PM32 43568-2

1 of 18

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

FEB 18 1992

Phos-Fume Chemical Co., Inc.
A Subsidiary of Midland Fumigants, Inc.
1805 South Second Street
Leavenworth, KS 66048

Attn: Ms. Jody A. Fox

Subject: Fumiphos 60% Aluminum Phosphide Bags
EPA Registration No. 43568-2
Your Application of November 18, 1991

Your recent submission concerning a proposed name change for the subject product and revised labeling has been reviewed, please note the following.

- The proposed product name change from "Quick Phos Aluminum Phosphide Bags" to "Fumiphos 60% Aluminum Phosphide Bags" is acceptable.

- The labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable. A stamped copy is enclosed for your records.

- The applicator's manual accompanying this submission, which is considered part of the product labeling is also acceptable. A stamped copy is enclosed for your records.

- The Confidential Statement of Formula enclosed with this submission, revised to reflect the name change, agrees with the label, and has been included in your product's confidential file.

Sincerely,

Ruth G. Douglas
Product Manager (32)
Antimicrobial Program Branch
Registration Division (H7504C)

CONCURRENCES								
SYMBOL								
SURNAME	Douglas							
DATE	FEB 18 199							

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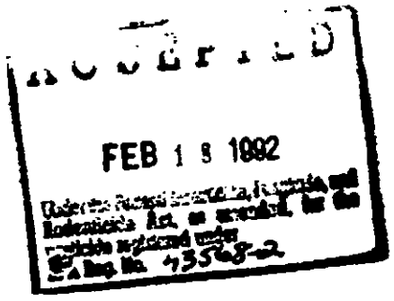


PRECAUTIONARY STATEMENTS
Hazards to Humans and Domestic Animals
KEEP OUT OF REACH OF CHILDREN
DANGER - POISON

Aluminum phosphide powder or bags may be fatal if swallowed. Do not get in eyes, on skin, or on clothing. Do not eat, drink, or smoke while handling aluminum phosphide fumigants. If a sealed container is opened, or if the material comes in contact with moisture, water, or acids, extremely toxic phosphine gas will be released. If a garlic odor is detected, you must monitor to determine whether phosphine gas is present above the acceptable exposure limits (see section on respiratory protection). Since an odor may not be detected under certain circumstances, the absence of a garlic odor does not mean that phosphine gas is absent. Observe proper application, aeration, re-entry, and disposal procedures specified elsewhere in the labeling to prevent overexposure.

NOTE TO PHYSICIAN: Aluminum phosphide react with moisture in the air, with acid and other liquids to release phosphine gas. Mild exposure by inhalation causes malaise, ringing of ears, fatigue, nausea, and pressure in the chest which is relieved by removal to fresh air. Moderate poisoning causes weakness, vomiting, epigastric pain, chest pain, diarrhea, and dyspnea. Severe poisoning may occur in a few hours to several days, resulting in pulmonary edema and may lead to dizziness, cyanosis, unconsciousness, and death.

In sufficient quantity, phosphine affects the liver, kidneys, lungs, nervous system, and circulatory system. Inhalation can cause lung edema and hyperemia, small perivascular brain hemorrhages, and brain edema. Ingestion can cause lung and brain symptoms, but damage to the viscera is more common. Phosphine poisoning may result in (1) pulmonary edema;(2) liver elevated serum GOT, LDH and alkaline phosphatase, reduced prothrombin, hemorrhage and jaundice, and (3) kidney hematuria and anuria. Pathology is characteristic of hypoxia. Frequent exposure over a period of days or weeks may cause poisoning. Treatment is symptomatic.

ENVIRONMENTAL HAZARDS

This product is very highly toxic to fish and wildlife. Non-target organisms exposed to phosphine gas will be killed. Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Do no contaminate water by cleaning of equipment or disposal of wastes. See Product Manual for additional Environmental Hazards.

PHYSICAL/CHEMICAL HAZARDS

Aluminum phosphide will release phosphine gas if exposed to moisture from the air or if it comes into contact with water, acids, and many other liquids. Piling of dust from their fragmentation may cause a temperature increase and confine the release of gas so that ignition could occur.

Always open container of aluminum phosphide products outdoors, as under certain conditions they may flash upon opening. When opening, point the container away from the face and body and slowly loosen the cap. Although the chances for flash are very remote, never open these containers in a flammable atmosphere. These precautions will also reduce the applicator's exposure to phosphine gas.

Pure phosphine gas is practically insoluble in water, and oils, and is stable at normal fumigation temperatures. However, it may react with certain metals and cause corrosion, especially at higher temperatures and relative humidities. Metals such as copper, brass, other copper alloys, and precious metals such as gold and silver are susceptible to corrosion by phosphine. Thus, small electric motors, smoke detectors, brass sprinkler heads, batteries and battery chargers, fork lifts, temperature monitoring systems, switching gears, communication devices, computers, calculators, or other electrical equipment should be protected or removed before fumigation.

Phosphine gas will also react with certain metallic salts and, therefore, sensitive items such as photographic film, some inorganic pigments, etc., should not be exposed.

STORAGE AND HANDLING

Store in a dry, well-ventilated area away from heat, under lock and key. Post as a pesticide storage area. Do not contaminate water, food, or feed by storing pesticides in the same areas used to store these commodities. Do not store in buildings inhabited by humans or domestic animals. Aluminum phosphide products shall not be placed in, or attached to packages intended for retailers.

RESTRICTED USE PESTICIDE
DUE TO ACUTE INHALATION TOXICITY OF HIGHLY TOXIC PHOSPHINE GAS

For retail sale to and use only by Certified Applicators for those uses covered by the Applicator's certification or persons trained in accordance with the attached Product Manual working under the direct supervision of, and in the physical presence of the Certified Applicator on site or on the premises. Read and follow the label and the FUMIPHOS 60% Product Manual which contains complete instructions for the safe use of this pesticide.

FUMIPHOS 60%®
ALUMINUM PHOSPHIDE FUMIGANT BAGS

A fumigant for use against listed insects which infest listed raw Agricultural Commodities, specified Processed Foods, and Animals Feeds. (See Product Manual)

ACTIVE INGREDIENT:	
Aluminum Phosphide	60%
INERT INGREDIENTS:	40%
Total	100%

KEEP OUT OF REACH OF CHILDREN

DANGER  **PELIGRO**

POISON

PRECAUCION AL USUARIO: Si usted no las ingles, no use este producto hasta que la etiqueta se le haya sido explicado ampliamente.

STATEMENT OF PRACTICAL TREATMENT

Symptoms of overexposure to phosphine are headache, dizziness, nausea, difficult breathing, vomiting, diarrhea. In all cases of overexposure get medical attention immediately. Take victim to a doctor or emergency treatment facility.

IF THE GAS FROM ALUMINUM PHOSPHIDE IS INHALED: Get exposed person to fresh air. Keep warm and make sure person can breathe freely. If breathing has stopped, give artificial respiration by mouth-to-mouth or other means of resuscitation. Do not give anything by mouth to an unconscious person.

IF ALUMINUM PHOSPHIDE IS SWALLOWED: Drink or administer one or two glasses of water and induce vomiting by touching back of throat with finger or, if available, syrup of ipecac. Do not give anything by mouth if victim is unconscious or not alert.

