

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS & DOMESTIC ANIMALS

DANGER, *gastoxin* when moist releases hydrogen phosphide which is poisonous if inhaled. Do not breathe dust or fumes. Poisonous if swallowed. Do not get in eyes, on skin, or on clothing. Do not smoke, drink, or eat when handling it. Wash hands thoroughly after use. Keep away from liquids or water as this causes immediate release of the gas. Do not open container except for immediate usage. **ALWAYS OPEN IN OPEN AIR.** Keep available a gas mask and canister showing the approval of MSHA, NIOSH or the U.S. Dept. of Interior Bureau of Mines for phosphine protection. Use mask and canister of the same manufacturer. Before application, make sure there are no humans or domestic animals in adjacent structures.

SYMPTOMS: Pressing sensation on the chest, nausea, and diarrhea.

ENVIRONMENTAL HAZARDS

When *gastoxin* decomposes in the upper atmosphere traces of phosphate are formed. When disposal instructions are followed, the dust remaining after decomposition of the tablets is of no environmental hazard. Hydrogen phosphide is practically insoluble in fats, oils, and water and is very stable at normal fumigation temperatures. It may at times react with some metals such as copper, brass, gold, and silver causing corrosion, especially if temperature and humidity are high. Care must be exercised to protect items made from such materials including some types of copying paper and undeveloped photographic film.

"Endangered Species Consideration:"

1) Black-Footed Ferret:

"Do not use this product in the range of the Black-Footed Ferret. Contact the nearest U.S. Fish and Wildlife Service Office (Endangered Species Specialist) before the product is used. They will arrange for a ferret survey of the proposed use site."

2) Utah Prairie Dog:

The directions for use for controlling prairie dogs must include the following restriction: "except Utah prairie dogs."

3) San Joaquin Kit Fox:

"This pesticide should not be used within 1 mile of active dens of the San Joaquin Kit Fox in the following California counties: Kern, Kings, Fresno, San Luis Obispo, Merced, Monterey, Santa Barbara, Ventura, Tulare, and San Benito. Prior to use, contact the California Department of Fish and Game for recommendations."

4) Blunt-Nosed Leopard Lizard:

"This pesticide should not be used in the range of the blunt-nosed leopard lizard in the following California counties: Kern, Fresno, Kings, Madera, Merced, and Tulare. Prior to use, contact the California Department of Fish and Game for recommendations."

5) Eastern Indigo Snake:

"Do not use this product in the range of the Eastern Indigo snake in the following states: Mississippi, Alabama, South Carolina, Georgia, and Florida."

6) Desert Tortoise:

"This pesticide should not be used in the Critical Habitat of the Beaver Dam slope population of the desert tortoise in Utah. This comprises an area extending from the southwest facing slope of the Beaver Dam Mountains, across Highway 91, west along the Arizona border and 10 miles to the Nevada border."

"This product is highly toxic to wildlife and fish. All burrows should be checked for signs of nontarget animals and if they are present, burrows should not be treated."

RESTRICTED USE PESTICIDE

For retail sale to and use only by Certified Applicators or their direct supervision and only for those uses covered by Applicator Certification

Supplemental Label For:

gastoxi

FUMIGATION TABLETS

Active Ingredient	FOR CONTROL OF MOLES AND BURROWING RODENTS
Inert Ingredients	
TOTAL	

**KEEP OUT OF REACH OF CHILDREN
POISON**

STATEMENT OF PRACTICAL TREATMENT

ing by touching back of patient's as the finger.

to open air. Make him lie down.

PHYSICIAN IMMEDIATELY.

d area with soap and water.

ghly with water.

for additional precautionary statements

Sold by:

BERNARDO CHE

9550 Flair Drive,

El Monte, CA 917

Tel. (213) 442-909

EST. NO. 43743-BR-01

REG. NO. 43743-1

Tablets, net weight, 3.3 lbs

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS & DOMESTIC ANIMALS

DANGER *gastoxin* when in contact releases hydrogen phosphide which is poisonous if inhaled. Do not breathe dust or fumes. Do not get in eyes, on skin, or on clothing. Do not smoke, drink, or eat when handling it. Wash hands thoroughly after use. Keep away from liquids or water as this causes immediate release of the gas. Do not permit children except for limited use. **ALWAYS OPEN IN OPEN AIR.** Keep available a gas mask and a canister showing the approval of MSHA, NIOSH or the U.S. Dept. of Interior, Bureau of Mines for phosphine protection. Use mask and canister of the same manufacturer before application. Do not use in areas where there are no humans or domestic animals in adjacent structures.

