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Proposed Special Review Decision

PSRD2024-01

Proposed Special Review Decision of Methyl Bromide and Its Associated End-use Products

Consultation Document

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Publications
Pest Management Regulatory Agency
Health Canada
2 Constellation Drive
8th floor, A.L. 2608 A
Ottawa, Ontario K1A 0K9

Internet: canada.ca/pesticides
pmra.publications-arla@hc-sc.gc.ca

Information Service:
1-800-267-6315
pmra.info-arla@hc-sc.gc.ca

Canada 

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Proposed special review decision for methyl bromide and associated end-use products

Under the authority of the *Pest Control Products Act*, pesticides are regulated by Health Canada's Pest Management Regulatory Agency (PMRA) on behalf of the Minister of Health. The *Pest Control Products Act* prescribes both the pre-market and post-market assessment (re-evaluations and special reviews) of pesticides to determine the acceptability or continued acceptability of human health and environmental risks, and, acceptable value of a pesticide in Canada. Unlike a re-evaluation, a special review is triggered only under certain circumstances, as described in section 17 of the *Pest Control Products Act*, and the intent of a special review is to address specifically the identified aspect(s) of concern. The special review approach is described in the [PMRA Guidance Document: *Approach to Special Reviews of Pesticides*](#). More details on the legislative framework are provided under the section of Legislative Framework of this document.

Health Canada evaluates the aspect(s) of concern that prompted the special review in accordance with subsection 18(4) of the *Pest Control Products Act*. The internationally accepted science-based approach is used for the assessment of the aspect(s) of concern, similar to all other scientific assessments (for example, new product registrations, re-evaluations). This step includes both risk (or value, if applicable) assessment and risk management to address the concerns identified. Health Canada's approach to risk and value assessment as well as risk management is outlined in the *Framework for Risk Assessment and Risk Management of Pest Control Products*.¹

Pursuant to subsection 17(2) of the *Pest Control Products Act*, Health Canada initiated a special review of all registered pest control products containing methyl bromide, based on the European Union's decision to prohibit all uses of methyl bromide. The identified aspects of concern are:

- Potential for risk from occupational exposure.
- Potential for risk to bystanders.

Methyl bromide is classified as an ozone-depleting substance (ODS) under the *Montreal Protocol on Substances that Deplete the Ozone Layer* (Montreal Protocol). This proposed special review decision will discuss the status of methyl bromide in Canada as a pest control product under the *Pest Control Products Act*.

Pursuant to subsection 18(4) of the *Pest Control Products Act*, Health Canada has evaluated the aspects of concern that prompted the special review of pest control products containing methyl bromide, which are relevant to human health. This proposed special review decision includes the outcome of the assessment of the aspects of concern.

¹ PMRA Guidance Document, A Framework for Risk Assessment and Risk Management of Pest Control Products (<https://www.canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/policies-guidelines/risk-management-pest-control-products.html>)

Methyl bromide is also under re-evaluation where aspects related to human health, environment and value are discussed in the Proposed Re-evaluation Decision PRVD2024-03, *Methyl bromide and its associated end-use products*.

Methyl bromide is a broad-spectrum fumigant, effective as an insecticide, acaricide, fungicide, animal toxicant, molluscicide, nematicide, and herbicide. It is registered as a general space fumigation of structures (for example, warehouses, grain elevators, food processing plants, restaurants), enclosed space fumigation (in other words, chamber/vault; vacuum chamber; and transport vehicles and gas tight covering (tarpaulin) fumigation). For these uses, it may be applied to empty structures or used to treat stored food/feed and non-food/non-feed commodities as listed on the label. It is also registered as a pre-plant soil fumigant for ornamental plants, forest nurseries and tomatoes. All currently registered products containing methyl bromide have been considered in this special review. Currently registered pest control products containing methyl bromide can be found in the [Pesticide Product Information Database](#) and in Appendix I.

Methyl bromide is classified as an ODS under the Montreal Protocol. Parties to the Montreal Protocol, including Canada, agreed to the reduction and phase-out of methyl bromide. Quarantine and pre-shipment applications (QPS), critical use exemptions (CUE) and emergency uses of methyl bromide, as defined under the Montreal Protocol as outlined in the Ozone-depleting Substances and Halocarbon Alternatives Regulations (ODSHAR) under the *Canadian Environmental Protection Act, 1999* (CEPA), are exempt from phase-out (see Appendix II for definitions).

Since 1 January 2005, the manufacture, import and export of methyl bromide has been prohibited in Canada, except for QPS, CUE, emergency uses, and non-pesticidal uses (in other words, as feedstock and analytical standards). Pre-plant and soil fumigation uses of methyl bromide do not meet the criteria for an exemption under the Montreal Protocol (in other words, not a QPS, CUE or emergency use), and are proposed for cancellation in the Proposed Re-evaluation Decision of methyl bromide (PRVD2024-03). Therefore, the registered pre-plant and soil fumigation uses have not been considered as part of the human health assessment in this Proposed Special Review Decision.

This proposed special review decision is a consultation document.² Health Canada will accept written comments on this proposal up to 90 days from the date of publication of this document. Please forward any comments to [Publications \(please see contact information on the cover page of this document\)](#).

Proposed special review decision for methyl bromide

Under the authority of the *Pest Control Products Act* and based on an evaluation of available relevant scientific information related to the aspects of concern for human health, Health Canada is proposing continued registration of the following uses of methyl bromide that fall within the definition of QPS uses under the Montreal Protocol:

² “Consultation statement” as required by subsection 28(2) of the *Pest Control Products Act*.

- general space fumigant, enclosed space fumigant and gas tight (tarpaulin) fumigant to treat empty structures or stored food/feed and non-food/non-feed commodities listed on the label

The assessment of the aspects of concern from this special review indicate that risks to human health for the above uses of methyl bromide are considered to be acceptable provided that proposed label amendments are implemented.

The proposed additional mitigation measures are summarized below, and details are outlined in Appendices III and IV.

Risk mitigation measures

Registered pesticide product labels include specific directions for use. Directions include risk mitigation measures to protect human health and the environment and must be followed by law. The proposed label amendments including any revised/updated label statements and/or mitigation measures, as a result of the special review of methyl bromide, are summarized below. Refer to Appendices III and IV for details.

Human health

Implementation of the mitigation summarized below and in Appendices III and IV is proposed. Additional revisions to the methyl bromide labels are also proposed to meet the current labelling standards.

To protect workers from occupational exposure, the following risk-reduction measures are proposed for methyl bromide:

- Updated personal protective equipment (PPE) statements to bring the product labels up to current standards.
- Reduction of methyl bromide exposure limit from 3 ppm to 1.0 ppm.
- New respiratory protection requirements based on the results of real-time air monitoring and/or anticipated maximum entry times in the fumigation site.
- As part of the mandatory training requirements for restricted-class products and fumigants, training must be completed annually by all employees working in the fumigation facility.
- Additionally, fumigation management plans (FMPs) must be completed prior to each fumigation application.

To protect the general public and bystanders, the following risk-reduction measures are proposed for methyl bromide:

- Buffer zones during treatment of commodities or structures and when they are being aerated.
- As part of the updates to all commodity fumigant labels:

- New air monitoring and distribution of fumigation information for all “difficult to evacuate sites” located within 16 meters of the treatment and aeration buffer zone perimeters.
- Updated placarding statements for treatment areas and buffer zone perimeters.
- Updated statements indicating that this product is **NOT** to be used in residential structures or public food service facilities (such as public restaurants). Residential structures include, but are not limited to, homes, garages, schools, restaurants, hotels/motels, public buildings or other structures where the general public including children may potentially be exposed.

Next steps

Health Canada will accept written comments on this proposal up to 90 days from the date of publication of this document. Before making a special review decision on methyl bromide, the comments received during the consultation period will be taken into consideration in preparation of the special review decision document.³ A science-based approach will be applied in making a final decision on methyl bromide. Health Canada will then publish a special review decision document, which will include the decision, the reasons for it, a summary of the comments received on the proposed decision, and Health Canada’s response to these comments.

Other information

The relevant confidential test data on which the proposed decision is based (see References section of this document) are available for public inspection, upon application, in the PMRA’s Reading Room. For more information, please contact the PMRA’s [Pest Management Information Service](#)

³ “Decision statement” as required by subsection 28(5) of the *Pest Control Products Act*.

Evaluation of the aspects of concern that prompted the special review

To assess the aspects of concern, Health Canada considered the information that prompted the special review and other information currently available relevant to the aspects of concern, including information considered by other regulatory agencies, such as the United States Environmental Protection Agency (USEPA). Health Canada considers foreign reviews and decisions, including mitigation measures implemented by the USEPA, to contribute to the assessment of Canadian pest control products. Based on the review of the USEPA regulatory decisions, additional risk mitigation measures are proposed in Canada to reduce potential exposure and risks to human health.

Human health assessment

Based on the review of the USEPA regulatory decisions and associated risk management measures for methyl bromide, additional risk mitigation measures are proposed by Health Canada to reduce potential exposure and risks to human health. Additional mitigation and label updates are also proposed to bring the methyl bromide labels up to current standards and updated mandatory training requirements for restricted-class products and fumigants in Canada. With the proposed risk mitigation measures specified in Appendices III and IV, potential risk to human health related to the aspects of concern (potential occupational and bystander risk) is considered to be acceptable.

No additional data are required in Canada at this time.

Health incident report summary

As of 12 February 2024, no human or domestic animal incidents involving methyl bromide were submitted to the PMRA.

List of abbreviations

%	percent
APR	Air-purifying respirator
CEPA	<i>Canadian Environmental Protection Act, 1999</i>
cm	centimetre
CPN	Chloropicrin
CSA	Canadian Standards Association
CUE	Critical use exemption
CUN	Critical use nomination
FMP	Fumigation Management Plan
FQPA	Food Quality Protection Act
IDLH	Immediately Dangerous to Life or Health
kg	kilogram
LOD	Limit of Detection
m	metre
m ³	cubic metre
MBR	Methyl bromide
NIOSH	National Institutes for Occupational Safety and Health
ODS	ozone depleting substance
ODSHAR	Ozone Depleting Substances and Halocarbon Alternatives Regulations
PCPA	Pest Control Products Act
PMRA	Pest Management Regulatory Agency of Health Canada
PPE	Personal Protective Equipment
ppm	Parts per million
PPQ	Plant Protection and Quarantine
PRVD	Proposed Re-evaluation Decision
PSRD	Proposed Special Review Decision
QPS	Quarantine and pre-shipment application
RED	Reregistration Eligibility Decision
SCBA	Self-Contained Breathing Apparatus
SDS	Safety Data Sheets
TRED	Tolerance Reassessment and Risk Management Decision
USEPA	United States Environmental Protection Agency

Appendix I Registered products containing methyl bromide in Canada¹

Registration number	Marketing class	Registrant	Product name	Formulation type	Guarantee
9564	Restricted	Lanxess Corporation	METH-O-GAS Space Fumigant	Liquid	MBR 100%
13477	Restricted		TERR-O-GAS 67 Preplant Soil Fumigant		MBR 67%, CPN 32.7%
18613	Technical Grade Active Ingredient		Methyl Bromide		MBR 99.96%

MBR = Methyl Bromide, CPN = Chloropicrin

¹as of 2 February 2024, excluding discontinued products or products with a submission for discontinuation

Appendix II Definitions of uses of methyl bromide that are exempt from phase-out under the Montreal Protocol as outlined in ODSHAR under CEPA, 1999.

Quarantine application (QPS) is defined as the treatment with methyl bromide of a commodity, product, facility or means of conveyance, when the treatment is intended to prevent the spread of, or to control or eradicate, pests of quarantine significance in order to meet a requirement of the importing country or a requirement of Canadian law.

Pre-shipment application (QPS) is defined as the treatment with methyl bromide, within 21 days prior to export, of a commodity or a product that is to be entirely exported to another country, or of a means of conveyance, in order to meet a requirement of the importing country or a requirement of Canadian law.

Critical use exemptions (CUE) are defined as having a lack of availability of methyl bromide for that use would result in a significant market disruption and there are no technically and economically feasible alternatives. Critical use nominations (CUN) go under a domestic and international review process before being granted an exemption under the Montreal Protocol.

Emergency use means a use of up to 20 tonnes of methyl bromide, in response to an emergency event, that conforms to Decision IX/6 set out in the document entitled *Report of the Ninth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer*, published by the Ozone Secretariat, United Nations Environment Programme.

Appendix III Proposed label amendments for products containing methyl bromide

The proposed label amendments presented below do not include all label requirements, such as first aid statements, disposal statements, precautionary statements and supplementary protective equipment. Information on labels of currently registered products should not be removed unless it contradicts the label statements below.

Label amendments relating to the Human Health assessment

Label amendments for restricted-class end-use products containing methyl bromide

For product(s) with registered QPS uses

On the Product Label (which includes the label brochure):

- I. Add a “**SAFETY REQUIREMENTS SUMMARY**” section containing the following:
 1. Carefully read the label and brochure and follow instructions explicitly.
 2. The licensed/certified applicator must develop and follow a Fumigation Management Plan and notify appropriate company employees prior to fumigation.
 3. Never fumigate alone from inside the treatment area. When entry into the treatment area for application of the fumigant is required, at least two persons, a licensed/certified applicator and a trained person, or two persons trained in accordance with the label and brochure working under the direct supervision of the licensed/certified applicator, must be present during fumigation, at the initiation of aeration, and when testing for re-entry. Appropriate respiratory protection, as outlined in the “**Respirator Requirements and Work Time Restrictions**” section, **MUST** be worn. If at any time methyl bromide levels exceed the limit of detection of **0.5 ppm**, all individuals who are not wearing respiratory protection or cannot follow the work time restrictions as outlined in the “**Respirator Requirements and Work Time Restrictions**” section must vacate the area until methyl bromide levels are at or below **0.5 ppm**. Respirators may not be required at certain concentrations above **0.5 ppm** depending on the work time restrictions (see “**Respirator Requirements and Work Time Restrictions**” section).
 4. Observe all provincial pesticide legislation requirements.
 5. The licensed/certified applicator must maintain visual and/or voice contact with all fumigation handlers during the application of the fumigants.
 6. Treatment and aeration buffer zones must be established for all fumigated sites as per the instructions outlined under the “**Treatment & Aeration Buffer Zone Requirements**” section.
 7. Post warning placards around the fumigated site, the treatment & aeration buffer zone perimeters as per instructions in the “**Placarding of Treatment Areas, Treatment Buffer Zones, and Aeration Buffer Zones**” section. If fumigated commodities are moved to a secondary aeration location before aeration is complete, warning signs must also be posted as per instructions in the “**Moving Commodity before Aeration Period is Complete**” section.