IF POWDER OR GRANULES OF ALUMINUM PHOSPHIDE GET ON SKIN: Brush material off clothes and shoes in a well ventilated area. Allow clothes to aerate in a ventilated area prior to laundering. Wash contaminated bare skin thoroughly with soap and water.

IF IN EYES: Flush with plenty of water. Get medical attention.

SEE SIDE PANEL AND PRODUCT MANUAL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

EPA REG. NO. 43568-2 EPA EST. NO. 30574-CI-1

Contents: 10 x 34 grams - Net Weight: 340 grams

Manufactured for: PHOS-FUME CHEMICAL CO.
A Subsidiary Company of
MIDLAND FUMIGANTS INC.
1805 South 2nd Street
Leavenworth, Kansas 66048

DIRE

"It is a violation of Federal Law to u

This fumigant is a highly hazardou use. Before using, read and follo Manual. Product Manual for comp South 2nd, Leavenworth, KS 6604

SPILL AN

A spill, other than incidental to ap therefore, attending personnel mu gas is unknown. Other NIOSH/MS is known. Do not use water at sp with unreacted tablets will greatly toxic and/or fire hazard. Wear cote Return all intact cans to cardboard according to DOT regulations. Not If cans have been punctured or da aluminum tape or the aluminum metal container which should be damaged container to an area se recommendations may be obtaine

STOR

STORAGE:

Store in a locked, dry, well ventil contaminate water, food, or fe commodities. Do not store in bu

DISPOSAL:

Unreacted or partially reacted a excess pesticide, spray mixture, disposed of by use according to Control Agency, or the Hazardo guidance. For specific instructio Some local and state waste dis Disposal procedures should be local regulations. Contact your Waste Specialist at the nearest D Triple rinse flasks and stoppers and dispose of in a sanitary authorities. Flasks may be disp procedures. It is also permissible the flasks is reacted. Then punct by other procedures approved by If properly exposed, the residue be grayish-white and contain no from incompletely exposed alu FUMIGANTS INC. Product Manu

SEE PRODUCT

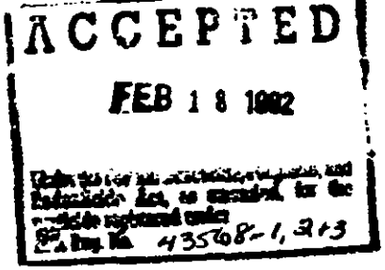
Seller does not make warranties these directed on the label. Cu contrary to label recommendatio

FOR

FUMIPHOS

TABLETS, PELLETS, AND BAGS

For use against insects which infest stored Commodities and Control of Burrowing Pests



Active Ingredient:

Aluminum Phosphide	60%
Inert Ingredient	40%
Total	100%

KEEP OUT OF REACH OF CHILDREN

DANGER - POISON - PELIGRO

PELIGRO AL USUARIO: Si usted no lee ingles, no use este producto hasta que la etiqueta se la haya sido explicado ampliamente.

(TO THE USER: If you cannot read English, do not use this product until the label and manual has been fully explained to you.)

STATEMENT OF PRACTICAL TREATMENT

Symptoms of overexposure are headache, dizziness, nausea, difficult breathing, vomiting, and diarrhea. In all cases of overexposure get medical attention immediately. Take victim to a doctor or emergency treatment facility.

If the gas or dust from aluminum phosphide is inhaled:
Get exposed person to fresh air. Keep warm and make sure person can breathe freely. If breathing has stopped give artificial respiration by mouth-to-mouth or other means of resuscitation. Do not give anything by mouth to an unconscious person.

If aluminum phosphide pellets, tablets, or bags are swallowed:
Drink or administer one or two glasses of water and induce vomiting by touching the back of the throat with finger, or if available, syrup of ipecac. Do not give anything by mouth if victim is unconscious or not alert.

If powder or granules of aluminum phosphide get on skin or clothing:
Brush or shake material off clothes and shoes in a well ventilated area. Allow clothes to aerate in a ventilated area prior to laundering. Do not leave contaminated clothing in occupied and or confined areas such as automobiles, vans, motel rooms, etc. Wash contaminated skin thoroughly with soap and water.

If dust from pellets or tablets gets in eyes:
Flush with plenty of water. Get medical attention immediately.

THIS PRODUCT IS ACCOMPANIED BY AN APPROVED LABEL AND APPLICATOR'S MANUAL. READ AND UNDERSTAND THE ENTIRE LABELING. ALL PARTS OF THE LABELING ARE EQUALLY IMPORTANT FOR SAFE AND EFFECTIVE USE OF THIS PRODUCT. CALL MIDLAND FUMIGANTS, OR EPA IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABELING. REFER TO THE APPLICATOR'S MANUAL FOR DETAILED PRECAUTIONS, RECOMMENDATIONS AND DIRECTIONS FOR USE.

WARRANTY

Seller warrants that the product conforms to its chemical description and when used according to label directions under normal conditions of use, it is reasonably fit for the purposes stated on the label. Seller makes no other warranty, either express or implied, and buyer assumes all risk should the product be used contrary to label instructions.

CLASSIFIED BY UNDERWRITERS LABORATORIES, INC. AS TO FIRE HAZARD ONLY WHEN USED SPECIFICALLY AS DIRECTED IN THE MANUFACTURER'S INSTRUCTIONS. FUMIPHOS TABLETS, PELLETS, AND BAGS ARE NONCOMBUSTIBLE, BUT EXPOSURE TO MOIST AIR OR WATER RELEASES FLAMMABLE AND TOXIC PHOSPHINE (HYDROGEN PHOSPHIDE) GAS. SPONTANEOUS IGNITION MAY RESULT IF CONTACTED BY WATER, ACIDS, OR CHEMICALS.

TABLE OF CONTENTS

SECTION 1
INTRODUCTION

FUMIPHOS fumigants are used to protect stored commodities from damage by insects and for the control of burrowing pests. Fumigation of stored products with FUMIPHOS in the manner prescribed in the labeling does not contaminate the stored commodity.

FUMIPHOS and other Aluminum Phosphide fumigants are acted upon by atmospheric moisture to produce Hydrogen Phosphide (phosphine, PH_3) gas. FUMIPHOS tablets, pellets, and bags contain aluminum phosphide (ALP) as their active ingredient and will liberate hydrogen phosphide via the following chemical reaction:

$$ALP + 3H_2O \longrightarrow Al(OH)_3 + PH_3$$

Hydrogen phosphide gas is highly toxic to insect, burrowing pests, humans, and other forms of animal life. In addition to its toxic properties, the gas will corrode certain metals and may ignite spontaneously in air at concentrations above its lower flammable limit of 1.8% (v/v). These hazards will be described in greater detail later on in this Applicators Manual for FUMIPHOS pellets, tablets, and bags.

FUMIPHOS also contains ammonium carbamate which liberates ammonia and carbon dioxide as follows:

$$NH_2COONH_4 \longrightarrow 2NH_3 + CO_2$$

These gases are essentially nonflammable and act as inerting agents to reduce fire hazards. The ammonia gas also serves as a warning agent.

FUMIPHOS is prepared in three forms, tablets, pellets, and bags. The rounded tablets weigh approximately 3 grams and release 1 gram of hydrogen phosphide gas. They are about 16mm in diameter and are bulk packaged in resealable aluminum flasks containing 100 or 500 tablets each. The pellets weigh approximately 0.6 gram and release 0.2 gram of hydrogen phosphide gas. They are about 16 mm in diameter and are packaged in resealable flasks containing about 1660 pellets.