SYMPTOMS Pressing sensation on the chest, nausea, and diarrhea.

ENVIRONMENTAL HAZARDS

When hydrogen phosphide decomposes in the upper atmosphere traces of phosphate are formed. When disposal instructions are followed, the dust remaining after decomposition of the tablets is of no environmental hazard. Hydrogen phosphide is practically insoluble in fats, oils, and water and is very stable at normal fumigation temperatures. It may at times react with some metals such as copper, brass, gold, and silver causing corrosion, especially if temperature and humidity are high. Care must be exercised to protect items made from such materials including some types of copying paper and undeveloped photographic film.

PHYSICAL OR CHEMICAL HAZARDS

Do not store near heat or open flame. *gastoxin* is non-combustible in itself, but contact with water releases phosphine gas immediately and self-ignition is possible under certain circumstances. Do not pierce tablets as this may confine the gas as it develops, and a flash could occur.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

Store only in cool, dry, locked and ventilated room. Protect from moisture, open flames or heat. Dispose of waste by incineration and offer for recycling or reconditioning, or dispose of in a sanitary landfill, or by other approved State and local procedures.

EFFICACY: When used as directed, *gastoxin* will effectively control all life stages of the following pests: grain and moth, angoumois grain moth, bean weevil, cigarette beetle, confused flour beetle, dermestids, dried fruit beetle, dried fruit moth, European grain moth, flat grain beetle, granary and rice weevil, Indian meal moth, lesser grain borer, Mediterranean flour moth, pink bollworm, raisin moth, red flour beetle, rusty grain beetle, sawtoothed grain beetle, and tobacco moth.

Details and instructions for the fumigation of specified raw agricultural commodities, processed foods, and animals, birds, and non-food plants, cereals, fruits, and vegetables, and warehouses are to be found in the booklet entitled, Product Manual for use with *gastoxin* Tablets and *gastoxin* Pellets. This manual is considered as labeling and is as official as the label on the container itself.

RESTRICTED USE PESTICIDE

For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Applicator's Certification.

Supplemental Label For:

gastoxin

FUMIGATION TABLETS

Active Ingredient

Inert Ingredients

TOTAL

FOR CONTROL OF MOLES AND
BURROWING RODENTS

KEEP OUT OF REACH OF CHILDREN

POISON
DANGER

STATEMENT OF PRACTICAL TREATMENT

- If swallowed: Induce vomiting by touching back of patient's throat with a hard object such as the finger.
- If inhaled: Remove victim to open air. Make him lie down and **CALL A PHYSICIAN IMMEDIATELY.**
- If on skin: Wash affected area with soap and water.
- If in eyes: Flush thoroughly with water.

See side panel for additional precautionary statements.

Manufactured by:

CASA BERNARDO LTDA
Rua Amador Bueno 316/319
Santos, Brazil
Tel (0132) 32-8811

Sold by:

BERNARDO CHEMICAL
39550 Flair Drive, Suite
El Monte, CA 91731
Tel (213) 442-9090

EPA EST. NO. 43743-BR-01

EPA REG. NO. 7373-1

Contents: 500 round tablets • Net weight: 3.3 lbs. (1.5 kg)

FOR CONTROL OF THE FOLLOWING MOLES AND BURROWING RODENTS:

Marmot sp. - Woodchucks and Yellow-Belly Marmots (Rockchuck),
Prairie Dogs (except Utah Prairie Dogs), Norway and Roof Rats,
House Mice, Ground Squirrels, Moles, Voles, Gophers, and Chipmunks.

DIRECTIONS FOR USE AGAINST BURROWING PESTS: Add from 2 to 4 *gastoxin* tablets to the burrow. Seal tightly by shoveling soil over the entrance after first packing the opening with crumpled newspaper. This will prevent the soil from covering the *gastoxin* tablets and slowing down their action. Use lower rates in smaller burrows under moist soil conditions and higher rates in larger burrows when soil moisture is very low. Treat reopened burrows a second time 1 to 2 days after the initial treatment. For use on non crop areas and orchards.

OUTDOOR USE ONLY:

Do not use within 15 feet (5 meters) of inhabited structures. Do not apply to burrows which may open under or into occupied buildings.

Please consult Local, State, and Federal Game Authorities to ensure that endangered species do not inhabit the area proposed for treatment.