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8. Entry by any person, except the licensed/certified applicator supervising the fumigation, or persons under their direct supervision, is prohibited in the treatment and aeration buffer zones. Authorized persons who enter the treatment or aeration buffer zones must follow the personal protective equipment requirements specified for fumigation handlers on this label.
 9. Only if necessary, should workers be present in the treatment and aeration buffer zones. All workers present in the buffer zones during the fumigation or aeration periods **MUST** follow the requirements as outlined in the label and brochure – “**Respirator Requirements and Work Time Restrictions**” section.
 10. Exposure to methyl bromide must never exceed **1.0 ppm** without following the requirements in the “**Respirator Requirements and Work Time Restrictions**” section. If workers must handle incompletely aerated commodity, or are indoors (e.g., an enclosed elevator head) they must follow the respiratory protection and work time restriction requirements in the “**Respirator Requirements and Work Time Restrictions**” section.
 11. Dispose of empty containers in a manner consistent with the label instructions.
 12. Do not reuse containers for any purpose.
 13. Pre-exposure screening of employees to detect impaired pulmonary function is recommended. Any employees developing this condition should be referred for medical examination.
 14. Theft of products: Immediately report to the local police department thefts of methyl bromide fumigants.
 15. Registrant must be informed of any incident involving the use of this product.
- II. Revise the “**PRECAUTIONS**” section to: “**PRECAUTIONARY STATEMENTS, HAZARDS TO HUMAN AND DOMESTIC ANIMALS**” and revise the text to the following:
- KEEP OUT OF REACH OF CHILDREN. Highly volatile causes burns, vapour extremely hazardous.** Extremely hazardous liquid and vapour under pressure. Fatal if inhaled or swallowed. Corrosive. Liquid or vapour can cause serious skin (for example, skin burns) or eye injury (for example, irreversible eye damage), both of which may have a delayed onset. Do not breathe vapour or gas. Inhalation may be fatal or cause serious acute illness or delayed lung, nerve, or brain injury. Keep away from heat.
- Do not get in eyes, on skin, or on clothing. Methyl bromide vapour is odorless 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 METH-O-GAS[®] must be trained or licensed in the use of METH-O-GAS[®] and be knowledgeable regarding the proper use of personal protective equipment, detector devices and emergency procedures.
- III. Under the new “**PRECAUTIONARY STATEMENTS, HAZARDS TO HUMAN AND DOMESTIC ANIMALS**” add a “**PERSONAL PROTECTIVE EQUIPMENT (PPE)**” section containing the following:
-

Applicators and other fumigation handlers must wear:

- Long-sleeved shirt and long pants
- Shoes and socks
- Protective eyewear, such as a full-face shield or safety glasses, when handling liquid if full face respiratory protection is not being used (as indicated in the “**Respiratory Requirements and Work Time Restrictions**” section). DO NOT wear goggles, because methyl bromide can be trapped inside tight objects and cause skin injury.
- Respiratory protections are required according to the “**Respirator Requirements and Work Time Restrictions**” section of this label.
 - **In the treatment area during the treatment period and when initiating aeration (e.g., installing exhaust systems and opening tarps), a supplied air respirator (NIOSH approval number prefix TC-19C) or a self-contained breathing apparatus (SCBA) (NIOSH approval number prefix TC-13F) is required at all times, regardless of the air concentration of methyl bromide.**
 - **For all other areas during fumigation or during aeration/venting, either a:**
 - Supplied air respirator (NIOSH approval number prefix TC-19C) or a self-contained breathing apparatus (SCBA) (NIOSH approval number prefix TC-13F) **is required** if methyl bromide concentrations are **> 3.0 ppm** or unknown.
 - A NIOSH-certified half-mask or full-face piece air-purifying respirator with a cartridge certified by the manufacturer for protection from exposure to methyl bromide concentrations of at least up to **3.0 ppm** (e.g., a 3M air-purifying respirator equipped with 3M Model 60928 Organic Vapor/Acid Gas/P100 cartridges) is required if methyl bromide concentrations are **> the limit of detection (0.5 ppm)** and **≤ 3.0 ppm**.
 - However, if there is concurrent personal air monitoring of methyl bromide levels, and methyl bromide concentrations remain **≤ 3.0 ppm** and exposures will be less than 8 hours, the Respirator Requirements and Work Time Restrictions in Table 2 of the “**Respirator Requirements and Work Time Restrictions**” section of this label may apply.

See the “**User Safety Requirements**” section for additional restrictions.

USER SAFETY REQUIREMENTS

Fumigation handlers must wear the listed PPE and respiratory protection requirements and/or Work Time Restrictions must be followed (as outlined in the “**Personal Protective Equipment (PPE)**” and “**Respirator Requirements and Work Time Restrictions**” sections) when moving, handling, opening fumigant containers, during delivery/dispensing of product, while attending to spills and leaks, and while monitoring methyl bromide levels during treatment and aeration. Fumigation handlers entering the fumigation site before methyl bromide has been introduced to the treatment area are not

required to wear the PPE listed above. Fumigation handlers entering the treatment area after the aeration period has ended are not required to wear the PPE listed if levels of methyl bromide are measured to be less than the limit of detection (LOD) of **0.5 ppm**.

The licensed/certified applicator responsible for the fumigation must inform all workers of the requirements relating to the use of personal respiratory protection equipment and to the use of monitoring devices and detection equipment. All workers must be informed by the licensed fumigator or someone under their direct supervision of the concentration/work time limits for entry (**1.0 ppm**) and the requirement for methyl bromide monitoring devices, as stated in the “**Respirator Requirements and Work Time Restrictions**” section.

When a respirator is required for use with this product, as per the requirements listed in the “**Mandatory Training Elements**” and “**Respirator Requirements and Work Time Restrictions**” sections, the licensed/certified applicator supervising the fumigation must make sure that users comply with the Canadian Standards Association (CSA) and observe all provincial pesticide legislation requirements for respiratory protection (including fit testing requirements, medical assessment requirements, etc.). The respiratory protection must fit properly, any obstruction to a proper fit should be removed (e.g., beard, long sideburns).

- Do not wear jewelry, rubber gloves, goggles, tight clothing, rubber protective clothing, or rubber boots when handling. Methyl bromide can be trapped inside clothing or objects 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, jewelry, bandages or carry cigarettes, wallets, etc.
- If liquid fumigant splashes or spills on clothing, remove them at once and place them outdoors in an isolated place to aerate, because vapour or gas will be an intolerable source of irritation.
- Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product. Do not reuse them. Air dry clothes in an isolated place prior to disposal.
- At the end of the workday remove outer clothing, shoes, and socks. Do not reuse contaminated clothing or shoes until cleaned. Keep and wash the clothing and shoes separately from other laundry.
- Follow manufacturer’s instructions for cleaning/maintaining protective eyewear and respirators.

Only if necessary, should workers be present in the treatment and aeration buffer zones. All workers present in the buffer zones during the fumigation or aeration periods **MUST** follow the requirements, as outlined in the brochure “**Respirator Requirements and Work Time Restrictions**” section.

For emergency use and/or to escape from conditions which are Immediately Dangerous to Life or Health (IDLH), keep an adequate number of Supplied Air Respirators (NIOSH-approval number prefix TC19-C) or SCBAs (NIOSH approval number prefix TC-13F) available for use.

IV Add a “**SPILL AND LEAK PROCEDURES**” section containing the following:

Methyl bromide is highly mobile and given enough time may penetrate seemingly gas-tight materials such as concrete and cinder block. Therefore, adjacent, enclosed areas likely to be occupied must be monitored to ensure that significant leakage has not occurred. Sealing of the fumigated site, establishment of a treatment buffer zone, and/or air flow in the occupied areas must be sufficient to meet the **1.0 ppm** exposure safety limit.

A spill, other than incidental to application or normal handling, may produce high levels of methyl bromide, and therefore, attending personnel must wear appropriate respiratory protection and personal protective equipment as specified in the “**Personal Protective Equipment (PPE)**” and “**Respirator Requirements and Work Time Restrictions**” sections. Contact the manufacturer and the provincial regulatory agency in case of a spill and for clean-up of spills.

If a spill or leak occurs, a treatment buffer zone must be established by the licensed/certified applicator around the location of the spill site based on their expertise taking into consideration site characteristics and environmental conditions. All workers present in the buffer zones **MUST** wear appropriate respiratory protection as outlined in the “**Respirator Requirements and Work Time Restrictions**” and the “**Treatment & Aeration Buffer Zone Requirements**” sections.

In case of a rupture of a hose or fitting while applying fumigant, immediately stop the fumigation. Evacuate everyone from the immediate area of spill or leak. Only applicators or other fumigation handlers, or emergency responders, are permitted to perform corrective action and clean-up. Use personal protective equipment specified in the “**Personal Protective Equipment (PPE)**” and “**Respirator Requirements and Work Time Restrictions**” sections of this label for entry into affected area to correct problem. Move leaking or damaged cylinders or containers outdoors or to an isolated location, observing strict safety precautions, 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. Work upwind if possible.

Allow spill to evaporate. Do not permit entry into spill area by persons without appropriate respiratory protection until concentration of METH-O-GAS[®] is determined to be less than **1.0 ppm**. For concentrations of methyl bromide over 1.0 ppm, see the “**Respirator Requirements and Work Time Restrictions**” section of this label for additional directions.

Contaminated soil, water and other clean-up debris is a toxic hazardous waste. For information on the clean-up of spills, contact the regional office of Environmental Protection, Environment and Climate Change Canada (1-800-668-6767) and Lanxess Corporation (*Add Canadian contact telephone number*).

V Add a “**TERMS USED IN THIS LABEL**” section containing the following:

Aeration Buffer Zone: an area that extends from the point of methyl bromide emission from the treatment area (e.g., exhaust stack or building edge) to a distance determined by this label where access is limited. Entry by any person except the licensed/certified applicator and authorized fumigation handlers under their direct supervision is prohibited except as provided in the “**Exceptions to Treatment and Aeration Buffer Zone Entry Restrictions**” section of the label. The aeration buffer zone begins when aeration begins and ends when the air concentration of methyl bromide in the breathing zone of the treatment area for structural fumigation, or in the air space immediately around the treated commodity is **1.0 ppm or less**.

Aeration Period: the period of time starting at the initiation of aeration and ending when the concentration of methyl bromide is **1.0 ppm or less** as measured according to the directions in the “**Aeration Period**” section of the label and the minimum aeration time has elapsed.

Business (as referenced in the “**Emergency Preparedness Measures**” section): Structures and outdoor areas where business is conducted; e.g., offices, shops, equipment yards.

Breathing Zone: Areas where individuals typically stand, sit or lie down while performing work functions.

Difficult to Evacuate Sites (as referenced in the “**Emergency Preparedness Measures**” section): Schools (preschool to grade 12), provincially licensed day care centers, nursing homes, assisted living facilities, hospitals, in-patient clinics, and prisons.

Exhaust Stack: A duct used to exhaust methyl bromide from the Treatment Area.

Fumigation Site: The location at which fumigation activities will be conducted, at a minimum encompassing the treatment area, treatment and aeration buffer zones, and any secondary aeration locations.

Fumigation Handlers: Persons at the Fumigation Site involved in the fumigation, including the licensed/certified applicator and persons under their supervision. Fumigation handlers must be trained and equipped to use PPE according to label and brochure requirements. Does not include persons who do not enter the treatment area, treatment and aeration buffer zones, or secondary aeration location.

Maximum Entry Time: The time allowed without respiratory protection per continuous 24 hours in the treatment buffer zone, aeration buffer zone, treatment area during aeration, spill areas, and the secondary aeration location.

Mechanical Aeration: The use of fans or any other mechanical devices to aerate or ventilate the treatment area. May also be referred to as “Active Aeration.”

Non-residential structures: A non-residential structures is a building or non-building where there is no access by the general public, including children. Examples include but are not limited to, the following: industrial/commercial indoor sites (for example, warehouses, food granaries); and modes of transport in areas where people are not present (for example, cargo planes, railcars).

Person in Charge of the Facility or Agricultural Establishment (i.e., “Owner): Any person or company who has a present possessory interest (including leasehold, rental, or other) in the commodity or space being fumigated.

Passive Aeration: Non-mechanical ventilation (i.e., opening doors, windows or removing tarpaulin cover) of the treatment area.

Release: When control and responsibility for the commodity or structure is passed to the owner of the commodity or structure, responsible site manager, or other person designated by the owner.

Remote Monitoring: Monitoring conducted remotely is performed using a system set up in a treatment area or structure prior to the introduction of methyl bromide which allows the fumigation handler to check concentrations from outside the treatment area and without opening the treatment area. Inserting a hand-held device into the treatment area through a port or seam is not considered remote monitoring.

Residential Area: A residential area is one where the general public, including children, could be exposed during or after application. Residential areas would include, but are not limited to, homes, garages, schools, restaurants, hotels/motels, public buildings, parks or any other areas where the general public including children may potentially be exposed.

Treatment Area: The structure, area or space which is, or was, enclosed or sealed to contain methyl bromide during the fumigation and continuing until the commodity or structure is moved or released.