The bags weigh 34 grams each and release 11 grams of hydrogen phosphide gas. They are packaged in metal containers of ten or one hundred bags to the container. The bags are packaged in an oxygen free environment.

Upon exposure to air FUMIPHOS pellets, tablets, and bags begin to react with atmospheric moisture to produce small quantities of hydrogen phosphide gas. This reaction starts slowly, gradually accelerates and then tapers off again as the aluminum phosphide is spent. FUMIPHOS pellets react somewhat faster than do the tablets and bags. The rates of decomposition of the tablets, pellets and bags will vary depending upon moisture and temperature conditions. For example, when moisture and temperature of the fumigated commodity are high, decomposition of FUMIPHOS may be complete in less than 3 days. However at lower ambient temperatures and relative humidity levels, decomposition of FUMIPHOS may require 5 days or more. After decomposition, FUMIPHOS leaves a gray-white powder composed almost entirely of aluminum hydroxide and other approved inert ingredients. This will cause no problems if the fumigant has been added directly to commodity such as grain or bulk animal feed. However, the spent powder must usually be retrieved for disposal after space fumigations. If properly exposed, the spent FUMIPHOS will normally contain only a small amount of unreacted aluminum phosphide and may be disposed without hazard. While not considered a hazardous waste, partially spent residual from incompletely exposed FUMIPHOS will require special care. Precautions and instructions for further deactivation and disposal will be given later in this Manual.

FUMIPHOS pellets, tablets and bags are supplied in gas tight containers and their shelf life is unlimited as long as the packaging remains intact. Once opened for fumigation , the flasks of tablets and pellets may be tightly resealed and stored for future use. FUMIPHOS bags container cannot be resealed for future use. Storage and handling instructions will be given in detail later in this Applicators Manual.

A summary of safety recommendations is outlined below:

SAFETY RECOMMENDATION SUMMARY

1. Carefully read the labeling and follow instructions
2. Never fumigate alone from inside the storage structure.
3. Person supervising must be a certified fumigator and personnel assisting must be trained in the use of ALP. Never allow uninstructed personnel to handle FUMIPHOS.
4. Approved respiratory protection must be available for the fumigation of structures from within.
5. Wear dry gloves of cotton or other material if contact with FUMIPHOS tablets, pellets or bags is likely. Aerate used gloves and other contaminated clothing in a well ventilated area prior to laundering. Wash hands thoroughly after using FUMIPHOS.
6. Open fumigant containers in open air only. Never open in a flammable atmosphere.
7. Do not allow FUMIPHOS to contact liquid or pile up.
8. Dispose of empty containers and spent residual dust in a manner consistent with the label instructions.
9. Post warning placards on fumigated areas.
10. Prior to fumigation, notify appropriate company employees. Provide to local officials (fire department, rescue squad, police, etc. on an annual basis relevant safety information for use in the event of an emergency.
11. Hydrogen phosphide fumigants are not to be used for vacuum fumigations.
12. Exposure to hydrogen phosphide must not exceed the eight hour TWA of 0 3 ppm during application, or a ceiling concentration of 0.3 ppm after application is completed.
13. Fumigated areas must be aerated to 0.3 ppm hydrogen phosphide or less prior to reentry by unprotected workers.
14. Finished foods and feeds that have been fumigated with FUMIPHOS must be aerated for 48 hours prior to offering to the end use consumer.
15. Transfer of a treated commodity to another site with-out complete aeration is permissible provided that the new storage site is placarded if its concentration is above 0.3 ppm..
16. Keep containers of FUMIPHOS tightly closed except while removing product for application.
17. Protect materials containing metals such as copper, silver, gold and their alloys and salts from corrosive exposure to hydrogen phosphide.
18. Tablets , pellets and bags must not come in contact with any processed food except that may be added directly to processed brewers rice, malt and corn grits used in the manufacture of beer.
19. Do not use aluminum phosphide containers for any purpose other than recycling or reconditioning.
20. OSHA recommends preexposure screening of employees to detect impaired pulmonary function. They recommend that any employees developing this condition be referred for medical examination.

SECTION 2
PRECAUTIONARY STATEMENTS

A. Hazards to Humans and Domestic Animals

DANGER: Aluminum phosphide from FUMIPHOS tablets, pellets or bags may be fatal if swallowed. Do not get in eyes, on skin or on clothing. Do not eat, drink or smoke while handling aluminum phosphide fumigants. If a sealed container is opened, or if the material comes in contact with moisture, water or acids, these products will release hydrogen phosphide (phosphine, PH3) which is an extremely toxic gas. If a garlic odor is detected refer to the Industrial Hygiene Monitoring section on page 14 of the Applicators Manual for appropriate monitoring procedures. Pure hydrogen phosphide gas is odorless: the garlic odor is due to contaminant. Since the odor of hydrogen phosphide may not be detected under some circumstances, the absence of a garlic odor does not mean that dangerous levels of hydrogen phosphide gas are absent. Observe proper reentry procedures specified elsewhere in the labeling to prevent overexposure.

B. Statement of Practical Treatment

Symptoms of overexposure are headache, dizziness, nausea, difficult breathing, vomiting, and diarrhea. In all cases of overexposure get medical attention immediately. Take victim to a doctor or emergency treatment facility.

If the gas or dust from aluminum phosphide is inhaled:

Get exposed person to fresh air. Keep warm and make sure person can breathe freely. If breathing has stopped, give artificial respiration by mouth-to-mouth or other means of resuscitation. Do not give anything by mouth to an unconscious person.

If aluminum phosphide pellets, tablets or bags are swallowed

Drink or administer one or two glasses of water and induce vomiting by touching back of throat with finger, or if available, syrup of ipecac. Do not give anything by mouth if victim is unconscious or not alert.

If powder or granules of aluminum phosphide get on skin or clothing: Brush or shake material off clothes and shoes in a well ventilated area. Allow clothes to aerate in a ventilated area prior to laundering. Do not leave contaminated clothing in occupied and/or confined areas such as automobiles, vans, motel rooms, etc. Wash contaminated skin thoroughly with soap and water.

If dust from pellets, tablets or bags gets in eyes:

Flush with plenty of water. Get medical attention.

C. Note to Physician (we recommend that this section be given to the attending physician)

Aluminum phosphide tablets , pellets or bags react with moisture from the air , acids and many other liquids to release hydrogen phosphide (phosphine PH3) gas. Mild exposure by inhalation causes malaise (indefinite feeling of sickness) ringing in the ears, fatigue, nausea and pressure in the chest which is relieved by removal to fresh air. Moderate poisoning may occur within a few hours to several days resulting in pulmonary edema (fluid in lungs) and may lead to dizziness, cyanosis (blue or purple skin color), unconsciousness, and death.

In sufficient quantity, phosphine affects the liver, kidneys, lungs, nervous system and circulatory system. Inhalation can cause lung edema (fluid in lungs) and hyperemia (excess of blood in body parts), small perivascular brain hemorrhages and brain edema (fluid in brain). Ingestion can cause lung and brain symptoms but damage to the viscera (body cavity organs) is more common. Phosphine poisoning may result in (1) pulmonary edema, (2) liver elevated serum GOT, LDH and alkaline phosphatase, reduced prothrombin, hemorrhage, and jaundice (yellow skin color) and (3) kidney hematuria (blood in urine) and anuria (abnormal or lack of urination). Pathology is characteristic of hypoxia (oxygen deficiency in body tissue). Frequent exposure to concentration above permissible levels over a period of days or weeks may cause poisoning. Treatment is symptomatic.

