumigate by using a fan or blower to re-circulate the Methyl Bromide Fumigant through the perforated pipes or ducts at the bottom of the bin, up through the return duct or discharge the fumigant through polyethylene tubing in the head space at intervals of 30 metres (100 feet) or less.
- e. Check periodically for leaks with a suitable detector.
- f. To aerate after fumigation, disconnect return air at the fan and discharge into outside air. Continue aeration until suitable detector shows the fumigant has dissipated. Use suitable detector to check the elevator head space for possible pockets of Methyl Bromide Fumigant.

GENERAL WARNINGS AND LIMITATIONS FOR INDOOR / STRUCTURAL FUMIGATION

At temperatures below 15.6°C (60°F) increase the dosage by 800g per 100 cubic meters (0.5 pound per 1000 cubic feet) for every 5.6°C (10°F) drop in temperature or use an approved procedure to heat the fumigant. Do not fumigate when temperature is below 10°C (50°F).

Claims for control of stored product pests and structural pests will also control rats and mice. When rodenticide claim is solely the object of fumigation, dosages are usually lower.

Overdosing, overexposure or repeated fumigation of food or feedstuff commodity should be avoided. When the prior history is not known, or in those instances where a repeated fumigation is necessary, the commodity should be analyzed for inorganic bromide residues before fumigation to make certain the proposed treatment will not result in residues that will exceed the tolerances established. Special care must be exercised to determine that Methyl Bromide fumigation of commodities such as animal feeds, dried eggs, dried figs, nuts, will not result in residues in excess of established tolerances. When used for fumigation of enclosed spaces, 2 persons trained in the use of Methyl Bromide Fumigant must be present at all times during introduction of the fumigant, testing, and aeration periods.

ENCLOSED SPACES

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 Fumigant 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.

Before introducing the fumigant, place warning signs and a red warning light on the door. Two people wearing full-masks with an approved NIOSH/MSHA self-contained breathing apparatus (SCBA or combination air-supplied) are required when introducing the fumigant and opening the door after fumigation.

At the end of the exposure period, aerate by opening the exhaust port, turning on the exhaust fan and opening the chamber door slightly to permit fresh air to enter.

Always check completeness of aeration with detection devices before allowing unprotected persons to enter the chamber.

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 Fumigant 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.

(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 Fumigant 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. 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.

PREPARE AN OPEN TOP TRUCK, VAN OR TRAILER FUMIGATION IN THE FOLLOWING WAY

All precautionary procedures as outlined previously must be followed:

Roll back the protective tarpaulin to expose the bulk grain or other commodity.

Prepare a gas expansion dome by placing several cardboard boxes, empty 20 litre (5-gallon) pails or other propping materials on the top of the load down the center line. These props should be high enough to support the tarpaulin 30 to 46 cm at the center line above the grain or commodity surface after replacement.

Place 2 shallow, plastic or non aluminium metal, containers on the center line grain surface of the load at points 0.3 and 0.6 the distance from the front of the conveyance. Direct into and firmly attach with tape one end of a 6.4 mm I.D. polyethylene applicator hose into each evaporating container to prevent liquid Methyl Bromide Fumigant from contacting the commodity. Hand the other end of each hose over the side of the conveyance down to approximate waist height from the ground. The ends of the hose should have a brass fitting for attaching to the applicator.

Pull the tarpaulin back over the load, covering the props thereby creating the gas expansion dome. Do not tie down the tarpaulin but leave sufficient room to tape the gas proof cover to the conveyance sides below the edges of the tarpaulin.

With the 6 mil (0.15 mm) polyethylene or other gas proof cover, completely over-cover the protective tarpaulin to extend down the sides of the container. Clean the containers of dirt and grease. With 5cm masking tape, seal the entire edge of the gas proof cover to the sides and ends of the container, below the tarpaulin, leaving the ends of the 2 applicator hoses exposed for attaching the applicator.