Treatment Buffer Zone: An area surrounding a treatment area during the treatment period (exposure or holding period) where access is limited. The treatment buffer zone extends from the perimeter of the treatment area to a distance determined by this label. Entry by any person except the licensed/certified applicator and authorized fumigation handlers under their direct supervision is prohibited except as provided in the “**Exceptions to Treatment and Aeration Buffer Zone Entry Restrictions**” section of the label. The treatment buffer zone begins when the fumigant is introduced into the fumigation enclosure and ends when aeration begins.

Secondary Aeration Location: A separate area where commodities may be moved for the continuation of aeration under the “**Moving Commodity before Aeration Period is Complete**” section of this label. The secondary aeration location must allow the free flow of air through the area and must not hold or contain concentrations of methyl bromide. The perimeter of the secondary aeration location extends 24-inches from the outermost treated commodity, or carton, pallet, or box containing the treated commodity. The secondary aeration location and associated restrictions terminate upon the end of the aeration period. Secondary aeration locations may include outdoor covered areas, car ports, and areas surrounded by mesh barriers.

Start of the Fumigation: The point in time at which methyl bromide is first introduced/delivered/dispensed into the air of the treatment area.

Work Time Restrictions: Include restrictions on the maximum entry time which is the time allowed without respiratory protection (per continuous 24 hours) in the treatment buffer zone, aeration buffer zone, treatment area during aeration, spill areas, and the secondary aeration location), the maximum level allowed per test, and/or requirements for a fumigation handler to wear a respirator and conduct air monitoring.

VI Add a “**RESPIRATOR REQUIREMENTS AND WORK TIME RESTRICTIONS**” section containing the following:

Tables 1 and 2 provide an overview of the required respiratory protection once methyl bromide has been introduced into the treatment area until the end of the aeration period.

A supplied air or self-contained breathing apparatus (SCBA) respirator is required for the methyl bromide concentrations and activities as noted in Table 1. A supplied air or SCBA respirator **is also required** during the fumigation or aeration periods if the methyl bromide concentration or the length of time needed to complete an activity is unknown.

Table 1 Respiratory Protection Requirements for Fumigation Handlers and Other Workers in Treatment areas, Secondary Aeration Locations, Treatment Buffer Zones, and Aeration Buffer Zones During the Fumigation and Aeration Periods (that is, once methyl bromide has been introduced into the treatment area until the end of the aeration period) and Spill Areas.

Methyl Bromide Concentration	Required Respiratory Protection ¹	Activity
Any or unknown	Supplied Air or SCBA Respirator	Any activity during the treatment period, <i>in the treatment area</i> Initiating aeration (e.g., installing portable exhaust systems or opening tarps for aeration)
> 3 ppm or unknown	Supplied Air or SCBA Respirator	

Methyl Bromide Concentration	Required Respiratory Protection ¹	Activity
≤ 3 ppm	Air Purifying Respirator with Air Monitoring OR No respiratory protection if following Work Time Restrictions	Any activity during the treatment period, <i>in all areas except the treatment area</i> During aeration period Removing tarps

Respirator Requirements:

Once methyl bromide has been introduced into the treatment area, fumigation handlers entering the treatment area, a treatment or aeration buffer zone, or secondary aeration location must wear either a supplied air respirator (NIOSH approval number prefix TC-19C) or a self-contained breathing apparatus (SCBA) (NIOSH approval number prefix TC-13F) when:

- the concentration of methyl bromide is > **3.0 ppm** or unknown,
- installing portable exhaust systems,
- opening tarps for aeration and any time during the aeration period, and
- removing tarps.

Treatment area and Secondary Aeration Location

Any fumigation handler entering the treatment area **during the treatment period** must wear either a supplied air respirator (NIOSH approval number prefix TC-19C) or a self-contained breathing apparatus (SCBA) (NIOSH approval number prefix TC-13F).

Any fumigation handler entering the treatment area or secondary aeration location **during the aeration period** must either (1) wear a respirator listed in the Table 1, or (2) follow the Work Time Restrictions below and in Table 2, depending on the concurrent air monitoring results.

Treatment Buffer Zones and Aeration Buffer Zones

Fumigation handlers entering a treatment buffer zone or aeration buffer zone must either (1) wear a respirator listed in Table 1, or (2) follow the Work Time Restrictions below and in Table 2, depending on the concurrent air monitoring results and whether fumigation is complete.

Respiratory Protection when Monitoring Air Concentrations

If methyl bromide concentrations are measured to be **3.0 ppm or less**, and the Work Time Restrictions (Table 2) are not followed, fumigation handlers may wear the following respirator instead of the supplied-air or SCBA respirator:

- a NIOSH-certified half-mask or full-face piece air-purifying respirator with a cartridge certified by the manufacturer for protection from exposure to methyl bromide at concentrations of at least up to **3.0 ppm** (e.g., a 3M air-purifying respirator equipped with 3M Model 60928 Organic Vapor/Acid Gas/P100 cartridges).

When an air-purifying respirator is worn, the following air monitoring procedures must be followed to ensure that the **3.0 ppm** upper protection limit of the air-purifying respirator plus respirator cartridge is not exceeded:

- Air monitoring samples for methyl bromide must be collected at least every hour in the fumigation handler's breathing zone. See the 'Monitoring Locations' section of this label for directions on where samples must be measured.
If any air sample is greater than **3.0 ppm** for methyl bromide:
 - All fumigation handlers wearing air-purifying respirators must either:
 - be removed from the fumigation site, or
 - put on a supplied-air respirator (NIOSH approval number prefix TC-19C), or a self-contained breathing apparatus (SCBA) (NIOSH approval number prefix TC-13F).
- Fumigation handlers can resume work activities with an air-purifying respirator if all of the following conditions exist:
 - Two consecutive air samples for methyl bromide taken at the work site at least 15 minutes apart must be less than or equal to **3.0 ppm**, and
 - New cartridges have been installed.

During the collection of air samples after an air sample has measured greater than **3.0 ppm**, a supplied-air respirator or a SCBA must be worn by the fumigation handler taking air samples or testing must be done remotely. New samples must be taken where the previous samples exceeded **3.0 ppm**.

Work Time Restrictions

Maximum Entry Time is the time allowed without respiratory protection per continuous 24 hours in the treatment buffer zone, aeration buffer zone, treatment area during aeration, spill areas, and the secondary aeration location.

The work time restrictions include restrictions on the **maximum entry time** which is the time allowed without respiratory protection (per continuous 24 hours) in the treatment buffer zone, aeration buffer zone, treatment area during aeration, spill areas, and the secondary aeration location), the **maximum level allowed per test**, and/or requirements for a fumigation handler to wear a **respirator and conduct air monitoring**.

Initial Test

The concentration of methyl bromide must be measured with an Initial Test using either:

- a continuous real-time detection device, with a sensitivity of at least **0.5 ppm** for methyl bromide. If at any time air concentrations exceed **3.0 ppm** or are unknown (e.g., during the initial test), then fumigation handlers and other workers must either wear an SCBA or supplied air respirator or move outside the treatment or aeration buffer zone. Respirators may not be required at certain concentrations above **0.5 ppm** depending on the work time restrictions (see Table 2). The type of monitoring device must be recorded. Measurements, date, time, and location of the measurement must be recorded at least every 15 minutes.

- a direct reading detection device capable of accurately measuring methyl bromide levels with a sensitivity of at least **0.5 ppm** for methyl bromide. Persons using direct read detection devices must follow manufacturer's directions. Fumigation handlers taking the Initial Test must wear either a supplied-air respirator (NIOSH approval number prefix TC-19C), or a self-contained breathing apparatus (SCBA) (NIOSH approval number prefix TC-13F).

- Fumigation handlers must discuss the specific air monitoring equipment requirements with the registrant prior to fumigation.
- The Initial Test must be performed as required in the 'Monitoring Locations' instructions below.
- The Initial Test may be repeated prior to the subsequent entry of fumigation handlers using the Work Time Restrictions. Fumigation handlers must follow the Work Time Restrictions triggered by the monitoring at the time they enter the area.
- If at any time air concentrations exceed **3.0 ppm** or are unknown (e.g., during the initial test), then fumigation handlers must either wear an SCBA or supplied air respirator or move outside the treatment or aeration buffer zone.
- The type of monitoring device and the measurements taken must be recorded.
- The results of the Initial Test are used to determine the Maximum Entry Time, the length of time work is allowed without respiratory protection within (i) the treatment buffer zone; (ii) the aeration buffer zone; (iii) the treatment area during aeration; and (iv) secondary aeration location. This does not include time spent outside these areas.
- Additional monitoring is required during the Work Time Restriction period according to schedules set forth in the Work Time Restrictions table until work has ceased or the Work Time Restriction period has expired, whichever occurs sooner. If any subsequent tests indicate a higher concentration, the Work Time Restrictions for the higher concentration must be followed. If any subsequent tests are lower, the Work Time Restrictions for the higher concentration remain in effect.

Monitoring Locations:

- At each site and operation under fumigation, monitor airborne methyl bromide concentrations in all areas to which fumigators and other workers have access during fumigation and aeration. Air monitoring must be performed within the fumigation handler's breathing zone where work functions will be performed. The monitoring location(s) must be recorded in the FMP.
- Breathing zones are defined as areas where individuals typically stand, sit or lie down while performing work functions.

Work Time Restriction Air Monitoring Schedule

Use the work time and air monitoring schedule in Table 2 for each 24-hour period.

If more than the Maximum Entry Time has elapsed since the last test, an SCBA or supplied air respirator must be worn during testing or testing must be done remotely.

For fumigation handlers who may be involved in multiple methyl bromide fumigations within a continuous 24-hour period, the maximum entry time is cumulative across all methyl bromide fumigations within that continuous 24-hour period.

Table 2 Respiratory Protection Requirements and Work Time Restrictions for Fumigation Handlers and Other Workers in Treatment Buffer Zone or Aeration Buffer Zone, Spill Area, or Treatment area and Secondary Aeration Location (only during the Aeration period).

Methyl Bromide Air Concentration [Maximum Allowed Per Test]	Required Respiratory Protection	Maximum Entry Time per Continuous 24 Hours <i>(Time Allowed without Respiratory Protection)</i>	Activity	Air Monitoring Required
> 2.0 to 3.0 ppm	Air-purifying respirator (APR) + air monitoring OR No respirator if following Maximum	160 Minutes (2 Hours and 40 Minutes)	<ul style="list-style-type: none"> • Any activity during the treatment period, <i>in all areas except the treatment area</i> 	Initial Test requires taking 2 samples at least 15 minutes apart. Both sampling results must be less than the 'Maximum Level Allowed Per Test'. Take additional sample once per hour after entry until work ends, the aeration period ends, or the

Methyl Bromide Air Concentration [Maximum Allowed Per Test]	Required Respiratory Protection	Maximum Entry Time per Continuous 24 Hours (Time Allowed without Respiratory Protection)	Activity	Air Monitoring Required
	Entry Time and Air Monitoring Requirements		<ul style="list-style-type: none"> • During aeration period • Removing tarps 	Maximum Entry Time expires, whichever is sooner.
> 1.0 to 2.0 ppm		240 Minutes (4 Hours)		Initial Test requires taking 2 samples at least 15 minutes apart. Both sampling results must be less than the 'Maximum Level Allowed Per Test'. Take additional sample once every two hours after entry until work ends, the aeration period ends, or the Maximum Entry Time expires, whichever is sooner.
> LOD ¹ to 1.0 ppm		480 Minutes (8 Hours)		Initial Test requires taking 2 samples at least 15 minutes apart. Both sampling results must be less than the 'Maximum Level Allowed Per Test'. Take additional sample once every two hours after entry until work ends, the aeration period ends, or the Maximum Entry Time expires, whichever is sooner. After entry, testing may be discontinued after two consecutive No Detectable Amount Results
No detectable amount (i.e., LOD)		No Limit		

1. Equipment sensitivity must reach 0.5 ppm or lower. Fumigation handlers must discuss the specific air monitoring equipment requirements with the registrant prior to fumigation.

VII Add a “**MANDATORY ANNUAL TRAINING**” section containing the following:

RESPONSIBLE PARTIES

Certified/Licensed Applicator: Responsible for informing the person in charge of the facility or agricultural establishment, the employer or their representative of the requirement for the mandatory training and maintenance of training records, and directing the person in charge of the facility or agricultural establishment, the employer or their representative on how to obtain a copy of the product-specific training material from the manufacturer.

Manufacturer: Responsible for developing product-specific training material and having the product-specific training material readily available upon request.

The person in charge of the facility or agricultural establishment or the employer or his/her representative: Responsible for:

- Developing site-specific training material.
- Providing both product-specific and site-specific training to workers.
- Maintaining training records for their employees/workers for a minimum of 2 years.

PERSONNEL

In facilities or agricultural establishments (i.e., farms) where this product is used, all employees (i.e., all individuals such as, workers, contractors, farmers, and farm workers) who are present in the facility or agricultural establishment during product use, **MUST** complete mandatory annual training using product-specific training material supplied by the manufacturer, and additional facility-specific information developed by the employer or their representative, before the fumigation is conducted.

MANDATORY TRAINING ELEMENTS

The training material **MUST** contain the following information:

Hazards of Methyl Bromide: Methyl bromide products are classified as restricted-class products due to high acute toxicity. Signs and symptoms of methyl bromide exposure are summarized as follows:

Early Symptoms: Include dizziness, headache, nausea and vomiting, weakness and collapse.

24-48 Hour Symptoms: Lung edema may develop, accompanied by cardiac irregularities. These effects are the usual cause of death.

Repeated Exposure: May cause blurred vision, staggering gait, and mental imbalance.

The **1.0 ppm** Exposure Limit: Information on the **1.0 ppm** exposure limit and that it is time-dependent, with specific time limits when a respirator is not required. Workers **MUST NOT** be exposed to methyl bromide levels above **3.0 ppm** for any duration of time, without SCBA or a supplied air respirator. Frequent exposure to concentrations above permissible levels over a period of days or weeks may cause poisoning.

