Class 2.3 Toxic Gas: Ventilation of Fumigated Freight Containers with Methyl Bromide Mixtures

This information bulletin outlines the general requirements in regard to the fumigation of shipping freight containers.

Why fumigation is required

Fumigation is required to prevent unwanted pests from being imported into Australia from other countries. If pests such as the Giant African Snail, exotic wood borers and fruit fly were allowed to enter Australia major damage to the horticultural industry, agricultural industry and the environment would occur.

The Australian Quarantine and Inspection Service (AQIS) Regulations and procedures require certain imported commodities in containers to be fumigated with methyl bromide.

Product description

Under dangerous goods legislation Methyl bromide (MeBr) is classed as a toxic gas. It is a colourless, nonflammable gas with no taste or odour at low concentrations. At levels well above the TWA, a sweetish odour may be observed. A lacrimator (an agent that irritates the eyes and causes tearing) most commonly chloropicrin is mixed with MeBr for detection purposes to prevent significant exposure. Chloropicrin is a chemical intermediate, fumigant, fungicide, insecticide and tear gas, that gives off a strong, sharp, highly irritating odour.

Severe irritation to the eyes and a pungent odour will be detected if the MeBr is above 1ppm within the freight container. However, anecdotal evidence suggests the chloropicrin has a slower dilution rate and may produce eye irritation when concentrations of MeBr are below 1ppm.

Health effects

- Skin contact with high vapour concentrations or with liquid methyl bromide can cause systemic toxicity and may cause stinging pain and blisters.
- Methyl bromide is a neurotoxic gas that can cause convulsions, coma, and long-term neuromuscular and cognitive deficits.
- Exposure to high concentrations of pure methyl bromide may cause inflammation of the bronchi or lungs, an accumulation of fluid in the lungs, and irritation of the eyes and nose. Lacrimators added to methyl bromide to provide warning of its presence can also cause these symptoms, even at very low concentrations.

Precautions before entering fumigated containers

The following procedure has been developed to assist all businesses receiving fumigated overseas containers to ventilate and unload containers in a safe manner:

1. Before the container arrives, identify where the shipping container originates from. Even if it came from interstate, it may have originated from overseas.
2. Where a container has arrived from overseas, it must be assumed it has been fumigated with MeBr whether it has warning signs or not.
3. The concentration of MeBr should be ascertained by a licensed MeBr fumigator.
4. Fumigation providers must issue a certificate to indicate that the fumigation was successful and conformed to AQIS standards.
5. Before anyone is allowed access to the container the licensed fumigator has the responsibility to take precautions to ensure that the area is free from hazardous levels of fumigant.

   Inadequately aerated goods threaten the health of workers involved in their unpacking and inspection. Where there is no documentation showing that an enclosure or container has been vented, handlers should treat it as still 'under gas' until a qualified fumigator has issued and '***Atmospheric Test Report***' showing levels are safe to enter.
6. In accordance with the national exposure standards for MeBr if the level is under 5ppm it is safe to enter. Studies from American Conference of Governmental Industrial Hygienists (ACGIH) recommend the level be under 1ppm before if it safe to enter. If the level is greater than this, further ventilation is required prior to entering.
7. If the container has been fumigated with MeBr, a risk assessment must be completed by the employers and appropriate procedures must be developed to allow staff to ventilate and enter. The employer must ensure staff are trained in these procedures and are issued with, and have been trained in the correct use of personal protective equipment (PPE).
8. If the container is labelled as having been fumigated, ventilate the container (see ventilation procedures below). When ventilating the container it should be positioned in the open air (not inside a building) with the doors facing the prevailing wind/breeze, and located a minimum of 10 metres from people and adjacent buildings, (if you do not have 10 metres, it is recommended that the levels be checked by a licensed MeBr fumigator prior to entry).

Ventilation procedures

- Wearing the correct Personal Protective Equipment (PPE) (refer to details under PPE heading), open all doors on the container and using large industrial fans (24 inches diameter) ventilate the container for a minimum of four (4) hours.

  As MeBr is heavier than air, to ventilate the fumigated freight container adequately, the container should be unloaded in half sections. This allows the forced air to circulate and break down any trapped pockets of air that may still be affected and trapped within the freight inside the container.
- Ensuring PPE is worn by unloading staff, unload half of the container. If at any stage ill effects become evident, the unloading staff should be withdrawn and seek immediate medical advice. An atmosphere retest should then be undertaken.

- After half of the container is unloaded move the industrial fan into the container, ventilate for two (2) more hours, and then unload the remaining items from the container, (preferably using different personnel than those who unloaded the first half of the container).

Personal Protective Equipment (PPE) required

- Elbow length chemical gloves
- Full coveralls
- Full face mask equipped with:
  - multi-gas filters; or
  - an organic vapour cartridge filter, that is designed to cover Methyl bromide and chloropicrin mixed gas (filter type will depend upon the brand & type of full face mask that you purchase); or
  - Self Contained Breathing Apparatus (SCBA).

  Ensure that the mask and filter supplied are designed to cover Methyl bromide and chloropicrin mixed gas.

Training & instruction

Ensure regular training and instruction on the procedures and the, maintenance and use of PPE is conducted to ensure staff are competent in its use. Records of this training should be maintained.

Health surveillance

MeBr is accumulative. New employees should be tested to establish bromide base levels. Regular blood tests are recommended for employees at intervals not exceeding 12 months. Test reports are to be obtained from the diagnostic pathologist and these reports are to be retained by the employer and employee.

For further information please contact NT Worksafe on 1800 019 155 or go to worksafe.nt.gov.au