Commodity Fumigation

In-Transit Fumigation of Rail Cars

Techniques to Fumigate Rail Cars

Rail cars, also known as free running cars, are not insect-proof. Rail cars have been known to harbor insect infestations. In-transit fumigation can ensure that the product will arrive with no live insects.

Hopper cars carry bulk ingredients that may be infested. A hopper car is a type of railroad freight car used to transport loose bulk commodities such as coal, ore, grain, track ballast, and the like.

Rail cars are easy to seal and most often fumigated.

Boxcars can also be fumigated successfully.

Truck trailers cannot be fumigated and continue to travel on highways while containing gas. They can be fumigated in-transit if riding on a trailer flat car and if trailer is aerated prior to traveling on the highway.

Types of gas for in-transit fumigation:

- Phosphine is the only gas that can be used for in-transit fumigation.
- Methyl bromide can be used if rail car is kept on a sidetrack or other secure area.
- Sulfuryl fluoride can be used on empty rail cars, dining cars, and passenger cars.
A Fumigator should work with the regular employees at the freight yard.

- Rail yards are dangerous places to work.
- People have been locked inside boxcars.
- Always work in pairs, one inside and one outside

Steps for fumigating:

- First, examine boxcar to determine if it can be completely sealed.
- A deteriorated wooden floor cannot be sealed.
- Holes and tears in walls cannot seal.
- Broken seals around doors make it difficult to fumigate in-transit boxcars.
- Tape applied to gaps and tears leaves places that will allow gas to escape.
- Only effective method is to seal one doorframe, with plastic sheets before loading and the other door after fumigant is placed in the car.
- Wear protective equipment when fumigating.

Receiving Fumigated Boxcars.

- The fumigated car must be aerated to a safe level at the receiving point.
- Receiver must be trained in proper techniques under the law.
- Shipper/fumigator should have a signed letter from the consignee that such a trained person will be available.
- Read instructions in plastic envelope glued near the door.
- Double check instructions.
- Fumigant needs a week or more to be effective.
Assume rail car contains a dangerous level of gas when opening doors; wear respiratory protection.

Take a high range fumigant reading after door is opened and again one (1) hour after aeration until the gas level is known.

When levels are below 0.3 ppm, you can enter without protection.

All units of phosphine must be recovered and disposed of.

**In-Transit Fumigation of Hopper Rail Cars**

Fumigation of hopper rail cars is much easier than boxcars and more effective. During a test, several hopper cars were checked 2 weeks after being fumigated, and all showed phosphine levels above 200 ppm

- This concentration and time would virtually control any insect pest.
- Sealing techniques used on all of these cars were excellent.

**Exposure to gas from Hopper Rail Cars**

- Fumigator works on top of hopper in open air.
- Slow release of phosphine.
- If fumigation was done in an enclosed trail shed, respiratory protection might be required.
- Use safety equipment to prevent falls.

Hatches on top of cars are either round or rectangular "slot" openings

- Determine amount of fumigant to be used by obtaining the volume of the rail car and referring to the dosage listed on label.
- When a fumigant package is opened, use all, do not try to reseal.
• Hatch is cleaned and filter taped in place.

• Place warning signs on all treated hatches and ladders to alert inspectors that the car has been fumigated.

• Seal ventilation holes located on the ends of the car.

**Receiving Fumigated Hopper Cars**

• Read the instruction packet before opening cars.

• Remove seals carefully, seal could have been broken en route.

• Dispose of phosphine units.

• Take readings of gas levels inside the cars, usually they are quite high, some fumigators wait an hour before taking the first reading.

• Open hatch must be protected from flying insects with a gauze cover or a special aeration hatch cover.

• After gas level drops below 0.3 ppm car can be unloaded.

• Record and save all gas measurements.

**Fumigating Semi Trailers**

Truck semi-trailers are often used as fumigation chambers when they arrive at their destination and are found to be infested. A semi-trailer can be a convenient, isolated chamber to fumigate infested material from a warehouse

• As of 1999, Department of Transportation requires that trucks be aerated and unloaded, and then reloaded before traveling on the highway.

• Semi-trailers are not gas tight and considerable leakage can occur.

• Refrigerated trucks have four drain holes at the corners that need to be sealed.
- If general condition of the truck suggests that there are too many leaks, another truck must be found.
- Truck semi-trailers cannot be fumigated in-transit unless carried on a flatbed rail car.
- Fumigation must occur at the rail yard, trailer cannot travel on highway until it has been properly aerated.

Fumigation Steps

Check trailer carefully to determine if it will hold gas.

- If methyl bromide is to be used without a heat exchanger a sheet of plastic should be placed over the cargo to avoid possible damage from contact with methyl bromide in liquid form.
- Fans should be placed at the front of semi-trailer to help exhaust the gas later and at the rear to aid in gas distribution at time of gas release, fans are not used with phosphine products.
- Trailer should be measured for volume.
- Close and seal doors.
- Turn on fan.
- Check lines and connections.
- Check for leaks and correct if found.
- Place warning signs on front and back of trailer and near rear door latch.
- After, 24 hours use of methyl bromide, doors can be opened by a fumigator wearing a SCBA.
- Check levels after 1 hour.

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- Remove any spent residue before fans are started.

Tarps

- Trailer can be separated from the tractor and parked on solid cement, covered with gas proof tarps.
- When only gravel or asphalt surfaces are available, trailer can be driven onto a gas proof tar and covered with other tarps joined to the base tarp.
- Three-ply fitted polyethylene insert.
- Is held tight to the floor, walls and ceiling by either two-pedestal fans or with a special vacuum device.
- Unit is unrolled inside the van and then inflated.
- Product is carefully loaded.
- Methyl bromide shooting line or tray of phosphine products is inserted and the end of bag is twisted shut.