The following measures are suggested for use by the physician in accordance with his own judgement:
In its milder forms, symptoms of poisoning may take some time (up to 24 hours) to make their appearance, and the following is suggested.

1. Give complete rest for 1-2 days, during which the patient must be kept quiet and warm.
2. Should patient suffer from vomiting or increased blood sugar, appropriate solutions should be administered. Treatment with oxygen breathing equipment is recommended as is the administration of cardiac and circulatory stimulants.

In cases of severe poisoning (Intensive Care Unit recommended):

1. Where pulmonary edema is observed, steroid therapy should be considered and close medical supervision is recommended. Blood transfusions may be necessary.
2. In case of manifest pulmonary edema, venesection should be performed under vein pressure control. Heart glycosides (I.V.) (in case of hemoconcentration, venesection may result in shock). On progressive edema of the lungs: immediate intubation with a constant removal of edema fluid and oxygen over-pressure respiration, as well as any measures required for shock treatment. In case of kidney failure extracorporeal hemodialysis is necessary. There is no specific antidote known for the poisoning.
3. Mention should be made here of suicidal attempts by taking solid phosphide by mouth. After swallowing: emptying of the stomach by vomiting, flushing of the stomach with diluted potassium permanganate solution of magnesium peroxide until flushing ceases to smell of carbide. Thereafter apply carbomedicinalis.

D. Physical and Chemical Hazards

Aluminum phosphide in tablets, pellets and bags will release hydrogen phosphide if exposed to moisture from the air or if it comes in contact with water, acids and many other liquids. Piling of tablets, pellets, or bags from their fragmentation may cause a temperature increase and confine the release of gas so that ignition could occur.

It is preferable to open containers of aluminum phosphide products in open air, as under certain conditions, they may flash upon opening. You may also wish to open containers near a fan or other appropriate ventilation which will rapidly exhaust contaminated air. When opening, point the container away from the face and body and slowly loosen the cap. Although the chances for a flash are remote never open the containers in a flammable atmosphere. These precautions will also reduce the fumigator's exposure to hydrogen phosphide.

Pure phosphine (hydrogen phosphide) gas is practically insoluble in water, fats and oils, and is stable at normal fumigation temperatures. However, it may react with certain metals and cause corrosion, especially at higher temperatures and relative humidities. Metals such as copper, brass and other copper alloys, and precious metals such as gold and silver are susceptible to corrosion by phosphine. Thus, small electric motors, smoke detectors , brass sprinkler heads, batteries and battery chargers, fork lifts, temperature monitoring systems, switching gears, communication devices, computers, calculators and other electrical equipment should be protected or removed before fumigation. Hydrogen phosphide will also react with certain metallic salts and therefore, sensitive items such as photographic film, some inorganic pigments, etc. should not be exposed.

SECTION 3
DIRECTIONS FOR USE

A. General

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

1. FUMIPHOS tablets, pellets and bags are Restricted Use Pesticide due to the acute inhalation of hydrogen phosphide (phosphine PH 3) gas. These products are for retail sale to and use only by certified applicators for uses covered by the applicators certification or person trained in accordance with the Applicators Manual working under the direct supervision and in the physical presence of the applicator. Physical presence means on site or on the premises. Read and follow the label and the FUMIPHOS Applicators Manual which contains complete instructions for the safe use of this pesticide.

2. FUMIPHOS is a highly hazardous materia. and should be used only by individuals trained in its proper use. Before using read and follow the label precautions and directions.

Additional copies of this Manual are available from: **PHOSFUME CHEMICAL CO. a subsidiary of Midland Fumigant Co., Inc.,** 1805 S. 2nd St., Leavenworth, KS 66048.

Persons working with FUMIPHOS should be knowledgeable of the hazards of this chemical and trained in the use of required respiratory equipment and detector device, emergency procedures and use of the fumigant.

3. A licensed fumigator must be present and at least two persons trained in the use of ALP should be present during fumigation of structure if entry into the structure is required for application of the fumigant. Two trained persons must also be present during reentry into fumigated or partially aerated structures. Only one trained person is required to be present when FUMIPHOS is applied from outside the area to be treated.

4. Shipholds, barges, containers on ships, railroad cars and containers shipped piggyback by railway may be fumigated intransit. However, trucks, vans, trailers and similar transport vehicles cannot be moved over public roads and highways until they are aerated and the warning placards removed.

5. Do not fumigate commodities with FUMIPHOS when commodity temperature is below 40 degrees F. (5 degrees C.).

6. The site to be fumigated must first be inspected to determine if it can be sufficiently gas tight. Then a plan should be developed to provide for safe and efficient application of the fumigant to include emergency procedures etc., where required, and to decide how monitoring should be conducted to prevent excessive exposures.

7. Wear dry gloves of cotton or other material while handling FUMIPHOS tablets, pellets, or bags. Wash hands thoroughly after use.

8. Hydrogen phosphide gas may flash at concentration above its flammable limit. Therefore, always open FUMIPHOS containers in open air and never in a flammable atmosphere. This precaution will not only prevent harm in the unlikely event of a flash but ,will reduce the applicators exposure to hydrogen phosphide gas.

9. Piling of tablets, pellets or bags or addition of liquid to FUMIPHOS may speed up the reaction, cause a temperature increase and confine the gas so that ignition could occur.

10. As much as is possible protect unused FUMIPHOS from excessive exposure to atmospheric moisture during application and tightly reseal the aluminum flask prior to returning tablets or pellets to storage. FUMIPHOS bag containers once opened cannot be resealed for future use.

11. Hydrogen phosphide gas may react with certain metals and their salts to produce corrosion. Copper, copper alloys and precious metals such as silver and gold are susceptible to corrosion and items containing these elements should be removed or protected prior to fumigation with FUMIPHOS.

12. Do not allow FUMIPHOS or its residual dust to come in contact with processed foods or commodity packages intended for retailers except that FUMIPHOS tablets pellets or bags may be added directly to processed brewers rice, malt and corn grits used in the manufacture of b

13. Respiratory protection approved for the concentration which the fumigator will be exposed must be available if FUMIPHOS is to be applied from within the structure to be fumigated. Respiratory protection need not be available for uses such as outdoor application, addition of tablets or pellets to automatic dispensing devices, etc., if exposures above the TLV's will not be encountered.

A NIOSH/MSHA approved, full-face gas mask -hydrogen phosphide canister combination may be used at levels up to 15 ppm. Above this level or in situations where the hydrogen phosphide concentration is unknown a NIOSH/MSHA approved, self contained breathing apparatus (SCBA) or its equivalent must be used.

14. Notify appropriate company employees prior to fumigation. Provide to local officials (fire department, rescue squad, police, etc.) on annual basis relevant safety information for use in the event of an emergency

B. Efficacy

FUMIPHOS has been found effective against the following insects and their preadult stages - that is eggs, larvae, and pupae:

almond moth	hairy fungus beetle
angoumois grain moth	Hessian fly
bean weevil	Indian meal moth
bees	khapra beetle
cadelle	lesser grain borer
carpet beetle	maize weevil
cigarette beetle	Mediterranean flour moth
confused flour beetle	pink bollworm
dermestid beetles	raisin moth
dried fruit beetle	red flour beetle
dried fruit moth	rice weevil
European grain moth	rusty grain weevil
flat grain beetle	saw-toothed grain beetle
fruit flies	spider beetles
granary weevil	tobacco moth
greater wax moth	yellow meal worm

Although it is possible to achieve total control of the listed insect pests, this is frequently not realized in actual practice. Factors contributing to less than 100% control are leaks, poor gas distribution, unfavorable exposure conditions, etc. In addition , some insects are less susceptible to hydrogen phosphide than others. If maximum control is to be attained extreme care must be taken in sealing, the higher dosages must be used, exposure periods must be lengthened, proper application procedures followed and temperature and humidity must be favorable.