How to use Detection/Monitoring Devices and Personal Protective Equipment: Information on facility-specific equipment, such as, how to use detection devices and how to properly fit-test respirators, must be included. In addition, information on when respiratory protection should be used must be included.

Procedures when Levels of Methyl Bromide Exceed **1.0 ppm**: Facility-specific details on what to do when methyl bromide levels exceed **1.0 ppm**, where workers are to go, who they should contact, the personal protective equipment to wear, and where the personal protective equipment is located.

Choosing an appropriate Treatment Buffer Zone and Aeration Buffer Zone: Process for choosing appropriate treatment and aeration buffer zone sizes based on the information provided in the “**Treatment & Aeration Buffer Zone Requirements**” section of this brochure.

VIII Add a “TREATMENT BUFFER ZONE & AERATION BUFFER ZONE REQUIREMENTS” section containing the following:

The appropriate treatment buffer zone and aeration buffer zone must be applied as summarized in Appendix IV. The appropriate treatment buffer zone and the aeration buffer zone distances must be used and must be included in the site-specific fumigation management plan. The treatment and aeration buffer zones are determined by the licensed/certified applicator who **MUST** be present for the duration of the aeration period.

Minimum Treatment and Aeration Buffer Zones: The minimum treatment and aeration buffer zones are 3 meters.

Treatment and Aeration Buffer Zones and Buildings: If the treatment area is contained within a closed building (exterior windows, doors, ventilation intakes, and other openings are closed), the entire building must follow all treatment and aeration zone restrictions, even if the calculated treatment zone distance would not encompass the entire building.

If the treatment area is within an opened building (all exterior windows, doors, and other openings are open), then only the area within the treatment buffer zone must follow the treatment buffer zone restrictions.

The treatment and aeration buffer zones extend into nearby buildings unless all openings (exterior windows, doors, ventilation intakes, and other openings) inside the treatment and aeration buffer zone are closed or sealed.

Treatment and Aeration Buffer Zone Overlap: If treatment or aeration buffer zones overlap from more than one methyl bromide fumigation, then to determine the treatment and aeration buffer zones, the licensed/certified applicator must:

- calculate the *total volume fumigated* for all the sites.
- select the *highest dosage* from the multiple fumigations,
- select the *lowest percent retained* from the multiple enclosures, and
- select the *longest air exchange interval*.

Using those inputs, look up the buffer zone size. This distance must be used for both the treatment and aeration buffer zones for each site.

TREATMENT AND AERATION BUFFER ZONE ENTRY RESTRICTIONS

Entry by any person, except the licensed/certified applicator supervising the fumigation, or persons under their direct supervision, is prohibited in the treatment buffer zone and in the aeration buffer zone. Authorized persons who enter the treatment or aeration buffer zones must follow the personal protective equipment requirements specified for fumigation handlers on this label. The licensed fumigator responsible for the fumigation must inform all workers of the requirements relating to the use of personal respiratory protection equipment and to the use of monitoring/detection equipment. All workers must be informed by the licensed fumigator or someone under their direct supervision of the concentration limits for entry (**1.0 ppm**) and the requirement for methyl bromide monitoring, as stated in the “**Work Time Restrictions**” section.

If a structure within the treatment buffer zone or aeration buffer zone is not occupied, ensure that persons do not enter the structure until the aeration buffer zone is terminated. For structures that have been vacated, persons may not re-enter until one air sample for methyl bromide, taken in the breathing zone on each floor of the structure after the termination of the aeration buffer zone indicates **1.0 ppm or less** methyl bromide. The sampling requirement does not apply to unoccupied buildings used for storage (e.g., sheds, barns, garages).

The fumigation site must be periodically monitored (i.e., according to a schedule made by the licensed/certified applicator as per site characteristics and environmental conditions and as stated in the **Fumigation Management Plan**) as well as at several locations along the buffer zone perimeter to ensure that liberation of gas from the treated commodity does not result in the development of unacceptable levels of methyl bromide. If at any time the person monitoring methyl bromide levels detects concentrations greater than **1.0 ppm**, the area must immediately be cleared of all individuals who are not wearing respiratory protection as outlined in the “**Respirator Requirements and Work Time Restrictions**” section.

Individuals must be excluded from the buffer zones to the extent possible. Appropriate respiratory protection, as outlined in the section “**Respirator Requirements and Work Time Restrictions**” MUST be worn if entry into the fumigated site is required.

If the fumigation site is to be entered after fumigation, it must be aerated until the level of methyl bromide is at or below **1.0 ppm** in the fumigation site and the treatment and aeration buffer zones. Otherwise, appropriate respiratory protection (as outlined in “**Respiratory Protection and Work Time Restrictions**”) must be worn.

Local, provincial, or federal officials performing inspection, sampling, or other similar official duties related to the fumigation are not excluded from the treatment area, treatment buffer zone, or aeration buffer zone by this label. The licensed/certified applicator supervising the application and the owner of the establishment where the application is taking place are not authorized to, or responsible for, excluding those officials from the treatment area, treatment buffer zone, or aeration buffer zone.

Exceptions to Treatment and Aeration Buffer Zone Entry Restrictions: Only if necessary, should authorized pesticide applicators/handlers or workers be present in the treatment or aeration buffer zones. All workers (including authorized pesticide applicators/handlers) in the buffer zones, **MUST** wear respiratory protection as outlined in the “**Respirator Requirements and Work Time Restrictions**” section.

There are two exceptions for entry into the treatment buffer zones and aeration buffer zones:

1. **Occupied Structure Exception:** Occupants of a structure that is within the treatment/aeration buffer zone may remain in the structure, *provided* continuous real-time monitoring indicates that methyl bromide concentrations are **1.0 ppm or less** within the occupied structure and the exposure time will be less than 8 hours. Fumigation handlers must monitor the air concentrations. This exception only applies to structures occupied by occupational workers. It does not apply to homes, apartment buildings, schools, hospitals, nursing homes, employee housing centers, or other prohibited sites. To use this exception, the FMP must state the distance of the occupied structure to the treatment area, the method of conducting the real time monitoring for methyl bromide during the period when the treatment buffer zone and aeration buffer zone are in force, and specific procedures for immediate intervention, such as cessation of aeration, evacuation of building, or other procedures if the concentration of methyl bromide exceeds **1.0 ppm at any time**.
2. **Transit Exception:** Limited transit through treatment and aeration buffer zones is allowed if brief and unavoidable. Routine or repeated work-related tasks are prohibited in the treatment and aeration buffer zones. No person is allowed to transit through a treatment or aeration buffer zone for more than 30 cumulative minutes in a 24-hour period.

To use this exception, the FMP must state the distance from the treatment area to areas where transit is anticipated, the estimated length of time persons in transit will be in the treatment buffer or aeration buffer zones, and the rationale why transit through these buffer zones will not exceed 30 minutes. No transit exception when horizontal exhaust stacks are used.

IX Add a “**PLACARDING OF TREATMENT AREAS, TREATMENT BUFFER ZONES, AND AERATION BUFFER ZONES**” section containing the following:

When using METH-O-GAS[®], placard or post all entrances to the treatment area and treatment buffer zone with warning signs in accordance with provincial regulations.

The licensed/certified applicator in charge of the fumigation (or someone under their supervision) must post warning placards around both the treatment area and the treatment buffer zone perimeter before the actual fumigation treatment. The licensed/certified applicator must placard or post warning signs at all usual points of entry, all entrances to the treatment area, and along other likely routes of approach where people not under the operator’s control may be in close proximity to the fumigated site and the treatment buffer zone. Placards should be placed in advance of the fumigation to keep unauthorized persons away. Some examples of points of entry include, but are not limited to, roadways, sidewalks, paths, and bike trails. Some examples of likely routes of approach are the area between a fumigation site and a roadway, or the area between a treatment buffer zone site and a housing development.

Posting of warning signs for the treatment and aeration buffer zone perimeters is required, UNLESS there is a physical barrier (e.g., fence) that prevents access into the treatment buffer zone. Once the fumigation is complete, the warning placards **MUST** be relocated to establish the aeration zone perimeter. Such signs must only be removed when aeration has occurred and when the air concentration of methyl bromide is monitored as described in this label and indicates that methyl bromide levels are **1.0 ppm** or less. The warning signs at entrances to fumigated structures may only be removed by the licensed/certified applicator in charge of the fumigation (or someone under their supervision).

Signs must be legible during the entire posting period. Placards must be at least 28 cm long and 21 cm wide and made of substantial material that can be expected to withstand adverse weather conditions. They must bear the following information in both English and French:

1. The signal word **DANGER** in letters at least 7 cm high and the skull and crossbones symbol in red.
2. The “DO NOT WALK” symbol.
3. The statement, "Area and/or commodity under fumigation, DO NOT ENTER."
4. “Methyl Bromide Fumigant in use”

5. The date and time when the fumigation begins and the date and time when the aeration can begin.
6. The name of fumigant and product used.
7. Contact information: The name, address, and telephone number of the licensed/certified applicator supervising the fumigation.
8. Placards must bear a 24-hour emergency response telephone number.

For railroad hopper cars, placards must be placed on both sides of the car near the ladders and next to the top hatches into which the fumigant is introduced.

Do not enter or allow entry by anyone other than fumigation handlers following the “**Respirator Requirements and Work Time Restrictions**” into the treatment area treatment buffer zone, and aeration buffer zone until the signs are removed, except as stated in the “Exceptions to Treatment and Aeration Buffer Zone Entry Restrictions” section of the label.

X Add an “**AERATION PERIOD**” section containing the following:

The aeration period starts at the end of the treatment period and continues until:

- The concentration of methyl bromide is measured to be **1.0 ppm or less**
AND
- The minimum time specified below has elapsed:
 - 4 hours, if using mechanical aeration; OR
 - 12 hours, if using passive aeration.
- Exceptions to the Minimum Time Requirement:
 - For vacuum chambers at least 4 Air Washes must be done before the commodity can be moved from the chamber. An Air Wash is an alternating cycle of pressurizing and depressurizing a vacuum chamber to achieve aeration. Vacuum chambers accelerate the rate of desorption of the methyl bromide.
 - If this exception is used, the FMP must explain the designation of the vacuum chamber and the number of air exchanges per hour.

Taking Concentration Measurements:

- For measurements intended to release or move a commodity, stop fans.
- Take concentration measurements in the air space immediately around the treated commodity and, when feasible, inside cartons or boxes.
- For structural fumigations, take concentration measurements in the breathing zone of the area of the structure to be released.

Moving Commodity before Aeration Period is Complete:

For commodities treated at normal atmospheric pressure, fumigated commodities may be moved from the treatment area to continue aeration in a Secondary Aeration Location provided:

- the concentration of methyl bromide is measured to be **3.0 ppm** or less as specified in the “**Taking Concentration Measurement**” section of this label,
- at least ten air exchanges have been completed in the treatment area; and
- during removal of commodity from fumigation chambers, all aeration fans must continue to run while handlers enter and exit the chamber to remove the commodity.

The Treatment area PPE, Respirator Requirements & Work Time Restrictions, and monitoring requirements apply to the secondary aeration location to which the fumigated commodity is moved, beginning at the time it is moved and ending at the termination of the aeration period. If methyl bromide levels are unknown or at or below **3.0 ppm**, appropriate respiratory protection must be worn or the Work Time Restrictions (as specified in the “**Respirator Requirements and Work Time Restrictions**” section) must be followed.

If a combination of aeration techniques is used, the minimum aeration time may be prorated to reflect the techniques used. For example, if two hours of mechanical aeration occur in the treatment area before the commodity is moved to a storage area, then that constitutes one-half of the required minimum aeration time (2 hours out of 4 hours for mechanical aeration). If the separate area uses passive ventilation, then the separate area would have to be passively ventilated for at least 6 hours (one half of the 12 hours for passive ventilation) before handlers would be permitted to handle the treated commodity.

Commodities aerated using a combination of aeration techniques may be released when the concentration of methyl bromide in the air space immediately around the commodity is measured to be **1.0 ppm** or less and the prorated minimum aeration time has been completed. The level of methyl bromide gas may be higher at the core of the commodity than the surrounding air. Monitoring is required when unloading or otherwise disturbing a commodity that has been fumigated to ensure that liberation of gas from the treated commodity does not result in unacceptable levels of methyl bromide.

Record the location and time when the commodity was moved and method for achieving 10 air exchanges in the pesticide application record.

Releasing Fumigated Commodities and Structures:

- After the aeration period is completed by one of the aeration methods above, the commodity or structure may be released.

- After the commodity or structure is released, record the date and time of the release in pesticide application records.
- Record the concentration reading date, time, and concentration measured, in pesticide application records.

XI Add an “**EMERGENCY PREPAREDNESS MEASURES**” section containing the following:

For each “**difficult to evacuate site**” within an estimated 16 meters of the treatment or aeration buffer zones, the licensed/certified applicator must conduct fumigation site monitoring and provide “information for neighbours”. “**Difficult to evacuate**” is defined as schools (preschool to grade 12), provincially licensed day care centers, nursing homes, assisted living facilities, hospitals, in-patient clinics, and prisons) as outlined below. Confirm all the appropriate local authorities (fire departments, police departments, etc.) have been notified as per label instructions, local ordinances, or instructions of the client.

Fumigation Site Monitoring:

From the start of the application until the aeration buffer zone period expires, a licensed/certified applicator or fumigation handler(s) under their supervision must:

- Monitor for methyl bromide with a direct read device in areas between the treatment and aeration buffer zone perimeter and residences and businesses that trigger this requirement.
- Monitoring must begin within 1 hour of the start of the application and continue until the treatment and aeration buffer zone period expires with a minimum of 2 air samples taken at least 1 hour apart every 6 hours during the treatment and aeration buffer zone periods.
- The FMP must include the licensed/certified applicator’s plans for where, when, and how monitoring will be performed. Air sampling results must be recorded.
- Implement the emergency response plan immediately if an air sample is greater than or equal to 1.0 ppm for methyl bromide.