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not get in eyes on skin
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use of the gas. Do not
eat. AIR. Keep available
U.S. Dept. of Interior
the same manufacturer
animals in adjacent

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after decomposition
practically insoluble in
water. It may at times
be used on especially
sensitive items made from
cellulose or graphic film

ARDS

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possible under certain
conditions and a flash

with this labeling

open flames or heat
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European grain moth
in the borer. Medfly
grain beetle, saw

raw commodities
stages and ware
gastoxin tablets
official as the label on

RESTRICTED USE PESTICIDE

For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicators Certification

Supplemental Label For:

gastoxin

FUMIGATION TABLETS

Active Ingredient: **Phosphide**
Inert Ingredients: **TOTAL**

FOR CONTROL OF MOLES AND BURROWING RODENTS

KEEP OUT OF REACH OF CHILDREN

POISON DANGER

STATEMENT OF PRACTICAL TREATMENT

If swallowed: If vomit is coming by touching back of patient's throat with a blunt object such as the finger.

If inhaled: Remove victim to open air. Make him lie down and keep him warm. **CALL A PHYSICIAN IMMEDIATELY.**

If on skin: Wash affected area with copious water.

If in eyes: Flush thoroughly with water.

Do not use for fumigation of raw commodities.

Manufactured by: **OYSA BERNARDO, LTD.**
1111 Camino del Rio, Suite 100
San Diego, CA 92108
Tel. (619) 592-6111

Wholesaler: **BERNARDO FUMIGANT LIMITED**
10000 El Camino Real, Suite 100
El Monte, CA 91731
Tel. (214) 442-9090

Reg. No. **43743-BR-01**

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FOR FUMIGATION OF RAW AGRICULTURAL COMMODITIES AND BULK ANIMAL FEEDS stored or shipped in bulk, the tablets may be either (1) fed into the commodity as it flows into a storage area or conveyance, such as a box or hopper rail car, static or in transit; static truck trailer, or (2) placed into the commodity in storage or after loading has been completed in a manner so as to provide uniform spacing between individual tablets. Care must be taken to see that the fumigated area is properly sealed and that warning placards are attached. For raw commodities not stored or shipped in bulk, tablets may be placed on trays or in moisture permeable envelopes and the fumigation proceeds as for with processed foods.

Dosage for commodities other than nuts and peanuts is 60-180 tablets per 1000 bushels. Dosage for peanuts is 60-125 tablets per 1000 cubic feet and for nutmeats 30 tablets per 1000 cubic feet of storage space. Effectiveness of the fumigation depends on the tightness of the storage area, commodity temperature, and length of exposure period.

FOR FUMIGATION OF PROCESSED FOODS AND PACKAGED ANIMAL FEEDS, the commodities may be fumigated in bulk, in bags, or in packages. They may be treated in box or hopper rail cars, static or in transit; static truck trailers under gas-proof tarpaulins, or in other enclosures where foods or feeds are commercially stored and can be made sufficiently gas tight. Tablets may be placed on trays or in moisture permeable envelopes (not more than two tablets per envelope) which in turn are fastened to a substantial support. After fumigation, tablet residue shall be disposed of by burying or saturating with water in which a small amount of wetting agent has been added. **gastoxin** tablets or their residual dust must not come in contact with any processed food.

Dosage for specified processed foods and packaged animal feeds (other than dried fruit and nuts) is 30-60 tablets per 1000 cubic feet of storage space. Dosage for dried fruit and nuts is 30 tablets per 1000 cubic feet of storage space.

gastoxin must not be placed in, or attached to, packages intended for consumers or retailers. Aerate finished food two days before it is offered to the consumer.

Do not move trucks, vans, or trailers during fumigation. They must be completely aerated before movement is allowed.

BARGE FUMIGATION IS REGULATED BY U.S. COAST GUARD REGULATIONS 46 CFR 147A

When fumigating an unmanned barge, the tablets may be fed into raw agricultural commodities and bulk animal feeds as the barge is being loaded, or may be placed in after loading is completed. When treating raw commodities or feeds not stored in bulk and processed foods, the tablets must be contained and fastened to a support. Dosage and exposure time on unmanned barges is identical to the use for the same commodities fumigated in land-based structures or storage areas.

Following application of the fumigant, the barge must be sealed and warning placards attached. Prior to unloading of unmanned, fumigated barges, make appropriate tests to ascertain safety of cargo area.

Dosage for cereal, mus, feed mills, and warehouses is 20-30 tablets per 1000 cubic feet of space. Fumigation of such areas must be conducted by trained fumigators. All safety precautions such as sealing of buildings, padlocking and guarding of entrances, notifying police and fire officials, and posting of guards, if required, must be adhered to.

Dosage for stored raw commodities is 60-180 tablets per 1000 cubic feet of space. Aeration time for hogheads shall not be less than three days for all other containers, two days.