SHIPBOARD, IN-TRANSIT OR SHIP HOLD FUMIGATION

Shipboard, in-transit ship or ship hold fumigation is also governed by Canadian Coast Guard Regulations. Refer to and comply with these 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 pre-notified 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 Fumigant leakage. If leakage of Methyl Bromide Fumigant 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 (e.g. low range gas detector tubes, portable gas chromatograph, thermal conductivity analyzer), monitor spaces adjacent to areas

containing fumigated cargo and all regularly occupied areas for Methyl Bromide Fumigant 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

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 (fiber made from the agave plant) kraft paper, tar paper, additional tarpaulin, polyethylene sheeting or a fumigation bubble.

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

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 60cm around the stack when the cover is laid over it.

The gas expansion dome – Center 4 or more sacks upright on top of the stacked material to form a gas expansion dome. This facilitates gas distribution.

The tubing and evaporating pans – Evaporating pans are essential for the volatilization and uniform dispersion of Methyl Bromide Fumigant 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 28.3m³ 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.

The tarpaulin – Water-proofed canvas tarpaulins are not satisfactory. 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 cylinder valve outlet and release fumigant. Use a cylinder dispenser or scale to meter small amounts from cylinders. 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.

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 gas proof cover several centimetres above material and seal the edges under earth. Evaporate the Methyl Bromide Fumigant 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.

Christmas trees

USE: 4-25 kg/100 m³

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 Fumigant (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 and Agri-food 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).

Wood and Wood Products

Methyl Bromide Fumigant 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 (dry wood, powder-post, subterranean, formosan, and damp wood), 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, sow bugs, 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.

SEEDBEDS AND PLANT BEDS, AND TURF USE

ADHERE TO THE FOLLOWING LIMITATIONS:

(1) Keep children and animals away from plots during treatment and at least 30 minutes after cover is removed.

(2) Consult the manufacturer or agricultural authorities for further details.

(3) Growers should experiment on a small scale for a full season before extensive use. Difficulty has been experienced with carnations, conifers, holly, multiflora roses, snapdragons, and certain other ornamental plants and shrubs.

(4) Do not fumigate close to desirable vegetation. Keep the edge of the cover at least 30 cm away from the roots of desirable plants.

(5) Fumigation with Methyl Bromide Fumigant sometimes slows the rate of nitrification. 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 half of the nitrogen fertilizer added immediately before or after fumigation should be in the form of nitrate nitrogen. The hazard may also be reduced by delaying planting for several months after fumigation.

(6) Fumigation of soils high in organic matter, such as muck, compost, or heavily manured soils may occasionally yield conditions which result in poor plant growth. These soils should be fumigated at least 2 months before planting.

SEEDBEDS AND PLANT BEDS FOR TOBACCO, SHADE TREES, FOREST TREES, ORNAMENTALS-HERBACEOUS, ORNAMENTALS-WOODY, PERENNIAL CROPS, VEGETABLES (FOR PRODUCTION OF TRANSPLANTS ONLY). PERMANENT PLANTING SITES FOR TOBACCO, FOREST TREES, ORNAMENTALS, PERENNIAL CROPS.

FOR CONTROL OF: Damping-off Organisms (*Fusarium*, *Pythium*, *Rhizoctonia*), Insects, Nematodes, Weed Seeds.

USE: 200-450 grams/10m²

APPLICATION: Prior to fumigation, the soil should be in seed bed condition with adequate moisture to support seed germination. The soil should be worked to the depth it is desirable for the fumigant to penetrate. Plant refuse should be worked into the soil and time allowed for refuse to decompose before treatment. For best results, fumigate when soil temperature at a depth of 10 cm is above 16°C; between 10°C and 16°C double the exposure time. Do not fumigate at temperatures below 10°C. Prior to planting, apply Methyl Bromide Fumigant at the rate that appears in the dosage table by means of tractor mounted wing-type shanks with the injection points no more than 30 cm apart and at a depth of 25 cm below the soil surface. To seal fumigant after application, cover immediately with high barrier tarpaulin by means of a mechanical tarp layer. Do not remove tarpaulin for 5 days. Use the high rate for control of damping-off organisms. Fumigate at least 120 hours and aerate at least 48 hours (low rate) or 72 hours (high rate). Seeds of some species can be planted immediately; for sensitive species, aerate several days longer. Do not set out living plants for at least 7 days.