Information for Neighbours:

The licensed/certified applicator supervising the application must ensure that residences and businesses that trigger the requirement have been provided the following information at least 1 week before the first fumigation begins and must be repeated annually or within 30 days of a change in the FMP, whichever occurs first.

- That methyl bromide fumigation(s) will take place
- The location(s) of the treatment area(s)
- Name of the product(s) to be used and the PCPA Registration number(s)
- Contact information for the licensed/certified applicator(s) supervising the fumigation(s)

- Time period(s) when the application(s) is/are planned to take place (must not exceed 1 year from the date the information is provided)
- Signs and symptoms of exposure to methyl bromide. See “Note to Physician” section of this label.
- What to do and who to call if you believe you are being exposed (911 in most cases).

The Information for Neighbours may be provided through mailings, door hangers, or other methods that effectively communicate the information above to the residents and/or business owners/operators.

XII Add an “SITE SPECIFIC FUMIGATION MANAGEMENT PLAN (FMP)” section containing the following:

A FUMIGATION MANAGEMENT PLAN MUST BE WRITTEN FOR ALL FUMIGATIONS PRIOR TO ACTUAL TREATMENT

Prior to fumigating, the licensed/certified applicator supervising the fumigation must verify that a site-specific fumigation management plan (FMP) exists. The FMP is intended to ensure a safe and effective fumigation and must be devised to cover the application and exposure period, aeration, and disposal of the fumigant so as to keep any human exposures to methyl bromide to a minimum and help ensure the adequate control of pests. The licensed/certified applicator in charge of the fumigation is responsible for working with the Person in Charge of the Facility or Agricultural Establishment (“owners”) and/or responsible employees of the site to be fumigated to develop a site-specific FMP. The licensed/certified applicator supervising the fumigation must ensure that the FMP is up-to-date and applicable to the fumigation before it takes place.

Before the start of any fumigation, the licensed/certified applicator supervising the fumigation must verify in writing (sign and date) that the FMP reflects current site conditions and that it addresses all elements identified in this label.

For situations where an initial FMP is developed and certain elements do not change for the fumigation, only elements that have changed need to be updated in the site-specific FMP provided that the licensed/certified applicator supervising the application has verified that those elements are current and applicable to the fumigation site before the fumigation begins, and record-keeping requirements are followed for the entire FMP (including elements that do not change).

The FMP must document the characteristics of the site, the treatment and aeration buffer zones, include appropriate monitoring and notification requirements and include a record that the following have been completed:

1. Inform the person in charge of the facility where the fumigation will take place that all workers must complete mandatory annual training as outlined in the

brochure “Mandatory Annual Training”. Training includes information on the hazards of the product, the use of safety equipment (i.e., respiratory protection monitoring equipment), and the exposure limit of **1.0 ppm**.

2. The Licensed/Certified Applicator, or a person under their supervision, must inspect the site to determine its suitability for fumigation. The application site consists of the treatment area and any structure that the treatment area is inside of.
3. Before fumigating, the licensed/certified applicator, or a person under their supervision, must assess the application site for any changes since the last application that could affect the efficacy or safety of the fumigation. This assessment must include a review of the most recent fumigation log from the application site and the most recent monitoring data from adjacent, occupied buildings, where such documents are available. In addition, the licensed/certified Applicator, or a person under their supervision, must consult the site manager regarding changes to the application site monthly, or if no fumigation has occurred at the application site for a month or more, upon resumption of fumigation activities.

If the licensed/certified applicator determines, based on the assessment, that modifications to the application site are required to ensure efficacy or safety, the basis for this conclusion, and confirmation that the modifications were made prior to fumigation, shall be recorded.

When sealing is required, the licensed/certified applicator must consult previous records for any changes to the site/structure, seal leaks, and monitor any occupied adjacent buildings to ensure safety.

4. The licensed/certified applicator, or a person under their supervision, prior to each fumigation must review any available existing FMPs, Safety Data Sheets (SDS), brochure, methyl bromide label and brochure, mandatory training materials, and other relevant safety procedures for the specific location or site, and consult with owners (whose structure or commodity is fumigated) and appropriate employees, if available.
5. The licensed/certified applicator, or a person under their supervision, must consult company officials in the development of procedures and appropriate safety measures for nearby workers that will be in and around the area during application and aeration.

6. The licensed/certified applicator, or a person under their supervision, must consult with company officials to ensure that an appropriate monitoring plan will be in place to confirm that nearby workers and bystanders will not be exposed to levels above the allowed methyl bromide safety limit (i.e., **1.0 ppm**) during application, fumigation and aeration. This plan must consider all of the treatment and aeration buffer zone requirements and demonstrate that nearby residents will not be exposed to concentrations above the allowable limits.
7. The licensed/certified Applicator, or a person under their supervision, must develop an appropriate exterior monitoring plan that will conform with the requirements of the treatment and aeration buffer zones to ensure that nearby handlers and bystanders are not exposed to levels above the allowed limits during fumigation and aeration and consult with owners, or site managers, if available.
8. The licensed/certified applicator, or a person under their supervision, must determine the proper treatment and aeration buffer zones, according to the methyl bromide product label and record the dosage, fumigated volume, and other parameters used to determine treatment and aeration buffer zone distances.
9. The licensed/certified applicator, or a person under their supervision, must develop procedures for notification of local emergency responders in the event of an emergency (“Emergency Response Plan”) and consult with owners or site managers, if available. The Emergency Response Plan must comply with all requirements established by local emergency responders while remaining consistent with label requirements.

If local emergency responders have not established any requirements, or if requirements are minimal or contradict the label, then the plan shall still include, at a minimum, instructions on the persons or entities to contact if: (1) there is a spill, leak, equipment failure, or other emergency at the application site during a fumigation that presents a risks to humans or domestic animals; or (2) anyone at the application site is experiencing symptoms of exposure.

The licensed/certified applicator, or a person under their supervision, must consult with local emergency responders at least annually to confirm the Emergency Response Plan conforms to their requirements, or, in the absence of such requirements, that the Emergency Response Plan contains the correct contact information.

10. The licensed/certified applicator, or a person under their supervision, must confirm the placement of warning placards around the fumigation site as described on the label. Placards should be placed to secure entrances and placed along other routes of approach into any site under fumigation and along the treatment and aeration buffer zone perimeters.

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11. The licensed/certified applicator, or a person under their supervision, must document the following:
- a. Credentials of the licensed/certified applicator in charge when the fumigant was introduced and when final clearance testing was completed (if different)
 - b. Credentials and/or names and contact information of all personnel members part of the fumigation/aeration prior to the introduction of the fumigant and at the time the commodity is aerated (if different)
 - c. The commodity or structure being fumigated
 - d. The target pest (if known)
 - e. The amount of fumigant introduced into the treatment area
 - f. Date and time of the fumigant introduction
 - g. Date and time final clearance testing completed
 - h. Monitoring specifications and results as noted in the “EMERGENCY PREPAREDNESS PROCEDURES” section of this label,
 - i. Details regarding the information disseminated to “**difficult to evacuate sites**” within 16 meters of the treatment and aeration buffer zones, as specified in the “EMERGENCY PREPAREDNESS PROCEDURES” section of this label and brochure.

This information may be documented on a form designated for this purpose or on supplemental documents such as those identified below, provided that each data point is documented in at least one location.

12. The licensed/certified applicator, or a person under their supervision, must confirm the required safety and monitoring/clearance equipment (including equipment required for entry into an area under fumigation) is in place and the necessary, trained fumigation handlers are available to complete a safe, effective fumigation.

It is important to note that some Fumigation Management Plans will be more comprehensive than others. All Fumigation Management Plans should reflect the experience and expertise of the licensed/certified applicator and circumstances at and around the site/structure and the treatment and aeration buffer zones. Elements of the FMP may be fulfilled through the use of supplemental documents such as fumigation logs, service reports, pesticide application records, facility maps, facility emergency plans, provincial or federally required forms, and other supplemental documents prepared for or used during the actual fumigation.

In addition to the development of the Fumigation Management Plan, the licensed/certified applicator must read the entire label and the brochure and follow its directions carefully. If the licensed/certified applicator has any questions about the development of a Fumigation Management Plan, contact the product manufacturer for further assistance.

RECORDKEEPING

The licensed/certified applicator's employer or the licensed/certified applicator supervising the fumigation must maintain all records required under the provisions of this label including the FMP and supplemental documents used to fulfill FMP requirements, information on incidents and complaints, and all air monitoring results for two years from the date of the fumigation. During the two-year period following a fumigation, these records must be made available upon request to any provincial, municipal, or federal pesticide enforcement personnel.

During the treatment and aeration buffer zone periods, the licensed/certified applicator must make a copy of the FMP and the associated SDS available for viewing by all fumigation handlers. The licensed/certified applicator must ensure the FMP is available upon request at the fumigation site while the treatment and aeration buffer zones are in effect.

Records of air monitoring results must include:

- Date of fumigation,
- Monitoring equipment used,
- Location and time of each required sample, and
- Concentration of methyl bromide found for each required sample.

Records of spills, equipment failures and other emergencies must include:

- Description of what happened
- Emergency procedures followed
- Whether the incident was reported to the provincial lead agency or other agency.

Records of complaints related to the fumigation received by the applicator during or after the fumigation must include:

- Contact information for the person filing the complaint
- Description of control measures or emergency procedures followed after the complaint, if any.

Records must be maintained and made available to Health Canada upon request. A copy of the records must be sent to the registrant at the end of the calendar year. These will be summarized (minus personal information such as name and location) and sent to the PMRA on annual basis.

XIII Add a “GUIDANCE FOR PREPARATION OF A FUMIGATION MANAGEMENT PLAN” section containing the following:

A Fumigation Management Plan (FMP) is an organized, written description of the required steps involved to help ensure a safe, legal and effective fumigation. It will also assist you and others in complying with pesticide product label requirements. The

guidance that follows is designed to help assist you in addressing all the necessary factors involved in preparing for and fumigating a structure and/or area.

This guidance is intended to help you organize any fumigation that you might perform, **PRIOR TO ACTUAL FUMIGATION**. It is meant to be somewhat prescriptive, yet flexible enough to allow the experience and expertise of the fumigator to make changes based on circumstances which may exist in the field. By following a step-by-step procedure, yet allowing for flexibility, a safe and effective fumigation can be performed.

Before any fumigation begins, carefully read and review the product label and the brochure. This information must also be given to the appropriate company officials (supervisors, foreman, safety officer, etc.) in charge of the site. Preparation is the key to any successful fumigation. If you do not find specific instructions for the type of fumigation that you are to perform listed in this Guidance Document, you will want to construct a similar set of procedures using this document as your guide or contact Lanxess Corporation for assistance. Finally, before any fumigation begins, you must be familiar with and comply with all applicable federal, provincial and municipal laws and regulations. The success of the fumigation is not only dependent on your ability to do your job but also upon carefully following all rules, regulations and procedures required by governmental agencies.

A CHECKLIST GUIDE FOR A FUMIGATION MANAGEMENT PLAN

This checklist is provided to help you take into account factors that must be addressed prior to performing all fumigations. It emphasizes safety steps to protect people and property. The checklist is general in nature and cannot be expected to apply to all types of fumigation situations. It is to be used as a guide to prepare the required Fumigation Management Plan. Each item must be included if it is applicable to the fumigation. However, it is understood that each fumigation is different and not all items will be necessary for each fumigation site.

A. PRELIMINARY PLANNING AND PREPARATION

1. Determine the purpose of the fumigation and ensure the application is (as defined by the Montreal Protocol): either a quarantine application, a pre-shipment application, or emergency use (or registration), or that the fumigation has a current Critical Use Exemption.
 - a. Control of insect infestation
 - b. Control of vertebrate pests
 - c. Plant pest quarantine
2. Determine the type of fumigation. For example:
 - a. Space: tarp, mill, warehouse, food processing plant,
 - b. Vehicle: railcar, truck, van, container
 - c. Commodity: raw agricultural or processed foods or non-food
 - d. Type of storage: vertical silo, farm storage, flat storage, etc.
 - e. Vessels: ship or barge. In addition to the brochure, read the Cargo, Fumigation and Tackle Regulations under the *Canada Shipping Act*.

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3. Fully acquaint yourself with the site and commodity to be fumigated, including:
 - a. The general structure layout, construction (materials, design, age, maintenance), of the structure, fire or combustibility hazards, connecting structures and escape routes, above and below ground, and other unique hazards or structural characteristics. Prepare, with the owner/operator/person in charge, a drawing or sketch of structure to be fumigated, delineating features, hazards, and other structural characteristics.
 - b. The number and identification of persons who routinely enter the area to be fumigated (employees, visitors, customers, etc.)
 - c. The specific commodity to be fumigated, its mode of storage, and its condition.
 - d. The previous fumigation/treatment history of the commodity, if available.
 - e. Accessibility of utility service connections
 - f. Nearest telephone or other means of communication. Mark the location of these items on the drawing/sketch.
 - g. Emergency shut-off stations for electricity, water and gas. Mark the location of these items on the drawing/sketch.
 - h. Current emergency telephone numbers of local health, fire, police, hospital and physician responders.
 - i. Name and phone number (both day and night) of appropriate company officials.
 - j. Check, mark and prepare the points of fumigant application locations if the job involves entry into the structure for fumigation.
 - k. Location of command centre
 - l. Exposure time considerations:
 - i. Product to be used
 - ii. Minimum treatment period, as defined and described by the label use directions.
 - iii. Down time required to be available
 - iv. Aeration requirements
 - v. Clean-up requirements, including dry or wet deactivation methods, equipment, and personnel needs, if necessary.
 - vi. Measured and recorded commodity temperature and moisture
 - m. Determination of dosage:
 - i. Cubic footage or other appropriate space/location calculations
 - ii. Structure sealing capability and methods
 - iii. Label recommendations
 - iv. Temperature, humidity, wind
 - v. Commodity/space volume
 - vi. Past history of fumigation of the site/structure
 - vii. Exposure time
 - viii. Amount of fumigant used
 - ix. Actual concentration achieved
 - n. Distance to other on-site and neighbouring off-site structures, recreational areas or areas where bystanders may be exposed.
 - o. Site of aeration vent(s) to be opened to aerate site/structure.
 - p. Treatment and aeration buffer zone requirements, including provisions for areas

not under the control of the owner/operator of the application site (e.g., agricultural areas, roads and rights of way, publicly owned and/or operated areas, “**difficult to evacuate**” sites and other “**residential areas**”).