Fumigated areas must be placarded on all entrances with signs containing at least the signal word **DANGER** and the skull and crossbones and the words: Area under fumigation, do not enter until completely aerated, the date of fumigation, name of the fumigator, emergency telephone number for contact, and the name and address of the fumigator. Do not remove warning signs until the fumigation area is completely aerated and safe for entry, as indicated by a suitable detector.

Exposure times required for a commodity are as indicated in the following guide:

- Cereals, nuts, and feeds: 4-5 days
- Corn, soybeans, and wheat: 4-5 days
- Corn, soybeans, and wheat: 4-5 days
- Corn, soybeans, and wheat: 4-5 days

Do not fumigate raw commodities in a barge for less than three days.

WARRANTY - We warrant that the tablets are of the highest quality and that the fumigation process is safe and effective when used in accordance with the instructions on the label.

WARRANTY - We warrant that the tablets are of the highest quality and that the fumigation process is safe and effective when used in accordance with the instructions on the label.



RESTRICTED USE PESTICIDE

For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.

PRODUCT MANUAL

FOR USE WITH

gastoxin[®] TABLETS

AND

gastoxin[®] PELLETS

ACCEPTED

NOV 22 1982

Under the Federal Insecticide,
Fungicide, and Rodenticide Act
as amended for the pesticide
registered under
EPA Reg. No. 43743-1

EPA EST. No. 44484-BR-01

EPA REG. No. 43743-1

EPA REG. No. 43743-2

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PRODUCT MANUAL

FOR **gastoxin**® TABLETS AND **gastoxin**® PELLETS

INTRODUCTION

This booklet has been prepared to assist the user in the safe and effective handling of **gastoxin**® tablets and pellets. As all fumigants are toxic to man and animals if not properly used, all directions for use must be carefully followed. If this is done, the product can be safely handled and effective insect control will be obtained.

PHYSICAL AND CHEMICAL PROPERTIES OF **gastoxin**®

gastoxin® is a formulated product consisting of aluminum phosphide, ammonium bicarbonate, urea, and edible paraffin. Upon exposure to the atmosphere, the ammonium bicarbonate dissociates, forming ammonia, a pungent smelling warning gas, and carbon dioxide, a fire suppressant. Within from one to four hours the active gas hydrogen phosphide (phosphine) begins to evolve as the pellet or tablet slowly decomposes. Hydrogen phosphide has a carbide-like odor and can be readily smelled by most humans at a concentration in the range of 0.02 parts per million. It is a colorless gas with great penetration power due to its high volatility. The threshold limit value for hydrogen phosphide is 0.3 parts per million.

gastoxin® is offered in two forms, tablets and pellets. The tablet is approximately 4/5 inch in diameter. It weighs three grams, and on decomposition releases one gram of hydrogen phosphide. Tablets are packaged either in gas tight tubes and cans or in resealable flasks. Each tube holds 20 tablets and each can holds 15 tubes. Each resealable flask holds 100 or 500 tablets in bulk. The pellet is spherical in form and approximately 3/8 inch in diameter. It weighs 0.6 grams, and on decomposition releases 0.2 grams of hydrogen phosphide. There are 1660 pellets packed in each resealable flask.

The rate of decomposition is dependent on temperature of the commodity and relative humidity of the atmosphere. At temperatures over 68°F. (20°C.) decomposition of both tablets and pellets is completed in approximately 72 hours. As temperature decreases, required exposure time is increased. Fumigation should not be attempted when commodity temperature is below 40°F. (5°C.).

Following decomposition of the tablets and pellets there remains a gray-white "dust" composed almost entirely of non-poisonous aluminum hydroxide, with a trace amount of the undecomposed aluminum phosphide. The "dust" is eliminated when treated raw agricultural commodities are moved, or it can be collected and properly disposed of following the treatment of processed foods.

HOW **gastoxin**® SHOULD BE USED

Tablets and pellets are received in wooden cases containing cans or resealable flasks. As long as the tubes, cans, or flasks are sealed, the storage life of the product is unlimited. Storage should be in a dry area and out of the reach of children and irresponsible persons.

HOW **gastoxin**® SHOULD BE HANDLED

1. Make certain that the label is intact and legible.
2. Read the label.
3. Open containers of tablets or pellets only in open air.
4. Wear gloves when handling the product.
5. Do not smoke, eat, or drink when handling a pesticide.
6. Use entire contents of a tube once it is opened. Unopened tubes may be returned to the locked storage area for later use.
7. Wash hands after use of the product.
8. Do not attempt to reuse empty container. Triple rinse with water and dispose of properly. Bury cans and stoppers. Flasks may be reused.