C. Exposure Conditions

The following conditions may be used as a guide in determining the minimum length of the exposure period at the indicated temperatures:

Minimum Exposure Periods for FUMIPHOS

Temperature	Pellets	Tablets	Bags
below 40°F (5°C)	Do not fumigate	Do not fumigate	Do not fumigate
40°-53°F (5-12°C)	8 days (192 hours)	10 days (240 hours)	14 days (336 hours)
54°-59° F (12-15°C)	4 days (96 hours)	5 days (120 hours)	7 days (168 hours)
60°-68° F (16-20°C)	3 days (72 hours)	4 days (96 hours)	4 days (96 hours)
above 68° F (20°C)	2 days (48 hours)	3 days (72 hours)	3 days (72 hours)

The length of the fumigation must be great enough so as to provide for adequate control of the insect pests which infest the commodity being treated. Additionally, the fumigation period should be long enough to allow for more or less complete reaction of FUMIPHOS with moisture so that little or no unreacted aluminum phosphide remains. This will minimize exposures during further storage and/or processing of the treated bulk commodity as well as reduce hazards in the disposal of partially spent aluminum phosphide products remaining after space fumigations. The proper length of the fumigation period will vary with exposure conditions since, in general, insects are more difficult to control at lower temperatures and the rate of hydrogen phosphide gas production by FUMIPHOS is less at lower temperatures and humidities.

It should be noted that there is little to be gained by extending the exposure period if the structure to be fumigated has not been carefully sealed or if the distribution of gas is poor and insects are not subjected to lethal concentrations of hydrogen phosphide. Careful sealing is required to ensure that adequate gas levels are retained and proper application procedures must be followed to provide satisfactory distribution of hydrogen phosphide gas. Some structures can only be treated when completely tarped, while others cannot be properly sealed by any means and should not be fumigated. Exposure times must be lengthened to allow for penetration of gas throughout the commodity when fumigant is not uniformly added to the mass, for example, by surface application or shallow probing. This is particularly important in the fumigation of bulk commodity contained in large storages.

Remember, exposure periods in the table are minimum periods and may not be adequate to control all stored products pests under all conditions nor will they always provide for total reaction of FUMIPHOS, particularly if temperatures and commodity moisture levels or humidity are low during the fumigation.

D. Commodities Which May be Fumigated with FUMIPHOS

FUMIPHOS may be used for the fumigation of listed raw agricultural commodities, animal feed and feed ingredients, processed foods, tobacco and certain other non-food items.

1. Raw Agricultural Commodities, Animal Feed and Feed Ingredients

FUMIPHOS tablets, pellets and bags may be added directly to animal feed, feed ingredients and raw agricultural commodities stored in bulk. For these commodities not stored in bulk, FUMIPHOS may be placed in moisture permeable envelopes, on trays, in bags, etc. and fumigated as with processed foods.

Raw Agricultural Commodities and Animal Feed and Feed Ingredients Which May be Fumigated with FUMIPHOS

Almonds	Peanuts
Animal Feed	Pecan
Barley	Pistachio Nuts
Brazil Nuts	Popcorn
Cashews	Rice
Cocoa Beans	Rye
Coffee Beans	Safflower Seed
Corn	Seed & Pod Vegetables
Cottonseed	Sesame Seed
Dates	Sorghum
Filberts	Soybeans
Flower Seed	Sunflower Seeds
Grass Seed	Triticale
Legumes	Vegetable Seeds
Millet	Walnuts
Oats	Wheat

2. Processed Foods

The listed processed foods may be fumigated with FUMIPHOS. Under no condition shall any processed food or bagged commodity come in contact with FUMIPHOS tablets, pellets, bags or residual dust except that FUMIPHOS may be added directly to processed brewer's rice, malt and corn grits for use in the manufacturer of beer.

Processed Foods Which May be Fumigated with FUMIPHOS

Processed candy and Sugar
Cereal Flours and Bakery Mixes
Cereal Foods (including cookies, crackers, macaroni, noodles, pasta, pretzels, snack foods and spaghetti)
Processed Cereals (including milled fractions and packaged cereals)
Cheese and Cheese By-products
Chocolate & Chocolate Products (assorted chocolate, chocolate liquor, cocoa, cocoa powder, dark chocolate coating and milk chocolate)
Processed Coffee
Corn Grits
Cured, Dried and Processed Meat Products and Dried Fish
Dates and Figs
Dried Eggs and Egg Yolk Solids
Dried Milk, Dried powdered milk, Non-dairy Creamers, and Nonfat Dried Milk
Dried or Dehydrated Fruits (apples, dates, figs, peaches, pears, prunes, raisins and sultanas)
Processed Herbs, Spices, Seasonings and condiments
Malt
Processed Nuts (almond, apricot kernels, Brazil nuts, cashews, filberts, peanuts, pecans, pistachio nuts, and walnuts)
Processed oats (including oatmeal)
Rice (brewers rice grits, enriched and polished wild rice)
Processed Tea
Dried and Dehydrated Vegetables (beans, carrots, lentils, peas, potato products and spinach)
Yeast (including primary yeast)

3. Nonfood commodities, Including Tobacco

The listed nonfood items may be fumigated with FUMIPHOS. Tobacco and certain other of the nonfood commodities should not be contacted by tablets, pellets or residual dust.

4. Nonfood Commodities which may be Fumigated with FUMIPHOS

Processed or Unprocessed Cotton, Wool and other Natural fibers or Cloth, Clothing
Straw and Hay
Feathers
Human Hair, Rubberized Hair, Vulcanized hair Mohair
Leather Products, Animal Hides and Furs
Tobacco
Wood, Cut Trees, Wood Chips and Wood and Bamboo Products
Paper and Paper Products
Dried Plants and Flowers
Seeds (grass seed, ornamental herbaceous plant seed and vegetable seed)

E. Recommended Dosages

Hydrogen phosphide is a mobile gas will penetrate to all parts of the storage structure. Therefore, dosage must be based upon the total volume of the space being treated and not on the amount of commodity it contains. The same amount of FUMIPHOS is required to treat a 30,000 bushel silo whether it is empty or full of grain unless, of course, the surface of the commodity is sealed off by a tarpaulin. The following dosage ranges are recommended for bulk and space fumigations:

Dosage Guidelines for Fumigations with FUMIPHOS

Product	per 1000 cu. ft.*	per 1000 bu.*
Bags	2 -6	2 - 6
Pellets	100 - 725	120 - 900
Tablets	20 - 145	25 - 180

*Dosage range for dates, nuts & dried fruits is 100-200 pellets, 20-40 tablets, 2-6 bags/1000 cu. ft.; 125-250 pellets, 25-50 tablets, 125-250 pellets, 2-6 bags/1000 bu.

These dosages are not to be exceeded. It is important to be aware that a shortened exposure period cannot be fully compensated for with an increased dosage of hydrogen phosphide.