B. PERSONNEL

1. Confirm in writing that all personnel in and around the site to be fumigated have been notified prior to application of the fumigant. Consider using a checklist that each employee initials indicating they have been notified.
2. Instruct all fumigation personnel to read the brochure concerning the hazards that may be encountered, and about the selection of personal protection devices, including sufficiently sensitive detection equipment.
3. Confirm that all personnel are aware of and know how to proceed in case of an emergency situation.
4. Instruct all personnel on how to report any accident and/or incidents related to fumigant exposure. Provide a telephone number for emergency response reporting.
5. Instruct all personnel to report to proper authorities any theft of fumigant and/or equipment related to fumigation.
6. Establish a meeting area for all personnel in case of an emergency.

C. MONITORING

1. Safety
 - a. Scheduled ambient air monitoring of methyl bromide concentrations must be conducted, downwind, along the treatment and aeration buffer zone perimeters to prevent exposure of unprotected workers and bystanders to concentrations of methyl bromide greater than 1.0 ppm*** and to determine where exposures may occur. It may be necessary to monitor gas levels in other areas as well. Document where monitoring will occur.
 - b. Monitor (and record) the wind direction and adjust the methyl bromide monitoring if wind direction changes over the fumigation/aeration period.
 - c. Keep a log or manual of monitoring records for each fumigated site and the treatment and aeration buffer zones. This log must, at a minimum, contain the monitoring equipment used, location and timing of each sample, number of readings taken and level of concentrations found in each location.
 - d. When monitoring, document any methyl bromide level even if it is present at or below the limit of detection.
 - e. From the beginning of the fumigant application and until the end of the treatment period, the licensed/certified applicator(s) and the applicator/handler or persons under their supervision must periodically monitor (i.e., according to a

schedule made by the licensed/certified applicator as per site characteristics and environmental conditions as stated in the **Fumigation Management Plan**) methyl bromide levels at several locations along the treatment and aeration buffer zone perimeters. During aeration, the licensed/certified applicator must periodically monitor (i.e., according to a schedule made by the licensed/certified applicator as per site characteristics and environmental conditions as stated in the **Fumigation Management Plan**) methyl bromide levels at several locations along the treatment and aeration buffer zone perimeters.

Only if necessary, should workers be present in the treatment and aeration buffer zones. All workers present in the buffer zones during the fumigation or aeration periods **MUST** wear appropriate respiratory protection, as outlined in the brochure – “**Respirator Requirements and Work Time Restrictions**” section.

*****NOTE: An evacuation action may be necessary when methyl bromide levels exceed 1.0 ppm.** To determine methyl bromide levels, readings may be taken using a real-time detection device or a direct reading detection device with a sensitivity of at least **0.5 ppm**.

D. NOTIFICATION

1. Confirm all the appropriate local authorities (fire departments, police departments, etc.) have been notified as per label instructions, local ordinances, or instructions of the client.

Prepare written procedure (“Emergency Response Plan”), which contains explicit instructions, names, and telephone numbers so as to be able to notify local authorities if methyl bromide levels are exceeded in an area that could be dangerous to bystanders and/or domestic animals. Elaborate in this section the key elements of an Emergency Response Plan including reference to evacuation procedures. Evacuation procedures must take into consideration any “**difficult to evacuate**” sites, which may take longer to evacuate. Difficult-to-evacuate sites are defined as schools (preschool to grade 12), provincially licensed day care centres, nursing homes, assisted living facilities, hospitals, in-patient clinics, and prisons.

E. SEALING PROCEDURES

1. Sealing must be adequate to control the pests. Care should be taken to ensure that sealing materials will remain intact until the fumigation is complete.
2. If the site has been fumigated before, review the previous Fumigation Management Plan for previous sealing information.
3. Make sure that construction/remodeling has not changed the site/structure in a manner that will affect the fumigation.

4. Warning placards must be placed to secure any entrance into the fumigated site and along other likely routes of approach.

F. APPLICATION PROCEDURES AND TREATMENT PERIOD

1. Plan carefully and apply the product in accordance with the label requirements.
2. At least two persons, a licenced/certified applicator and trained person, or two persons trained in accordance with the label and the brochure working under the direct supervision of the licenced/certified applicator must be present during fumigation of structures when entry into the structure for application of the fumigant is required. Appropriate respiratory protection, as outlined in the “**Respirator Requirements and Work Time Restrictions**” section MUST be worn at all times during delivery/dispensing of product, while attending to spills and leaks and while monitoring methyl bromide levels.
3. Apply fumigant from the outside when and where appropriate. Large-scale fumigations may require the posting of a police officer or guard to prevent entry into the site under fumigation and the treatment and aeration buffer zones. Refer to provincial pesticide regulations.
4. When entering sites/structures, always follow applicable provincial legislation for confined spaces.
5. Document that the receiver of transport vehicles shipped piggyback by rail and/or shipping containers fumigated in-transit has been notified.
6. Turn off any electric lights in the fumigated site and/or structure, as well as all non-essential electrical motors.

G. POST-APPLICATION OPERATIONS

1. Large-scale fumigations may require the posting of a police officer or guard to prevent entry into the site under fumigation and the treatment and aeration buffer zones. Refer to provincial pesticide regulations.
2. Ventilate and aerate the fumigated site in accordance with site and/or structural limitations and nearby occupied areas so as to minimize bystander exposure.
3. Turn on ventilating or aeration fans, where appropriate.
4. Determine methyl bromide concentration in the fumigated environment from outside if possible. As much as possible limit exposure, for example, by using monitoring equipment that measures indoor concentrations and displays results outside of the fumigated site. Use a sufficiently sensitive gas detector before entry into a fumigated site and/or structure to determine fumigant concentration.

5. During aeration, monitor gas levels periodically (i.e., according to a schedule made by the licensed/certified applicator as per site characteristics and environmental conditions as stated in the **Fumigation Management Plan**) until the fumigated site and/or structure is ready for entry.
 6. Keep written records of monitoring to document completion of aeration.
 7. Consider temperature when aerating.
 8. Ensure that aeration is complete before moving treated transport vehicles onto public roads.
 9. The warning signs/placards may only be removed by the licensed/certified applicator (or someone under their supervision) only after aeration of the fumigated site is complete and the methyl bromide level is at or below 1.0 ppm in the fumigated site and the aeration buffer zone as determined by using a detection device with a sensitivity of at least **0.5 ppm**.
 10. Inform business/client that employees/other persons may return to work or otherwise be allowed to enter the aerated site and/or structure.
- XIV Replace the “**COMMODITY, FOOD, AND FEED FUMIGATION DIRECTIONS**” section with a “**PRECAUTIONARY PROCEDURES FOR ALL USES**” section containing the following:

The following precautionary procedures are required for all uses:

This product is only to be used for control of pests for quarantine/regulatory commodity fumigation only and applications must only be (as defined by the Montreal Protocol) either a (1) quarantine application (treatment is intended to prevent the spread of, or to control or eradicate, pests of quarantine significance, and required by the laws of the importing country as a condition of entry, or under Canadian law), a (2) pre-shipment application (treatment within 21 days prior to export of a commodity or product that is to be entirely exported to another country where such treatment is required by the importing country or in support of Canada’s sanitary or phytosanitary programs), a (3) Critical Use Exemption granted under the Montreal Protocol, or an (4) emergency registration. If monitoring indicates concentration of fumigant is insufficient to be effective for the target pest, additional fumigant may be added as required; but concentration is not to exceed the maximum dosage at the time of application.

Methyl bromide is a highly hazardous material and should only be used by individuals trained in its proper use, the use of the required respiratory equipment and detector devices and emergency procedures. Before using, read and understand the entire label and this brochure and follow all precautions, safety recommendations and directions. 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), at least two persons, a licensed/certified applicator, and a trained person, or two persons trained in accordance with the label and the brochure working under direct supervision of the licensed/certified applicator, or licensed in the use of this product must be present during the treatment period, introduction of the fumigant, at the initiation of aeration, and after aeration when testing for re-entry. All fumigation handlers must be under direct on-site supervision of the certified/licensed applicator at the start of the fumigation, at the initiation of aeration, or when testing for re-entry into the treatment area until the commodity/structure is fully aerated (methyl bromide concentrations are ≤ 1.0 ppm). Only one fumigation handler needs to be present if monitoring is conducted remotely (from outside the treatment area).

Methyl bromide is to be used only in **non-residential structures**. Refer to the **TERMS USED IN THIS LABEL**.

When fumigating tanks, silos, etc., of stored bulk flour, empty or draw down flour to less than one-half meter deep. Do not introduce liquid methyl bromide into flour storages. Set up fans or air circulation to avoid localized high concentrations of methyl bromide when shooting gaseous methyl bromide into the storage. Do not overdose flour storages. It is recommended that the fumigant be applied outside flour storages that are inside buildings and allowed to drift in through open hatches.

Treatment and aeration buffer zone must be established for all fumigated sites as per the instructions outlined in the “**Treatment and Aeration Buffer Zones**” section. All workers present in the buffer zones **MUST** wear appropriate respiratory protection, as outlined in the “**Respirator Requirements and Work Time Restrictions**” and “**Treatment & Aeration Buffer Zone Requirements**” sections.

A Fumigant Management Plan (FMP) must be written for all fumigations prior to actual fumigation and must be devised for application, aeration and disposal of the fumigant so as to keep exposures to methyl bromide to a minimum. Refer to the “**Site-Specific Fumigation Management Plan**” section.

Observe all precautionary and safety statements mentioned elsewhere in this brochure.

Appendix IV Summary of methyl bromide treatment and Aeration Buffer Zones

The following tables summarize the minimum and maximum buffer zone distances for scenarios varying across multiple parameters (in other words, treatment/aeration length, application rate, enclosure size, aeration type, stack height, and air exchange rate). These tables do not include the values for retention rate that would otherwise determine the exact buffer zone distance for each scenario.

The minimum buffer zone distance is 3 metres for all scenarios.

Rounding Instructions

When a parameter's value is not listed in the table exactly, use the following rounding instructions to determine the value based on the type of table:

For Treatment Buffer Zone tables:

- When the specific application rate or enclosure size is not listed in the buffer zone tables, round-up to the nearest rate or size.
- Vacuum chambers are assumed to retain 99% of methyl bromide. Plant Protection and Quarantine (PPQ) approved pressure-tested enclosures are assumed to retain at least 99% of methyl bromide. Untested enclosures are assumed to retain 90% of methyl bromide.

For Aeration Buffer Zone tables:

- When the enclosure size or the application rate is not listed in the buffer zone tables, round-up to the nearest enclosure size or application rate to calculate the aeration buffer zone distance.
- When the air exchange rate or stack height is not specifically listed in the buffer zone tables, round-down to the nearest air exchange rate or stack height. The minimum air exchange rate provided is 0.1 air exchanges per hour. For air exchange rates below 0.1, use the Passive Aeration buffer zone tables.
- For attached stacks, measured from the base of the roof of the enclosure. For open-area stacks, measured from the ground. The open-area vertical stack height must be at least 2 metres, as measured from the ground level to the top of the stack, to be included in this category.
- Vacuum chambers are assumed to retain 99% of methyl bromide. PPQ-approved pressure-tested enclosures are assumed to retain at least 99% of methyl bromide. Untested enclosures are assumed to retain 90% of methyl bromide.

Health Canada is proposing methyl bromide treatment and aeration buffer zones based on the ones implemented by the USEPA. As a result, conversion of values from imperial to metric units was required. Values were rounded to reflect the scale in the original tables. Specifically:

- Stack height was rounded to the nearest metre
- Application rate was rounded to the nearest half (0.5) kg/100 m³

- Enclosure size was rounded to the nearest 10 m³
- Buffer zone distance was rounded to the nearest metre

Treatment buffer zones

Treatment Buffer Zone (≤ 8 hours treatment time)			
Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
1.5–6.5	30–7080	3	3
12–14.5	30–710, 2830–7080	3	3
	1420	3	21
24	30, 140–280, 2830–7080	3	3
	60	3	5
	710	3	15
	1420	3	43

Treatment Buffer Zone (> 8 hours treatment time)			
Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
1.5	30–141580	3	3
	212380	3	55
	283170	3	93
3	30–70790	3	3
	141580	3	105
	212380	3	166
	283170	3	218
5	30–21240	3	3
	28320	3	24
	70790	3	72
	141580	3	172
	212380	3	247
	283170	3	312
6.5	30–14160	3	3
	21240	3	27
	28320	3	56
	70790	3	113
	141580	3	227
	212380	3	317
	283170	3	396
	30–280, 2830–7080	3	3
12 - 14.5	710	3	6
	1420	3	23
	14160	3	73

Treatment Buffer Zone (> 8 hours treatment time)			
Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
	21240	3	117
	28320	3	154
	70790	3	258
	141580–283170	3	439
24	30, 280, 2830	3	3
	60	3	5
	140	3	6
	710	3	20
	1420	3	38
	7080	3	56
	14160	3	133
	21240	3	189
	28320	3	236
	70790	3	392
	141580–283170	3	439