PATTERN OF USE

REGISTERED USES: **gastoxin**® tablets and pellets are registered with the Environmental Protection Agency for the post harvest fumigation of:

Raw Agricultural Commodities (can be treated by direct addition): brazil nuts, buckwheat, cashews, cocoa beans, coffee beans, corn, seed, grass seed, millet, oats, peanuts, popcorn, rice, rye, safflower, vegetables (except soybeans), sesame seed, sorghum, soybeans, sunflower seeds, nuts, wheat, and vegetable seed.

Processed Foods (can not be treated by direct addition) — bakery mixes, cereal flours and related milled fractions, cocoa powder, dried apples, dried carrots, dried egg yolk solids, dried milk, dried spinach, macaroni, malt, milk chocolate, non dairy creamer, milk, noodles, packaged cereals, pasta, potato flour, pretzels, processed spices, raisins, sugar, sultanas, tea, and processed nutmeats.

Animal Feed and Feed Ingredients (can be treated by direct addition):

Non-Foods — tobacco, cotton and wool fabrics, rubberize jute, paper, and sisal.

TOLERANCES:

Raw Agricultural Commodities (except seed and pod vegetables) and Animal Feeds — 0.1 ppm: seed and pod vegetables (except soybeans) — 0.01 ppm.

INSECTS TO BE CONTROLLED:

When used as directed, **gastoxin**® will effectively control the following pests: almond moth, angoumois grain moth, bean weevil, beetle, confused flour beetle, dermestids, dried fruit beetle, European grain moth, flat grain beetle, granary and rice weevil, lesser grain borer, Mediterranean flour moth, pink bollworm, rice beetle, rusty grain beetle, saw-toothed grain beetle, and tobacco

HOW **gastoxin**® SHOULD BE STORED

Tablets and pellets are received in wooden cases containing sealed tubes or cans or resealable flasks. As long as the tubes, cans, or flasks remain intact, the storage life of the product is unlimited. Storage should be in a dry, locked, ventilated area and out of the reach of children and irresponsible persons.

HOW **gastoxin**® SHOULD BE HANDLED

1. Make certain that the label is intact and legible.
2. Read the label.
3. Open containers of tablets or pellets only in open air.
4. Wear gloves when handling the product.
5. Do not smoke, eat, or drink when handling a pesticide.
6. Use entire contents of a tube once it is opened. Unopened tubes and resealable flasks may be returned to the locked storage area for later use.
7. Wash hands after use of the product.
8. Do not attempt to reuse empty container. Triple rinse with water, crush, and dispose of properly. Bury cans and stoppers. Flasks may be recycled.

PATTERN OF USE

REGISTERED USES: **gastoxin**® tablets and pellets are registered with the U.S. Environmental Protection Agency for the post harvest fumigation of the following:

Raw Agricultural Commodities (can be treated by direct addition)—almonds, barley, brazil nuts, buckwheat, cashews, cocoa beans, coffee beans, corn, cottonseed, flower seed, grass seed, millet, oats, peanuts, popcorn, rice, rye, safflower seed, seed and pod vegetables (except soybeans), sesame seed, sorghum, soybeans, sunflower seed, walnuts, wheat, and vegetable seed.

Processed Foods (can not be treated by direct addition) — assorted chocolate, bakery mixes, cereal flours and related milled fractions, cocoa powder, coffee, crackers, dried apples, dried carrots, dried egg yolk solids, dried milk, dried peaches, dried pears, dried spinach, macaroni, malt, milk chocolate, non dairy creamers, non-fat dried milk, noodles, packaged cereals, pasta, potato flour, pretzels, primary yeast, processed spices, raisins, sugar, sultanas, tea, and processed nutmeats.

Animal Feed and Feed Ingredients (can be treated by direct addition) — All.

Non-Foods — tobacco, cotton and wool fabrics, rubberized hair, wood, pelts, jute, paper, and sisal.

TOLERANCES:

Raw Agricultural Commodities [except seed and pod vegetables (except soybeans)] and Animal Feeds — 0.1 ppm: seed and pod vegetables (except soybeans) — 0.01 ppm
Processed Foods — 0.01 ppm.

INSECTS TO BE CONTROLLED:

When used as directed, **gastoxin**® will effectively control all life stages of the following pests; almond moth, angoumois grain moth, bean weevil, cadelle, cigarette beetle, confused flour beetle, dermestids, dried fruit beetle, dried fruit moth, European grain moth, flat grain beetle, granary and rice weevils, Indian meal moth, lesser grain borer, Mediterranean flour moth, pink bollworm, raisin moth, red flour beetle, rusty grain beetle, saw-toothed grain beetle, and tobacco moth.