The wide range of dosages listed above is required to handle the variety of fumigation situations encountered in practice. Some what higher dosages are usually recommended under cooler, drier conditions or where exposure periods are relatively short.

However, the major factor in selection of dosage is the ability of the structure to hold hydrogen phosphide gas during the fumigation. A good illustration of this point is comparison of the low dosages required to treat modern, well-sealed warehouses with the higher range used for poorly constructed buildings that cannot be sealed adequately. In certain other fumigations, proper distribution of lethal concentrations of gas to reach all parts of the structure becomes a very important factor in dose selection. An example where this may occur is in the treatment of grain stored in tall silos. Poor gas distribution frequently results when the fumigant cannot be uniformly added to the grain and it must be treated by surface application.

Although it is permissible to choose from the full range of dosages listed above, the following dosages are recommended for the various types of fumigations:

Recommended FUMIPHOS Dosages for Various Types of Fumigations

Type of Fumigation 1. Space	Bags	Pellets	Tablets
Mills, Warehouse, etc.	2-6/1000 cu. ft.	100-300/1000 cu. ft.	20-60/1000 cu. ft.
Bagged Commodities	2-6/1000 cu. ft.	150-300/1000 cu. ft.	30-60/1000 cu. ft.
Processed Fruits & nuts	2-6/1000 cu. ft.	100-200/1000 cu. ft.	20-40/1000 cu. ft.
Stored tobacco	2-6/1000 cu. ft.	100-200-/1000 cu. ft	20-40/1000 cu. ft.
2. Bulk Stored Commodities Vertical storages	2-6/1000 cu. ft. 2-6/1000 BU	150-300/1000 cu. ft. 200-375/1000 BU	30-70/1000 cu. ft. 40-75/1000 BU
Tanks	2-6/1000 cu. ft. 2-6/1000 BU	150-350/1000 cu. ft. 200-450/1000 BU	30-60-/1000 cu. ft. 40-90/1000 BU
Flat storages	2-6/1000 cu. ft. 2-6/1000 BU	250-725/1000 cu. ft. 300-900/1000BU	50-145/1000 cu. ft. 60-180/1000 BU
Farm Bins	2-6/1000 cu. ft. 2-6/1000 BU	350-725/1000 cu. ft. 450-900/1000 BU	70-145/1000 cu. ft. 90-180/1000 BU
Bunkers & tarped ground storages	2-6/1000 cu. ft. 2-6/1000 BU	150-400/1000 cu. ft. 200-500/1000 BU	30-80/1000 cu. ft. 40-100/1000 BU
Railcars	2-6/1000 cu. ft. 2-6/1000 BU	150-325/1000 cu. ft. 200-400/1000 BU	30-65/1000 cu. ft. 40-80/1000 BU
Barges	2-6/1000 cu. ft. 2-6/1000 BU	150-400/1000 cu. ft. 200-500/1000 BU	30-80/1000 cu. ft. 40-100/1000 BU
Shipholds	2-6/1000 cu. ft. 2-6/1000 BU	150-330/1000 cu. ft. 200-375/1000 BU	30-66/1000 cu. ft. 40-75/1000 BU

Higher dosages are recommended in structures that are of loose construction and in the fumigation of bulk stored commodities in which diffusion will be slowed and result in poor distribution of hydrogen phosphide gas.

F. Application Procedures

1. General Statement

Regardless of the type of storage to be treated, there are several important factors common to all application procedures. A number of these points have been covered in other sections of the Applicator's Manual but are listed again in the following for completeness.

a. A plan should be devised for application, aeration and disposal of the fumigant so as to keep a minimum any exposures to hydrogen phosphide. See the requirements for Industrial Hygiene Monitoring under the Applicator and Worker Exposure section of this Applicators Manual.

b. FUMIPHOS tablets or pellets or bags should be applied so as to provide effective gas concentrations throughout the storage. When tablets or pellets or bags are not applied uniformly to a bulk commodity (surface application in a tall silo or ships hold for example), exposure times should be lengthened to allow for penetration of gas throughout the storage.

c. The storage structure should be sealed so as to maintain a suitable gas concentration over the time period required for control of insect pests.

d. Ideally, exposure periods should be long enough to provide for adequate control of insect pests and also more or less completely react the fumigant.

e. Piling of large numbers of tablets or pellets, whether applied to a bulk commodity or for space fumigation, may prevent complete breakdown of the product by limiting its access to moist air. This can result in decreased efficacy as a result of poor gas release and may leave an active residual for disposal which contains considerable amounts of unreacted aluminum phosphide. Piling of product may also result in increased hazard of fire if water should come into contact with the mass of aluminum phosphide.

f. Contact with liquid water should be carefully avoided when applying FUMIPHOS for treatment of bulk commodities or space.

g. Aluminum phosphide fumigants should not be applied to confined spaces where the concentration of hydrogen phosphide may build up to exceed its lower flammable limit.

h. Observe the precautionary and safety statements mentioned in this manual.

The following instructions are intended to provide general guidelines for typical fumigations. These instructions are not intended to cover every type of situation nor are they meant to be restrictive. Other procedures may be used if they are safe, effective and consistent with the properties of aluminum phosphide products.

2. Fumigations of Farm Bins

Leakage is the single most important cause of failures in the treatment of farm storages. Since these storages are often small, they usually have a higher leakage area in proportion to their capacity. Most wooden storage structures are so porous that they cannot be successfully fumigated unless they are completely tarped. Do not fumigate storages which will be entered by humans or animals prior to aeration. Do not fumigate areas which house sensitive equipment containing copper or other metals likely to be corroded by hydrogen phosphide gas.

Seal the bin as tightly as possible. It is recommended that the surface of the grain be covered with poly after FUMIPHOS has been applied. Tarping the grain surface will greatly reduce the leak rate of the gas as well as reduce the amount of FUMIPHOS required. Only the volume below the tarp must be dosed. If not tarped, the entire volume of the storage must be treated, whether full or empty.

FUMIPHOS tablets, pellets, or bags may be scattered over the surface or probed into the grain using a rigid PVC pipe about 5 to 7 feet in length and having a diameter of 1 1/4 inches. Use about 20-50 tablets or 100-250 pellets or 60-150 bags. Immediately cover the surface of the grain with a plastic tarpaulin. Place no more than 25 percent of the total dose at the bottom if the bin is equipped with aeration fans. Caution: Make sure that the aeration duct is dry before adding FUMIPHOS. Addition of FUMIPHOS to water in an aeration duct may result in a fire. Seal the aeration fan with 4 mil plastic sheeting.

Post fumigation warning signs on entrances to the bin and near the ladder.

Following aeration of the bin, the surface of the grain may be sprayed with an approved protectant to discourage reinfestation.

3. Fumigation of Flat Storages

a. Establish a plan for application of fumigant to the structure. Treatment of these types of storages may require considerable effort, therefore, sufficient manpower should be available to complete the work rapidly enough to prevent excessive exposure to hydrogen Phosphide gas. Vent flasks outside the storage, conduct fumigations during the cooler periods and employ other work practices to minimize exposures. It is often advisable to wear respiratory protection during application of fumigant to flat storages. Refer to the sections on Applicator and Worker Exposure and Respiratory Protection.

b. Seal any vents, cracks and other sources of leaks.

c. Apply tablets, pellets, or bags by surface application, shallow probing, deep probing or uniform addition as the bin is filled.