Aeration buffer zones

Aeration time	Aeration method	Stack height	Buffer zone table
≤ 8 Hours	Passive	N/A	Use Treatment Buffer Zone (≤ 8 hours treatment time) table
	Active Aeration – Attached Vertical Stacks	0 metres	Use Aeration Buffer Zone (≤ 8 hours aeration time) – active aeration – Open-area vertical stacks – 2 metres table
	Active Aeration – Attached Vertical Stacks	2 metres	Use Aeration Buffer Zone (≤ 8 hours aeration time) – active aeration – Open-area vertical stacks – 2 metres table
> 8 hours	Passive	N/A	Use Treatment Buffer Zone (> 8 hours treatment time) table
	Active Aeration – Attached Vertical Stacks	0 metres	Use Aeration Buffer Zone (> 8 hours aeration time) – active aeration – Open-area vertical stacks – 2 metres table
	Active Aeration – Attached Vertical Stacks	2 metres	Use Aeration Buffer Zone (> 8 hours aeration time) – active aeration – Open-area vertical stacks – 2 metres table

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Attached vertical stacks – 3 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
1	1.5, 3, 5, 6.5, 8	30–7080	3	3	
		12	30–710, 2830	3	3
			1420	3	80
			7080	3	160
	24	30–60, 280, 2830	3	3	
		140	3	20	
		710	3	105	
		1420	3	225	
5	1.5–12	30–7080	3	3	
		30–710, 2830	3	3	
	24	1420	3	125	
		7080	3	345	
10–70	1.5–24	30–7080	3	3	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration - Attached vertical stacks – 3 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
1	1.5, 3, 5, 6.5, 8	30–7080	3	3	
		12	30–710, 2830	3	3
			1420	3	80
			7080	3	160
	24	30–60, 280, 2830	3	3	
		140	3	20	
		710	3	105	
		1420	3	225	
5	1.5–12	30–7080	3	3	
		30–710, 2830	3	3	
	24	1420	3	125	
		7080	3	345	
10–70	1.5–24	30–7080	3	3	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration - Attached vertical stacks – 15 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
1	1.5–12	30–7080	3	3
	24	30–2830	3	3
		7080	3	235
5–70	1.5–24	30–7080	3	3

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Open-area vertical stacks – 2 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
5	1.5	30–60, 710–7080	3	3	
		140	3	5	
		280	3	10	
	3	3	30–60	3	3
			140	3	15
			280	5	20
			710	3	10
			1420	3	25
			2830	3	50
			7080	3	105
	5	5	30	3	3
			60	3	5
			140	5	15
			280	10	25
			710	3	30
			1420	3	55
			2830	3	90
			7080	3	160
	6.5	6.5	30	3	3
			60	3	10
			140	5	20
280			10	35	
710			3	45	
1420			3	75	
2830			3	115	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Open-area vertical stacks – 2 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
	8	7080	3	230	
		30	3	3	
		60	3	15	
		140	10	25	
		280	10	40	
		710	3	60	
		1420	3	90	
		2830	3	150	
		7080	3	310	
	12	30	3	5	
		60	3	20	
		140	10	40	
		280	15	55	
		710	5	80	
		1420	20	150	
		2830	40	250	
		7080	95	470	
	24	30	3	25	
		60	10	45	
		140	20	75	
		280	30	110	
		710	40	185	
		1420	70	310	
		2830	110	480	
		7080	205	870	
	10	1.5	30–60, 280–7080	3	3
			140	3	5
		3	30, 280–7080	3	3
60			3	5	
140			3	10	
5		30, 710–7080	3	3	
		60	3	10	
		140	3	15	
		280	3	10	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Open-area vertical stacks – 2 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
	6.5	30, 710–7080	3	3
		60	3	10
		140	5	20
		280	3	15
	8	30	3	5
		60	3	15
		140	5	20
		280	3	25
		710–7080	3	3
	12	30	3	10
		60	5	20
		140	10	30
		280	3	40
		710	3	3
		1420	3	75
		2830	3	125
	24	7080	3	220
		30	3	20
		60	10	35
		140	15	55
		280	15	75
710		3	110	
1420		3	215	
2830		3	360	
20	7080	3	675	
	1.5	30–7080	3	3
	3–5	30, 140–7080	3	3
		60	3	5
	6.5	30	3	5
		60	3	10
		140–7080	3	3
	8	30	3	5
		60–140	3	10
		280–7080	3	3
12	30	3	10	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Open-area vertical stacks – 2 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		60	5	15	
		140	3	15	
		280–7080	3	3	
	24		30	5	20
			60	10	30
			140–280	3	40
			710–7080	3	3
50	1.5–6.5	30–7080	3	3	
	8	30	3	5	
		60–7080	3	3	
	12	30	3	10	
		60–7080	3	3	
	24	30	3	15	
		60	3	10	
140–7080		3	3		
70	1.5–8	30–7080	3	3	
	12	30	3	5	
		60–7080	3	3	
	24	30	3	10	
		60–7080	3	3	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration - Attached vertical stacks – 8 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
1	1.5–12	30–7080	3	3
	24	30–2830	3	3
		7080	3	235
5–70	1.5–24	30–7080	3	3

Aeration buffer zone (≤ 8 hours aeration time) – Active aeration - Attached vertical stacks – 15 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
1	1.5–12	30–7080	3	3
	24	30–2830	3	3
		7080	3	235
5–70	1.5–24	30–7080	3	3

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Open-area vertical stacks – 3 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
5	1.5–3	30–7080	3	3	
		5	30, 280–1420	3	3
	6.5	6.5	60	3	5
			140	3	10
			2830	3	50
			7080	3	135
			30	3	5
			60	3	10
			140–280	3	15
			710	3	3
			1420	3	30
			2830	3	95
	7080	3	185		
	8	8	30	3	5
			60	3	10
			140	3	20
			280	3	25
			710	3	3
			1420	3	70
			2830	3	125
			7080	3	245
	12	12	30	3	10
			60	3	15
			140	3	30
			280	3	40

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Open-area vertical stacks – 3 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		710	3	65	
		1420	3	115	
		2830	3	205	
		7080	3	415	
	24		30	5	15
			60	10	30
			140	15	50
			280	15	75
			710	3	145
			1420	3	265
			2830	90	450
			7080	175	815
	10	1.5–6.5	30–7080	3	3
8		30–60	3	5	
		140–7080	3	3	
12			30–60	3	10
			140	3	15
			280–2830	3	3
			7080	3	180
24			30	3	15
			60	3	25
			140	3	40
			280	3	60
			710	3	85
			1420	3	150
	2830		3	290	
	7080		3	600	
20	1.5–12	30–7080	3	3	
	24	30	3	10	
		60	3	15	
		140–7080	3	3	
50–70	1.5–24	30–7080	3	3	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Open-area vertical stacks – 8 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
5	1.5–6.5	30–7080	3	3
		30–2830	3	3
		7080	3	135
	12	30–2830	3	3
		7080	3	260
	24	30–710	3	3
		1420	3	140
2830		3	255	
	7080	3	670	
10	1.5–12	30–7080	3	3
	24	30–2830	3	3
		7080	3	340
20–70	1.5–24	30–7080	3	3

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Open-area vertical stacks – 15 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
5	1.5–12	30–7080	3	3
	24	30–2830	3	3
		7080	3	360
10–70	1.5–24	30–7080	3	3

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Horizontal stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
0.1	1.5	30–280	3	3
		710	3	6
		1420	3	9
		2830	3	14
		7080	3	24
	3	30–140	3	3
		280	3	6
		710	3	11

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Horizontal stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		1420	3	17	
		2830	3	24	
		7080	3	46	
	5	30–60	30–60	3	3
			140	3	5
			280	3	8
			710	3	15
			1420	3	23
			2830	3	37
			7080	3	66
			6.5	30–60	30–60
	140	3			6
	280	3			11
	710	3			18
	1420	3			29
	2830	3			46
	8, 12, or 14.5	30–60	30	3	3
			60	3	6
			140	3	12
			280	3	20
			710	3	35
			1420	3	55
			2830	3	85
			7080	3	149
	24	30–60	30	3	3
			60	3	9
			140	3	18
			280	3	29
			710	3	52
			1420	3	79
2830			3	120	
7080			3	210	
0.2	1.5	30–280	3	3	
		710	3	6	
		1420	3	11	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Horizontal stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
		2830	3	17
		7080	3	30
	3	30–60	3	3
		140	3	5
		280	3	8
		710	3	14
		1420	3	20
		2830	3	32
		7080	3	58
		5	30–60	3
	140		3	8
	280		3	11
	710		3	18
	1420		3	29
	2830		3	46
	7080		3	84
	6.5	30	3	3
		60	3	5
		140	3	9
		280	3	14
		710	3	24
		1420	3	38
		2830	3	59
		7080	3	107
	8, 12, or 14.5	30	3	5
		60	3	9
		140	3	17
		280	3	26
		710	3	47
		1420	3	72
2830		3	111	
7080		3	195	
24	30	3	8	
	60	3	14	
	140	3	24	
	280	3	38	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Horizontal stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		710	3	67	
		1420	3	104	
		2830	3	157	
		7080	5	274	
0.5	1.5	30–280	3	3	
		710	3	6	
		1420	3	12	
		2830	3	20	
		7080	3	35	
	3	30–60	140	3	5
			280	3	8
			710	3	15
			1420	3	23
			2830	3	35
			7080	3	66
			5	30	60
	140	3			8
	280	3			12
	710	3			21
	1420	3			34
	2830	3			53
	7080	3			96
	6.5	30			60
			140	3	11
			280	3	15
			710	3	27
			1420	3	44
			2830	3	69
			7080	3	126
			8, 12, or 14.5	30	60
	140	3			20
	280	3			32
710	3	6			

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Horizontal stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		710	3	56	
		1420	3	87	
		2830	3	134	
		7080	3	235	
	24		30	3	11
			60	3	17
			140	3	30
			280	3	47
			710	3	82
			1420	3	125
			2830	3	191
			7080	6	331
	1	1.5	30–280	3	3
			710	3	6
1420			3	12	
2830			3	18	
7080			3	32	
3			30–140	3	3
			280	3	6
			710	3	14
			1420	3	21
			2830	3	35
			7080	3	62
5			30–60	3	3
			140	3	6
			280	3	11
			710	3	20
			1420	3	32
			2830	3	50
			7080	3	91
6.5			30	3	3
			60	3	5
			140	3	9
	280		3	15	
	710		3	26	
	1420		3	43	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Horizontal stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		2830	3	66	
		7080	3	120	
	24		30	3	11
			60	3	17
			140	3	30
			280	3	47
			710	3	84
			1420	3	128
			2830	3	198
			7080	6	344
	8, 12, or 14.5		30	3	8
			60	3	12
			140	3	20
			280	3	30
			710	3	56
			1420	3	87
			2830	3	134
			7080	3	239
2	1.5	30–280	3	3	
		710	3	5	
		1420	3	11	
		2830	3	17	
		7080	3	27	
	3		30–140	3	3
			280	3	5
			710	3	12
			1420	3	20
			2830	3	30
			7080	3	56
	5		30–140	3	3
			280	3	9
			710	3	18
			1420	3	29
			2830	3	47
			7080	3	82
	6.5		30–60	3	3

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Horizontal stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
		140	3	8
		280	3	14
		710	3	24
		1420	3	40
		2830	3	61
		7080	3	110
	8, 12, or 14.5	30	3	6
		60	3	11
		140	3	18
		280	3	29
		710	3	52
		1420	3	79
		2830	3	123
	24	30	3	11
		60	3	17
		140	3	29
		280	3	44
		710	3	79
		1420	3	120
		2830	3	181
	10	1.5	30–7080	3
3		30–280, 7080	3	3
		710	3	8
		1420–2830	3	9
5		30–140	3	3
		280	3	6
		710	3	12
		1420	3	15
		2830–7080	3	18
6.5		30–140	3	3
		280	3	8
		710	3	15
		1420	3	21
		2830	3	29

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – Horizontal stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
	8, 12, or 14.5	7080	3	40
		30–60	3	3
		140	3	12
		280	3	18
		710	3	34
		1420	3	53
		2830	3	82
		7080	3	145
	24	30	3	5
		60	3	11
		140	3	20
		280	3	32
		710	3	58
		1420	3	90
		2830	3	140
		7080	3	247

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – No stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
0.1	1.5–6.5	30–7080	3	3
	8, 12, or 14.5	30, 140–280, 2830–7080	3	3
		60	3	5
		710	3	17
		1420	3	44
	24	30	3	5
		60	3	8
		140	3	12
		280, 2830	3	3
		710	3	38
1420		3	72	
7080		3	119	
0.2	1.5 - 3	30–7080	3	3
	5	30–710, 2830–7080	3	3
		1420	3	17

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – No stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
	6.5	30, 140–710, 2830–7080	3	3	
		60	3	5	
		1420	3	30	
	8, 12, or 14.5	30	3	5	
		60	3	8	
		140	3	11	
		280, 2830	3	3	
		710	3	37	
		1420	3	69	
		7080	3	111	
		24	30	3	8
	60		3	12	
	140		3	18	
	280		3	23	
	710		3	61	
	1420		3	101	
	2830		3	3	
	7080		3	213	
	0.5	1.5	30–7080	3	3
		3	30–710, 2830–7080	3	3
			1420	3	18
5		30, 140–710, 2830–7080	3	3	
		60	3	5	
		1420	3	37	
6.5		30	3	5	
		60–140	3	6	
		280, 2830–7080	3	3	
		710	3	21	
		1420	3	49	
8, 12, or 14.5		30	3	8	
		60	3	11	
		140	3	18	
		280	3	20	
		710	3	55	
		1420	3	91	
		2830	3	3	

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – No stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
		7080	3	195
	24	30	3	11
		60	3	15
		140	3	27
		280	3	40
		710	3	81
		1420	3	130
		2830	3	117
		7080	3	297
1		1.5	30–7080	3
	3	30–710, 2830–7080	3	3
		1420	3	29
	5	30, 280, 2830–7080	3	3
		60–140	3	5
		710	3	20
		1420	3	44
	6.5	30	3	5
		60	3	6
		140	3	9
		280, 2830	3	3
		710	3	29
		1420	3	56
		7080	3	69
		8, 12, or 14.5	30	3
	60		3	12
	140		3	20
	280		3	26
	710		3	62
	1420		3	102
	2830		3	3
	7080		3	221
	24		30	3
		60	3	18
		140	3	32
		280	3	46
		710	3	90