APPLICATION PROCEDURES

General:

1. Never fumigate alone.
2. Have correct personal protection equipment on hand and in good working order.
3. Have appropriate gas detection devices available for use as needed.
4. Never fumigate any structure or area unless it is unoccupied.
5. When necessary, make certain to notify police and fire officials having jurisdiction over the area of the planned fumigation.
6. Never fumigate when commodity temperature is below 40°F. (5°C.).
7. Aerate finished food for 48 hours before it is offered to the consumer.

For Fumigating Silo Type Storages:

1. Calculate required number of tablets or pellets based on dosage selected and quantity of commodity to be treated.
2. Determine the amount of ventilation in both the basement and on the bin floor where the fumigant will be applied.
3. Open all containers outside the building.
4. Tablets may be applied to grain on the transfer belt by hand. Pellets are best applied using an automatic pellet dispenser. They may be dispensed into the up leg of the elevator from the work room floor, or onto the grain as it travels along the transfer belt on the bin floor.
5. Place a warning sign on the bin cover on the bin floor, and on the bin valve in the basement. Date the sign as to when the fumigation commenced.
6. Each day before work starts, the bin floor and basement should be checked for the presence of gas.
7. Elevator personnel may carry out their normal duties when **gasloxin®** is used to treat grain in upright silo storage.

For Fumigating Flat Storages:

1. Make certain that structure is tight enough to be fumigated successfully. Seal structure as needed.
2. Make certain that there are no adjoining structures occupied by man or animals.
3. Determine quantity of tablets or pellets required.
4. During fumigant application leave all doors or other openings open to create a cross ventilation. Application can proceed for 2-4 hours or until the odor of phosphine is detected in the overspace.
5. Apply the tablets or pellets by using a probe. Make probes every 4-5 feet horizontally across the grain in both directions. The number of tablets or pellets used per probe is determined by dividing the amount of fumigant to be used by the number of probings to be made. The fumigant is dropped in the probe at intervals as the pipe is withdrawn from the grain.

APPLICATION PROCEDURES

6. A plastic tarpaulin may be pulled over the grain surface following application of the fumigant. This reduces convection currents and increases the effectiveness of the fumigant. Care must be taken to see that the plastic is removed when the fumigation is completed. (No more than 5-6 days or sweating of the grain may occur).
7. Close and seal all external openings.
8. Placard and lock entrances.
9. Following the exposure period, open doors and windows creating a cross draft to aid in aeration.
10. Make certain all warning signs are removed when aeration is complete.

For Fumigation of Railcars:

1. Boxcars and hopper cars of bulk raw agricultural commodities and animal feeds are fumigated in the same manner as are silos or flat storages. The tablets or pellets may be added to the commodity as it flows into the railcar, be placed on the floor of the empty car, be placed on the surface of the commodity, or probed into the commodity after loading is completed.
2. Processed foods and bagged raw commodities and animal feeds are fumigated by placing the tablets or pellets in moisture permeable envelopes or on trays, which in turn are fastened to a substantial support within the car. Care must be taken to see that the fumigant or its reacted residue does not come in contact with processed foods.
3. Close and seal all hatches or doors. On hopper cars, make sure that the vents at the end of the car are sealed with masking tape. Placards approved by the Department of Transportation must be applied to each door of box cars and near the ladder on hopper cars as well as on the top hatch covers. Date signs as to when fumigation commenced and when the car may be opened.
4. Notify the consignee that the car is to be received under fumigation.

For Fumigation Under Tarpaulins:

1. Cover the stack of product to be fumigated with polyethylene (1.5-2 mil is satisfactory). Secure the edges of the tarpaulin to the floor using sand snakes, tape, or other suitable material.
2. Spread tablets or pellets on trays and insert under the edge of the tarpaulin. Reseal tarpaulin to floor in that location.
3. Placard stack on all exposed sides indicating that fumigation is in progress. Date and sign warning placard indicating when cover may be removed.
4. Maintain adequate ventilation around stack at all times. If this is done, workers do not have to vacate the premises.
5. Following the exposure period, collect all residual "dust" and dispose of it according to label directions. Remove tarpaulins if desired, but at any rate, all warning signs must be removed and destroyed.