Storages requiring more than 24 hours to fill should not be treated by addition of fumigant to the commodity stream as large quantities of hydrogen phosphide may escape before the bin is completely sealed.

Probes should be inserted vertically at intervals along the length and width of the flat storage. Pellets, tablets or bags may be dropped into the probe at intervals as it is withdrawn.

Surface application may be used if the bin can be sufficiently gas tight to contain the fumigant gas long enough for it to penetrate the commodity. In this instance, it is advisable to place about 25 percent of the dosages in the floor level aeration ducts. Check the ducts prior to addition of FUMIPHOS to make sure that they contain no liquid water.

d. Tarping the surface of the commodity is often advisable, particularly if the overhead of the storage cannot be well sealed.

e. Lock all entrances to the storage and post fumigation warning placards.

4. Fumigation of vertical Storages (concrete upright bins and other silos in which grain can be rapidly transferred

a. Close all openings and seal all cracks to make the structure as airtight as possible. Prior to the fumigation, seal the vents near the bin top which connects to adjacent bins.

b. Pellets, tablets may be applied continuously by hand or by an automatic dispenser on the headhouse/ gallery belt or into the fill opening as the commodity is loaded into the bin. An automatic dispenser may also be used to add FUMIPHOS into the commodity stream in the leg of the elevator.

c. Seal the bin deck openings after the fumigation has been completed.

d. Bins requiring more than 24 hours to fill should not be fumigated by continued addition into the commodity stream. These bins must be fumigated by probing surface application, or other appropriate means. Exposure periods should be lengthened to allow for diffusion of gas to all parts of the bins in FUMIPHOS has not been applied uniformly throughout the commodity mass.

e. Place warning placards on the discharge gate and on all entrances.

5. Fumigation of Mills, Food Processing Plants and Warehouses

a. Using the label, calculate the length of the fumigation and dosage of tablets, pellets or bags to be applied based upon volume of the building, air and /or commodity temperature and the general tightness of the structure.

b. Carefully seal and placard the space to be fumigated.

c. Place trays or sheets of Kraft paper or foil, up to 12 sq. ft. (1.1 sq. M) in area, on the floor throughout the structure to hold FUMIPHOS pellets or tablets. Bags should be spread evenly on the floor. Use total floor space.

d. Spread FUMIPHOS on the sheets at a density no greater than 30 tablets per sq. ft. This corresponds slightly more than one-half flask of tablets of one-half flask of pellets per 3' x 4" sheet. Check to see that FUMIPHOS has not piled up and that it is spread evenly to minimize contact between the individual pellets, tablets, and bags.

e. Doors leading to the fumigated space should be closed, sealed, locked, and placarded with warning signs.

f. The fumigation period usually lasts from 2 to 5 days, depending upon the temperature. Upon completion of the exposure period, windows, doors, vents, etc. should be opened and the fumigated structure allowed to aerate for at least two hours before entering. When required, gas concentration readings may be taken using low level detector tubes or similar devices to ensure safety of personnel who reenter the treated area. Refer to the section on Applicator and Worker Exposure.

g. Collect the spent bags, and FUMIPHOS dust and dispose of it, with or without further deactivation, following the recommendations given under Disposal Instructions.

h. Remove fumigation warning placards from the aerated structure.

6. Fumigation of Railcars, Containers, Trucks, Vans and other Transport Vehicles

Railcars, containers, trucks, vans and other transport vehicles loaded with bulk commodities to which FUMIPHOS tablets, pellets, or bags may be added directly are treated in essentially the same way as any other flat storage facility. FUMIPHOS may be added as the vehicle is being filled, the dose may be scattered over the surface after loading has been completed or the tablets, pellets, or bags may be probed below the surface. Carefully seal any vents, cracks, or other leaks, particularly if the fumigation is to be carried out intransit. Remember, railcars and containers shipped piggyback by rail may be fumigated intransit, but it is not legal to move trucks, trailers, vans, etc. over public roads or highways until they are aerated. See section 6 of this Applicator's Manual for the recommendations on placarding. Notify the consignee if the commodity is to be shipped under fumigation with FUMIPHOS. If the consignee is unfamiliar with proper handling of treated railcars, it is recommended that they be provided with the necessary information.

7. Tarpaulin and Bunker Fumigations

Use of plastic sheeting or tarpaulins to cover commodities is one of the easiest means for providing relatively gas tight enclosures which are very will suited for fumigation. Poly tarps are penetrated only very slowly by hydrogen phosphide gas, and tight coverings are readily formed from the sheets. The volume of these enclosures may vary widely from a few cubic feet, for example, a fumigation tarpaulin placed over a small stack of bagged commodity, to a plastic bunker storage capable of holding 600,000 bushels of grain or more.

An enclosure suitable for fumigation may be formed by covering bulk or packaged commodity with poly sheeting. The sheets may be taped together to provide a sufficient width of material to ensure that adequate sealing is obtained. If the flooring upon which the commodity rests is of wood or other porous material, it should be repositioned onto poly prior to covering for fumigation. The plastic covering of the pile may be sealed to the floor using sand or water snakes, by shoveling soil or sand onto the ends of the plastic covering or by other suitable procedures. The poly covering should be reinforced by tape or other means around any sharp corners or edges in the stack so as to reduce the risk of tearing. Thinner poly, about 2 mil., is suitable for most indoor tarp fumigations and for sealing of windows, doors and other openings in structures. However, 4 mil poly or thicker is more suitable for outdoor applications where wind or other mechanical stresses are likely to be encountered.

Tablets, pellets or bags may be applied to the tarped stack or bunker storage of bulk commodity through slits in the poly covering. Probing or other means of dosing may be used. Avoid application of large amounts of FUMIPHOS at any one point. The FUMIPHOS should be added below the surface of the commodity if condensation or other source of moisture is likely to form beneath the poly. The slits in the covering should be carefully taped to prevent loss of gas once the dose has been applied. FUMIPHOS bags are recommended for the treatment of bagged commodities and processed foods although tablets and pellets on trays or sheets of Kraft paper may be used. Care should be taken to see that the poly is not allowed to cover the FUMIPHOS and prevent contact with moist air or confine the gas.

Distribution of hydrogen phosphide gas is generally not a problem in the treatment of bagged commodities and processed foods. However, fumigation of larger bunker storages containing bulk commodity will require proper application procedures to obtain adequate results.

Place warning placards at conspicuous on the enclosure.

8. Fumigation of Ships

a. General Information

1. IMPORTANT - shipboard, intransit ship or shiphold fumigation is also governed by U.S. Coast Guard Regulation 46 CFR 147A. Refer to this regulation prior to fumigation.

2. FUMIPHOS tablets, pellets, and bags are classified by EPA as restricted use pesticides due to the acute inhalation toxicity of hydrogen Phosphide (phosphine, PH3) gas. These products are for retail sale to and use only

by certified applicators for those uses covered by the applicators certification or persons trained in accordance with the Applicators Manual working under the direct supervision and in the physical presence of the certified applicator. Physical presence means on site or on the premises. Read and follow the label and the **PHOSFUME CHEMICAL CO. a subsidiary of Midland Fumigant Co., Inc.** Applicators manual which contains complete instructions for the safe use of this pesticide.

b. Pre-Voyage Fumigation 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 ships crew throughout the duration of the fumigation. If it is determined that the design and configuration of the vessel does not allow safe occupancy by the ships 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 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.