Aeration Buffer Zone (≤ 8 hours aeration time) – Active aeration – No stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
2		1420	3	142	
		2830	3	146	
		7080	3	328	
	2	1.5	30–7080	3	3
		3	30, 140–710, 2830–7080	3	3
			60	3	5
			1420	3	34
		5	30	3	5
			60	3	6
			140	3	8
			280, 2830–7080	3	3
			710	3	24
			1420	3	49
		6.5	30	3	5
			60	3	8
			140	3	11
			280, 2830	3	3
			710	3	34
			1420	3	59
			7080	3	99
		8, 12, or 14.5	30	3	9
			60	3	14
			140	3	23
			280	3	30
			710	3	64
			1420	3	102
			2830	3	81
7080			3	218	
24		30	3	12	
		60	3	20	
	140	3	34		
	280	3	49		
	710	3	91		
	1420	3	140		
	2830	3	157		
7080	3	314			

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Attached vertical stacks – 8 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
1	1.5–5	30–14160	3	3
		30–7080	3	3
	6.5	14160	3	135
		30–7080	3	3
	8	14160	3	205
		30–7080	3	3
	12	14160	3	255
		30–7080	3	3
		14160	3	255
24	30–2830	3	3	
	7080	3	255	
	14160	3	510	
5	1.5–8	30–14160	3	3
		30–7080	3	3
	12	14160	3	290
		30–7080	3	3
	24	14160	3	585
10, 50–70	1.5–24	30–7080	3	3
20	1.5	30–710, 2830–7080	3	3
		1420	3	5
	3–24	30–7080	3	3

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Attached vertical stacks – 15 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
1	1.5–5	30–7080	3	3
		30–7080	3	3
	6.5	14160	3	135
		30–7080	3	3
	8	14160	3	205
		30–7080	3	3
	12	14160	3	255
		30–7080	3	3
	24	14160	3	405
30–7080		3	3	

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Attached vertical stacks – 15 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
5–10, 50–70	1.5–24	30–7080	3	3
20	1.5	30–710, 2830–7080	3	3
		1420	3	5
	3–24	30–7080	3	3

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 2 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
5	1.5	30–60, 710–14160	3	3	
		140–280	3	10	
	3	3	30, 710	3	3
			60	3	5
			140, 1420	3	15
			280	5	20
			2830	3	55
			7080	3	110
			14160	3	165
	5	5	30	3	3
			60	3	10
			140	5	20
			280	10	30
			710	3	35
			1420	3	60
			2830	3	100
			7080	3	175
	6.5	6.5	30	3	3
			60	3	15
			140	10	25
			280	10	40
			710	3	55
			1420	3	85

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 2 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		2830	3	135	
		7080	3	225	
		14160	3	330	
	8		30	3	3
			60	3	15
			140	10	30
			280	15	45
			710	3	65
			1420	3	105
			2830	3	160
			7080	3	270
			14160	3	395
			12		30
	60	5			25
	140	15			45
	280	20			60
	710	3			95
	1420	3			145
	2830	40			215
	7080	100			360
	14160	150			520
	24		30	3	25
			60	10	40
			140	25	65
			280	35	95
			710	50	150
			1420	80	225
			2830	125	335
			7080	215	545
	10	1.5	30–60, 280–14160	3	3
140			3	5	
3		30, 280–14160	3	3	
		60	3	5	

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 2 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
	5	140	3	10
		30, 710–14160	3	3
		60, 280	3	10
	6.5	140	3	15
		30	3	5
		60, 280	3	15
		140	5	20
	8	710–14160	3	3
		30	3	5
		60	3	15
		140	5	25
		280	3	25
	12	710–14160	3	3
		30	3	10
		60	5	20
		140	10	40
		280	3	45
		710	3	3
		1420	3	85
		2830	3	135
		7080	3	235
	24	14160	3	345
		30	5	25
		60	10	40
		140	20	60
		280	15	85
		710	3	125
		1420	3	195
2830		3	285	
7080		3	475	
20	14160	3	690	
	1.5	30–14160	3	3
	3	30, 140–14160	3	3
		60	3	5
5–6.5	30	3	5	

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 2 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		60	3	10	
		140–14160	3	3	
	8		30	3	10
			60	3	15
			140–14160	3	3
	12		30	3	10
			60	5	20
			140	3	15
			280–14160	3	3
	24		30	5	20
			60	10	35
			140–280	3	45
			710–14160	3	3
50	1.5–6.5	30–14160	3	3	
	8	30	3	5	
		60–14160	3	3	
	12	30	3	10	
		60–14160	3	3	
	24	30	3	15	
		60	3	10	
140–14160		3	3		
70	1.5–12	30–14160	3	3	
	24	30	3	10	
		60–14160	3	3	

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 3 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
5	1.5	30–14160	3	3	
		30–7080	3	3	
	3		14160	3	105
			30	3	5
			60–140	3	10
			280–1420	3	3

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 3 metres					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		2830	3	55	
		7080	3	150	
		14160	3	235	
	6.5		30	3	5
			60	3	10
			140	3	15
			280	3	20
			710	3	3
			1420	3	50
			2830	3	110
			7080	3	210
			14160	3	315
			8		30
	60	3			15
	140	3			20
	280	3			30
	710	3			3
	1420	3			85
	2830	3			145
	7080	3			260
	14160	3			380
	12		30	3	10
			60	3	20
			140	3	35
			280	3	50
			710	3	80
			1420	3	135
			2830	3	205
			7080	3	350
	24		30	5	20
60			10	35	
140			15	60	
280			15	90	
710			3	145	

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 3 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
		1420	3	220
		2830	100	330
		7080	195	540
		14160	295	790
10	1.5–6.5	30–14160	3	3
	8	30	3	5
		60	3	10
		140–14160	3	3
	12	30	3	10
		60–140	3	15
		280–2830	3	3
		7080	3	195
		14160	3	305
	24	30	3	20
		60	3	30
		140	3	50
		280	3	70
		710	3	100
		1420	3	175
		2830	3	270
7080		3	460	
14160	3	670		
20	1.5–12	30–14160	3	3
	24	30–60	3	15
		140–14160	3	3
50–70	1.5–24	30–14160	3	3

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 8 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
5	1.5–5	30–14160	3	3
	6.5	30–7080	3	3
		14160	3	235
	8	30–2830	3	3

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 8 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
		7080	3	175
		14160	3	325
	12	30–1420	3	3
		2830	3	135
		7080	3	310
		14160	3	475
	24	30–710	3	3
		1420	3	180
		2830	3	295
		7080	3	520
14160		205	770	
10	1.5–12	30–14160	3	3
	24	30–2830	3	3
		7080	3	395
		14160	3	610
20–70	1.5–24	30–14160	3	3

Aeration buffer zone (> 8 hours aeration time) – Active aeration - Open-area vertical stacks – 15 metres				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
5	1.5–8	30–14160	3	3
	12	30–7080	3	3
		14160	3	350
	24	30–2830	3	3
		7080	3	440
		14160	3	695
10	1.5–12	30–14160	3	3
	24	30–7080	3	3
		14160	3	420
20–70	1.5–24	30–14160	3	3

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - No stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
0.1	1 or 1.5	30–7080	3	3	
		28320	3	29	
	2.5 or 3	70790	3	67	
		141580	3	137	
		283170	3	242	
		5	30–14160	3	3
			21240	3	40
	28320		3	59	
	70790		3	108	
	141580		3	200	
	283170		3	335	
	6.5	30–710, 2830–7080	3	3	
			1420	3	11
		14160	3	34	
		21240	3	61	
		28320	3	81	
		70790	3	143	
		141580	3	251	
		283170	3	416	
	14.5	30–280, 2830	3	3	
			710	3	14
		1420	3	27	
		7080	3	44	
		14160	3	94	
		21240	3	136	
		28320	3	169	
		70790	3	280	
		141580–283170	3	439	
	24	30, 2830	3	3	
			60	3	5
		140–280	3	8	
		710	3	24	
		1420	3	43	

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - No stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		7080	3	81	
		14160	3	149	
		21240	3	204	
		28320	3	248	
		70790	3	411	
		141580–283170	3	439	
0.2	1 or 1.5	30–28320	3	3	
		70790	3	37	
		141580	3	85	
		283170	3	143	
	2.5 or 3	30–14160	3	3	
		21240	3	35	
		28320	3	50	
		70790	3	91	
		141580	3	151	
		283170	3	239	
	5	30–710, 2830–7080	30–710, 2830–7080	3	3
			1420	3	9
			14160	3	38
			21240	3	58
			28320	3	73
			70790	3	126
			141580	3	204
			283170	3	312
	6.5	30–280, 2830–7080	30–280, 2830–7080	3	3
			710	3	5
			1420	3	14
			14160	3	53
			21240	3	75
			28320	3	93
70790			3	155	
141580			3	247	
283170	3	378			

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - No stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
	14.5	30–60, 2830	3	3
		140–280	3	5
		710	3	17
		1420	3	29
		7080	3	61
		14160	3	104
		21240	3	137
		28320	3	165
		70790	3	271
		141580	3	416
		283170	3	439
	24	30	3	3
		60	3	5
		140	3	9
		280	3	12
		710	3	26
		1420	3	43
		2830	3	41
		7080	3	93
		14160	3	148
		21240	3	192
		28320	3	229
70790	3	375		
141580–283170	3	439		
0.5	1 or 1.5	30–14160	3	3
		21240	3	15
		28320	3	35
		70790	3	69
		141580	3	116
		283170	3	178
	2.5 or 3	30–710, 2830–7080	3	3
		1420	3	9
		14160	3	40
		21240	3	58

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - No stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		28320	3	72	
		70790	3	122	
		141580	3	186	
		283170	3	279	
	5	30–280, 2830	30	3	3
			710	3	6
			1420	3	15
			7080	3	26
			14160	3	58
			21240	3	79
			28320	3	96
			70790	3	160
			141580	3	241
			283170	3	358
	6.5	30–280, 2830	30	3	3
			710	3	11
			1420	3	20
			7080	3	41
			14160	3	73
			21240	3	98
			28320	3	116
			70790	3	192
			141580	3	287
			283170	3	424
	14.5	30	30	3	3
			60	3	5
			140	3	8
			280	3	11
			710	3	23
			1420	3	35
			2830	3	38
			7080	3	82
			14160	3	128
21240			3	162	
28320			3	192	
70790			3	311	

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - No stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
	24	141580–283170	3	439
		30	3	5
		60	3	6
		140	3	12
		280	3	17
		710	3	32
		1420	3	49
		2830	3	62
		7080	3	116
		14160	3	174
		21240	3	218
		28320	3	256
		70790	3	418
		141580–283170	3	439
		1	1 or 1.5	30–14160
21240	3			38
28320	3			50
70790	3			90
141580	3			142
283170	3			215
2.5 or 3	30–280, 2830 - 7080		3	3
	710		3	5
	1420		3	14
	14160		3	53
	21240		3	73
	28320		3	88
	70790		3	148
	141580		3	221
283170	3		328	
5	30–280, 2830		3	3
	710		3	11
	1420		3	20
	7080		3	41

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - No stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
		14160	3	75	
		21240	3	98	
		28320	3	116	
		70790	3	191	
		141580	3	283	
		283170	3	419	
	6.5	30–280, 2830	30	3	3
			710	3	14
			1420	3	24
			7080	3	55
			14160	3	91
			21240	3	117
			28320	3	139
			70790	3	226
			141580	3	335
			283170	3	439
	14.5	30	30	3	3
			60	3	5
			140	3	9
			280	3	14
			710	3	27
			1420	3	43
			2830	3	52
			7080	3	101
			14160	3	151
			21240	3	191
			28320	3	223
			70790	3	363
			141580– 283170	3	439
			24	30	30
60	3	8			
140	3	15			
280	3	21			
710	3	40			
1420	3	58			

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - No stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
		2830	3	78
		7080	3	137
		14160	3	204
		21240	3	253
		28320	3	297
		70790–141580	3	439
		283170	30	439
2	1 or 1.5	30–710, 2830 - 7080	3	3
		1420	3	5
		14160	3	29
		21240	3	47
		28320	3	61
		70790	3	107
		141580	3	163
		283170	3	245
	2.5 or 3	30–280, 2830	3	3
		710	3	8
		1420	3	17
		7080	3	32
		14160	3	64
		21240	3	85
		28320	3	102
		70790	3	168
		141580	3	251
		283170	3	369
	5	30–280, 2830	3	3
		710	3	14
		1420	3	23
		7080	3	52
		14160	3	87
		21240	3	111
		28320	3	131
		70790	3	215
		141580	3	319
		283170	3	439

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - No stacks					
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)	
	6.5	30–60, 2830	3	3	
		140	3	5	
		280	3	6	
		710	3	18	
		1420	3	29	
		7080	3	66	
		14160	3	105	
		21240	3	133	
		28320	3	157	
		70790	3	255	
		141580	3	376	
	283170	3	439		
	14.5		30	3	3
			60	3	6
			140	3	12
			280	3	17
			710	3	32
			1420	3	49
			2830	3	62
			7080	3	114
			14160	3	171
			21240	3	213
			28320	3	250
			70790	3	407
			141580– 283170	3	439
			24		30
	60	3			9
	140	3			17
	280	3			24
	710	3			44
	1420	3			66
	2830	3			88
	7080	3			155
14160	3	229			
21240	3	285			

Aeration Buffer Zone (> 8 hours aeration time) – Active aeration - No stacks				
Air exchange rate/hr	Application rate (kg/100 m³)	Enclosure sizes (m³)	Minimum buffer zone distance (m)	Maximum buffer zone distance (m)
		28320	3	334
		70790–141580	3	439
		283170	49	439

References

Information considered in the human health assessment

Additional information considered

Published information

PMRA Document Number	Reference
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