For Fumigation of Cereal Mills, Feed Mills, and Warehouses:

1. Seal the enclosure to be treated using appropriate sealing materials (except exit door).
2. When necessary, notify police and fire officials having jurisdiction over the area.
3. Determine dosage required and calculate the amount of fumigant needed. Open all containers out of doors.
4. Spread tablets or pellets on kraft paper trays laid on the floor, with application starting at the farthest point from the exit door.
5. Lock and seal exit door. Post guards if required.
6. Placard all entrances with warning signs.
7. Notify local hospital that fumigation is underway and explain the fumigant being used.
8. When fumigation is completed, open all doors and windows to commence aeration. It will be necessary to wear a gas mask if the building must be entered before aeration is complete.
9. Using gas detection devices, document that all gas is gone before turning structure back for reoccupancy.
10. Collect and properly dispose of all fumigant "dust". Remove and discard all warning placards.

For Intransit Ship Fumigation:

IMPORTANT

Shipboard, intransit ship or shiphold fumigation is also governed by U.S. Coast Guard Regulations. Refer to and comply with these regulations prior to fumigation.

PROCEDURES

Prefumigation Procedures

1. Prior to fumigating a vessel for intransit cargo fumigation, the Master of the vessel or his representative, and the fumigator must determine whether the vessel is suitably designed and configured so as to allow for safe occupancy by the ship's crew throughout the duration of the fumigation. If it is determined that the design and configuration of the vessel does not allow for safe occupancy by the ship's crew throughout the duration of the fumigation, then the vessel will not be fumigated unless all crew members are removed from the vessel. The crew members will not be allowed to reoccupy the vessel until the vessel has been properly aerated and a determination has been made by the Master of the vessel and the fumigator that the vessel is safe for occupancy.

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

3. During the fumigation or until a manned vessel leaves port or the cargo is aerated the person in charge of the fumigation shall insure that a qualified person using gas or

vapor detection equipment tests spaces adjacent to spaces containing fumigated cargo and all regularly occupied spaces for fumigation leakage. If leakage of the fumigant is detected, the person in charge of the fumigation shall take action to correct the leakage, or shall inform the Master of the vessel, or his representative, of the leakage so that corrective action can be taken.

4. If the fumigation is not completed and the vessel aerated before the manned vessel leaves port, the person in charge of the vessel shall insure that at least two units of personal protection equipment and one gas or vapor detection device, and a person qualified in their operation be on board the vessel during the voyage.

"Personal protection equipment means a gas mask or respirator for the fumigant, jointly approved by the Mining Enforcement and Safety Administration and the National Institute of Occupational Safety and Health."

Precautions and Procedures During Voyage

1. Using appropriate gas detection equipment, monitor spaces adjacent to areas containing fumigated cargo and all regularly occupied areas for fumigant leakage. If leakage is detected, the area should be evacuated of all personnel, ventilated, and action taken to correct the leakage before allowing the area to be occupied.

2. Do not enter fumigated areas except under emergency conditions. If necessary to enter a fumigated area, appropriate personnel protection equipment must be used. NEVER enter fumigated area alone. At least one other person, wearing personal protection equipment, should be available to assist in case of an emergency.

Precautions and Procedures During Discharge

1. If necessary to enter holds prior to discharge, test spaces directly above grain surface for fumigant concentration, using appropriate gas detection and personnel safety equipment. Do not allow entry to fumigated areas without personal safety equipment, unless fumigant concentrations are at safe levels, as indicated by a suitable detector.

2. Remove and dispose of all sealing materials and warning signs.

Directions for Use (dry bulk carriers and tankers)

NOTE: For additional use and safety information refer to other sections of this booklet and the labels.

The intransit fumigation procedures may continue only after the vessel has been inspected as outlined above and it has been ascertained that the design and configuration of the vessel will permit the ship's crew to remain on board without undue hazard from the treatment.

1. Lock and/or secure all avenues normally used to enter the holds. Using appropriate sealing materials, seal all openings into the areas which are to be fumigated (excluding the main hatch openings). On tankers, be sure that all pressure relief systems are adequately sealed.

2. Post appropriate danger signs on all such avenues of entrance to the holds.

3. Make certain that all appropriate local authorities have been notified of the fumigation.

4. Calculate the dosage of **gastoxin** required based on 33 tablets or 165 pellets per 1000 cubic feet of hold volume. Do not consider whether the hold will be slack or full.

5. Apply the tablets or pellets as evenly as possible over the grain surface. Where possible, step the fumigant below the surface or probe it in to the desired depth.

6. Close, secure and seal the hatch covers or tank covers and butterworths as soon as the fumigant has been applied.
7. Post appropriate danger signs in conspicuous locations on the outside of all hatch and tank covers.
8. Monitor all areas of the vessel which are, or could be occupied by a crew member for the presence of hydrogen phosphide until the vessel leaves port. Check hatch and/or tank covers for leakage and reseal as necessary.