**Fumigating Commodities Under Gas Proof Sheets (Tarps)**

Fumigating commodities under a gas proof sheet (tarps) is a valuable technique used worldwide.

- Often used in a quarantine fumigation.
- One or more containers can be fumigated with this technique.
- Possible to achieve complete control of all life stages of all target pests if this work is performed properly.
- Although, this technique looks easy, failures do occur:
- Phosphine kill requires a long exposure, one week or more.
- Wrong fumigant used.
- Small holes in gas proof sheets.
- Improper folding of sheets.
- Asphalt or wooden floor that permits gas to escape.
- Rough concrete floor, expansion joints, or a floor drain.
- Temperature too low.
- Leakage between the sand snakes.
- Dirty or rough floors.
- Re-infestation can occur from nearby areas during aeration.

Good sanitation and storage practices

- Floor should be cleaned of all dirt, grain or other food materials.
- Fill floor cracks with concrete, and dry.
- Check walls for holes or dirt layers, clean and patch.
- Stacks must be at least 3 feet from a wall or a post.
- Stacks or bags should not be more than 18 feet high.
- Stock rotated.
- Inspection of arriving products with regular inspections.
- All spills must be cleaned during occurring shift.
- Rodent control programs.
- Floor drains and other areas cleaned and screened.
- Bags or boxes should be as level as possible on the top.

Preparation of the area

- Identify pest and extent of infestation.
- Ensure enough room on all sides and top to work.
- Be sure people will not be exposed during the fumigation.
If floor is porous, place a gas proof sheet on floor.

- Check tarps or plastic for holes or tears.
- Seal tarp around floor.

Using methyl bromide

- A free air space should be created by placing bags or boxes on the top of the stack.
- Methyl bromide should always be released at the top of the stack in one or more locations.
- Fans are always recommended for methyl bromide fumigation.
- When gas is introduced, check area for any leaks

Using phosphine

- Seal must be even better than that for methyl bromide.
- Seal must hold for 4 days or more.
- Roll corners of tarp to a rope-like edge and then clamp the rolled seam.
- Phosphine pellets or tablets should not be layered, could cause a fire.
- Use several small boxes placed in various areas.
- If in contact with water, could cause a fire.
- Place warning signs to be seen by persons entering area.
- Tarp should be sealed to the floor.
- Fumigator must be fully protected until readings indicate gas level is below the TLV.
Aeration

- Measure gas left in fumigated space.
- If gas level indicates fumigation was a success.
- Aeration can be started.
- Release gas slowly.
- Do not remove tarps until the gas level is lower.
- Release gas slowly by removing the sand snakes or other seal at both ends of a stack.
- After all areas are below the TLV, signs can be removed and authorities notified that all is clear.

Fumigating Shipping Containers

Metal containers facilitate handling of individual pallets of goods. Also permits segregation of products by shipper.

- Can be the size of metal truck trailers or smaller.
- Can be transported long distances on railroad flat cars or ships and then taken short distances by truck.
- Used to ship products such as commodities and equipment.
- Since they are stacked together on ships and rail cars, in-transit infestation can occur.
Containers are not gas tight and do require sealing.

- Doors need to be covered with plastic or taped.
- Ventilators at the four upper corners need to be sealed.
- Fumigant cannot be added to transport units on board a vessel.
- Containers must not be loaded until 24 hours after fumigation.
- Proper warning signs must be on container.
- Master of ship must be notified prior to loading that the cargo has been fumigated.
- Vessels carrying more than 26 passengers, fumigated transports can only be stored on deck.
- Equipment capable of detecting the fumigant and instruction for the equipment's use must be on the vessel.
- Fumigated unit cannot be stored within 15 feet from any opening to accommodation spaces.

Only a few fumigants that can be used for this type of fumigation in the United States.

Choose a phosphine product if:

- Fumigation will be in-transit.
- Product does not have copper or other items that could be armed by phosphine.
- Methyl bromide could harm seed germination or cause other problems.
- Label of phosphine is the only one that lists this product and site.
- Exposure time and temperature are adequate for phosphine to be effective.

Choose methyl bromide with chloropicrin if:

- Fumigation will not be in-transit.
- Product is not a food or feed item.
• Safety consideration or regulations require the use of chloropicrin.
• Product will not be harmed by either gas.
• Time will not permit use of phosphine.

Choose methyl bromide **without** chloropicrin if:
• Fumigation will not be in-transit.
• Product is a food or feed item.
• Time will not permit effective us of phosphine.
• Product could be harmed by chloropicrin.
• Product and site are only on this label.

**Respiratory Equipment**

**Formal Respiratory Protection Program**

If your work requires respirators, your employer should have a formal respiratory protection program.

• Must include all requirements outlined in OSHA Respiratory Protection Standard.
• Must have written operating procedures.
• Must educate respiratory users, performing maintenance, and cleaning and storing respirator equipment.
• Training is critical to use these devices safely and effectively.

Three kinds of respirators
**Atmosphere-Supplying Respirators:** Provide air from a source other than the air the wearer is working in.

Two main types:

**Self contained breathing apparatus** – fumigator wearing a SCBA does not need to be connected to a stationary breathing source such as an air compressor. Two types of SCBA regulators available are: demand and pressure demand.

**Supplied-air-respirators** - most common supplied-air respirator. Supplies compressed air from a stationary source through a hose.

**Air-Purifying Respirators:** Remove particular matter from the air or remove toxic vapors and are limited in their capacity to purify air.

**Gas Mask or Canister Respirators:** Has colored stripes that indicate its type and limitations.

**Care of Respiratory Equipment**

- Each person should have his/her own respirator and canister.
- Do not rescue canisters, especially following an emergency.
- Clean and disinfect the respiratory mask after each day's use and at least once a month.