The "High Barrier" tarpaulin used in the fumigation must have a permeability factor of less than 8 milliliters Methyl Bromide per hour, per square meter, per 1,000 ppm of Methyl Bromide under

tarp at 30 degrees Celsius. Also, any polyethylene tarp of 6 mil (0.15 mm) thickness or greater meets this criterion.

TURF (ORNAMENTAL, SPORTS)

FOR CONTROL OF: Damping-Off Organisms (*Fusarium*, *Pythium*, *Rhizoctonia*), Insects, Nematodes, Weed Seeds.

USE: 200 - 450 grams/10m²

TURF RENOVATION: Turf is usually worked up before fumigation but may be left undisturbed. Soil should be moist. Follow direction for seed and plant beds. Use the high rate for control of damping-off organisms.

Fumigate at least 120 hours and aerate at least 48 hours (low rate) or 72 hours (high rate). For best results, fumigate when soil temperature is above 16°C at a 10 cm depth. At temperatures between 10° and 16°C, soil may be seeded or sprigged without the removal of the dead sod.

COMPOST, MANURE, TOPSOIL – DAMPING-OFF ORGANISMS (*FUSARIUM*, *PYTHIUM*, *RHIZOCTONIA*), INSECTS, NEMATODES, WEED SEEDS.

USE: 1.75-3.50 kg/100m³

Fumigate either outdoors or in a well-ventilated place. Material should be loose moist, and above 15°C. For best results pile not over 30cm (1 foot) deep on wet ground or on a concrete floor. Piles up to 92 cm high may be fumigated if perforated every 30 cm. Support a gas-proof cover a few cm above the material to permit gas to diffuse and seal the edges. Introduce fumigant at the highest point of the pile. Use the high rate for damping-off organisms. Expose 24 hours. Aerate for 24 hours, then stir thoroughly and aerate 48 hours longer before using.

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. Do not fumigate nutmeat or nuts without a shell.
- b) Tolerance of fruit to Methyl Bromide Fumigant 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' FOR STORED PRODUCT PESTS INFESTING RAW AGRICULTURAL COMMODITIES ⁽¹⁾			
COMMODITY	DOSAGE (kg/100m³)	EXPOSURE TIME (hours)	AERATION PERIOD(hours)
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
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
Eggplants	5	4	48
Filberts	5.7	24	168
Garlic	5	4	48
Grapefruit	5	2	48
Grapes	6.4	2	48
Hickory Nuts	5.7	24	168

COMMODITY	DOSAGE (kg/100m³)	EXPOSURE TIME (hours)	AERATION PERIOD(hours)
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
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
Pistachios	5.7	24	168
Plums	8.2	2	48
Popcorn	2.5	2	48
Potatoes	5	6	48
Prunes	8.2	2	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

COMMODITY	DOSAGE (kg/100m³)	EXPOSURE TIME (hours)	AERATION PERIOD(hours)
Strawberries	3.2-5	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
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 (hours)	AERATION PERIOD(hours)
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 & Roquefort)	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 21°C.

TABLE III

APPLICATION SUMMARY FOR STRUCTURES ⁽¹⁾			
TREATMENT SITE	VOLUME (m³)	Dosage (kg/100m³)	EXPOSURE TIME (hours)
Feed Room, Food Processing Plant Grain	Less than 2,830	1.6-4.8	24
Grain Bin, Grain Elevator	2,830 - 14,150	1.6-2.4	24
Restaurant, Silo	14,150- 28,300	1.6-2.0	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 Fumigant. Do not fumigate when temperature is below 5°C.

TABLE IV

APPLICATION SUMMARY FOR WOOD & WOOD PRODUCTS ⁽¹⁾		
PEST GROUP	GENERAL RATE (g/m³)	EXPOSURE TIME (hours)
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

1. 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 FOR PESTS OF MISCELLANEOUS COMMODITIES ⁽¹⁾			
COMMODITY	DOSAGE (kg/100m³)	EXPOSURE TIME (hours)	AERATION PERIOD (hours)
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 TEMPERATURE (°C)	DOSAGE (kg/100m³)	MINIMUM CONCENTRATION (kg/100m³)	EXPOSURE TIME (hours)
-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	4
+04 to +09	8	3.50	4
+10 to +15	5.5	3.25	3
+16 and above	4	3.00	3

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