DISPOSAL OF RESIDUAL "DUST" AND CONTAINERS

When **gasloxin**® is used to fumigate raw agricultural commodities and bulk animal feed there are no special disposal procedures. When the commodity is moved, the residual "dust" is further decomposed and removed along with the grain dust.

When processed foods are fumigated and when the fumigant is used for space fumigations, the "dust" must be collected and disposed of. Disposal is accomplished by burying or by slowly adding the "dust" to a bucket of water containing a small amount of wetting agent. A five gallon bucket should be 3/4 full of water and wetting agent. The "dust" is stirred into the water until a slurry is formed and the "dust" sinks. It is then merely clay and is no longer a contaminant.

The cans, tubes, and stoppers should be buried. Triple rinse the cans and tubes before crushing and burial. Flasks may be recycled.

EQUIPMENT FOR PERSONAL PROTECTION

Due to the manner in which **gasloxin**® is formulated, it is not necessary to wear a gas mask when it is applied. If directions for use are followed, the applicator will not be exposed to harmful concentrations of gas. Even so, it is mandatory that at least two approved gas masks be on the job site and available for immediate emergency use.

It is a federal requirement that gas masks be fitted with a canister of the same manufacturer and designed to offer respiratory protection against the specific gas being used.

It will be necessary to don a gas mask if:

- a) a structure under fumigation must be entered in case of an emergency.
- b) a structure must be entered to commence aeration procedures.

GAS DETECTION DEVICES

There are several gas detection devices available which the fumigator can use to determine gas concentrations. The devices consist of a pump designed to draw a specific volume of air, and a graduated glass tube filled with a chemical that reacts with hydrogen phosphide. In use, the gas laden air is drawn through the tube and the concentration can be read from the amount of discoloration which results.

There are two types of tubes available; high range tubes for assessing the effectiveness of a treatment, and low range tubes for assuring worker safety.

FIRST AID INSTRUCTIONS

Hydrogen phosphide is a very toxic gas to all forms of animal life, and exposure to even small amounts should be prevented. Poisoning must result from ingestion or inhalation as hydrogen phosphide is not absorbed through the skin. It is also insoluble in water, fats, and oils.

Symptoms of Poisoning:

Exposure to hydrogen phosphide produces symptoms of poisoning, the severity of which is dependent on the concentration involved. Mild poisoning results in fatigue, nausea, pressure or pain in the chest, ringing in the ears, and uneasiness. As hydrogen phosphide is not a chronic poison, these symptoms will readily disappear with rest and fresh air.

Greater quantities of gas produce such symptoms as vomiting, stomach ache, diarrhea, disturbance in equilibrium, and dyspnea (difficulty in breathing). Very high concentrations quickly cause cyanosis (bluish-purple skin color), agitation, ataxia, anoxemia (subnormal blood oxygen content), unconsciousness, and death. Death can occur very quickly or be delayed several days as a result of pulmonary edema, and collapse, by paralysis of the central respiratory system. Because of heavy poisoning, disturbance in liver and kidney function (hematuria, proteinuria, uremia, jaundice), and arrhythmia can also occur.

First Aid Treatment:

Should exposure to hydrogen phosphide be documented or suspected:

1. Call a physician immediately.
2. Remove patient from gas atmosphere.
3. Have patient lay down, keeping him warm and comfortable. Treat as for shock.
4. **Make no antidotal use of fats, oil, butter, or milk. Do not administer atropine as it is contraindicated.**
5. Commence artificial respiration: if breathing has ceased.
6. Even when exposure to low concentrations of hydrogen phosphide have been documented or suspected, the individual involved should rest for 24 hours and under no circumstances should he resume any work dealing with fumigation during that period.

ADVICE TO PHYSICIANS:

To be used in accordance with his own best judgement.

1. Mild cases of poisoning may not manifest themselves for up to 24 hours and the following is recommended:
 - a) Complete bed rest for 1-2 days during which time the patient should be kept warm and quiet.
 - b) As poisoning is not chronic, symptoms will disappear by themselves.
2. Severe poisoning will be readily apparent. Steroid therapy should be considered when pulmonary edema is observed, and close medical supervision is suggested. Blood transfusions may also be required.

3. In case of suicidal attempts by swallowing tablets or pellets, the stomach should be flushed with a dilute solution of potassium permanganate or a solution of magnesium peroxide until flushing liquid ceases to smell of carbide. Thereafter administer *carbo medicinalis*.

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