Personal protection equipment means a NIOSH/MSHA approved respirator or gas mask fitted with an approved canister for phosphine. The canister is approved for use up to 15 ppm. SCUBA or its equivalent must be used above 15 ppm or at unknown concentrations.

3. Seal all openings to the cargo hold or tank and lock or otherwise secure all openings, manways, etc., which might be used to the enter the hold. The overspace pressure relief system of each tank aboard tankers must be sealed by closing the appropriate valves and sealing the openings into the overspace with gas-tight materials.

4. Placard all entrances to the treated spaces with fumigation warning signs.

5. If the fumigation is not completed and the vessel aerated before the manned vessel leaves port, the person in charge of the vessel shall ensure that 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.

6. During the fumigation or until a manned vessel leaves port or the cargo is aerated, the person in charge of the fumigation shall ensure that a qualified person using gas or vapor detection equipment tests spaces adjacent to spaces containing fumigated cargo and all regularly occupied spaces for fumigant 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.

7. Review with the master, or his representative, the precautions and procedures for during the voyage.

c. Application Procedures for Bulk Dry Cargo Vessels and Tankers

1. Apply tablets, pellets or bags by scattering uniformly over the commodity surface or they may shallow or deep probed into the commodity mass.

2. Immediately after application of the fumigant, close and secure all hatch covers, tank tops, butterworth valves, manways, etc.

d. Intransit Fumigation of Containers Aboard Ships

Intransit fumigations of containers on ships is also governed by U.S. Coast Guard Regulation 46 CFR 147A as modified by U.S. Coast Guard Special Permit 52-75. This permit which must be obtained prior to the fumigation is available from:

U.S. Coast Guard
Hazardous Materials Branch
MTH-1
Washington, D.C. 20593-0001

Application procedures for fumigation of raw commodities or processed foods in containers and other transport vehicles are described in section 3a.

e. 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 personal protection equipment must be used. Never enter fumigated areas alone. At least one other person, wearing personal protection equipment, should be available to assist in case of an emergency.

f. 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 personal safety equipment. Do not allow entry to fumigant areas

without personal safety equipment, unless fumigant concentrations are at safe levels, as indicated by a suitable detector.

9. Fumigation of Barges

Barge fumigations are also regulated by U.S. Coast Guard regulation 46 CFR147A as modified by U.S. Coast Guard Special Permit 2-75. This permit which must be obtained prior to the fumigation is available from:

U.S. Coast Guard
Hazardous Materials Branch
MTH-1
Washington, D.C. 20593-0001

Leaks are a common cause of failures in the treatment of commodities aboard barges. Carefully inspect all hatch covers prior to application of FUMIPHOS and seal, *if* necessary. Notify consignee if the barge is to be fumigated intransit.

10. Fumigations in Small Sealable Enclosures

Excellent results may be attained in the treatment of small enclosures since it is often possible to control the fumigation and also to make the enclosure virtually gas tight. Take care not to overdose during these fumigations. A single pellet will treat a space of from 1.4 to 10 cubic feet. From 6.9 to 50 cubic feet may be fumigated with a single FUMIPHOS tablet or 1 FUMIPHOS bag.

11. Treatment of Beehives, Supers and other Beekeeping Equipment

FUMIPHOS tablets, pellets and bags may used for the control of the greater wax moth in stored beehives, supers and other beekeeping equipment and for the destruction of bees, Africanized bees, and diseased bees including those infested with tracheal mites and foulbrood. The recommended dosage for this use is 30-45 tablets, 150-225 pellets or 3 bags per 1000 cu. ft .

Fumigations may be performed in chambers at atmospheric pressure, under tarpaulins, etc. by placing bag and the tablets or pellets on trays or in moisture permeable envelopes. Do not add more than 2 tablets or 10 pellets to each envelope. Honey from treated hives or supers may only be used for bee food.

12. Burrowing Pest Control

a. List of Burrowing Pests

FUMIPHOS tablets, pellets and bags may be used out of doors only for the control of the following burrowing rodents and moles: Marmot sp. - Woodchucks and yellow-belly Marmots (Rockchucks), Prairie Dogs (except Utah Prairie Dogs), Norway and Roof Rats, Mice, Ground Squirrels, Moles, Voles, Gophers, and Chipmunk.

b. Directions for Use

Add from one 1 to 4 FUMIPHOS tablets, 5 to 20 pellets, or 2 to 6 bags to each burrow opening. Then seal tightly by shoveling soil over the entrance after first packing the opening with crumpled newspaper or something similar so as to prevent soil from covering the FUMIPHOS and slowing its action. Subsurface tunnels or runways should be treated every 5 to 10 feet with a dose of 2 to 4 tablets , 10 to 20 pellets, and 2 to 6 bags.
Use lower rates in smaller burrows in tight soils under moist soil conditions and higher rates in larger burrows in porous soils when soil moisture is low. Addition of several cups of water to the burrow prior to dosing with FUMIPHOS may improve efficacy in some porous soils. Treat reopened burrows and fresh runways a second time 1 to 3 days after the initial treatment.

FUMIPHOS may be used out of doors only for control of burrowing pests. Do not use within 15 feet (5 meters) of inhabited structures. Do not apply to burrows which may open under or into occupied buildings. For use on all agricultural and noncropland areas.

c. Environmental Hazards

This product is very highly toxic to wildlife. Non-target organisms exposed to phosphine gas in burrows will be killed. Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes) . Do not contaminate water by cleaning of equipment, or disposal of wastes.

d. Endangered Species Restrictions

The use of FUMIPHOS in a manner that may kill or otherwise harm an endangered or threatened species or adversely modify their habitat is a violation of Federal laws. The use of this product is controlled to prevent death or harm to endangered or threatened species that occur in the following counties or elsewhere in their range. Use of this product in the areas listed below os prohibited without first contacting and obtaining permission from the Endangered Species Specialist at the nearest regional offices of the U.S. Fish and Wildlife Service (FWS).

Areas Inhabited by Endangered or Threatened Species

1. Black-footed Ferret - State of Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah and Wyoming.

2. Blunt-nosed Leopard Lizard - Counties of Kern, Kings, Fresno, Madera, Merced and Tulare in the State of California.

3. Desert Tortoise - Washington County in the State of Utah

4. Eastern Indigo Snake - States of Florida and Georgia

5. San Joaquin Kit Fox - Counties of Kern, Kings, Fresno, Merced, Monterey, San Benito, San Luis Obisno, Santa Barbara, Tulare and Ventura in the State of California.

e. Special Local Restrictions

1. North Carolina

FUMIPHOS tablets, pellets, and bags may only be used for control of rats and mice in the State of North Carolina. Use against other pests is not permitted.

2. Oklahoma

A special permit for black-tailed prairie dog control by poisoning is required in Oklahoma. Contact the Oklahoma State Department of Wildlife Conservation to obtain this permit.

3. Wisconsin

A state permit is required for use of pesticides in Wisconsin to control small mammals, except rats or mice. Please contact your local Department of Natural Resources office for information.

4 Indiana

Use of FUMIPHOS tablets, pellets, or bags for mole control is not legal in the State of Indiana.

5. Missouri

A state permit is required for use of oesticide in Missouri to control small mammals, except rats and mice. Please contact the Missouri Department of Conservation office for information.

6. Kansas

A special permit for black-tailed prairie dog control by poisoning is required in Kansas. Contact the Kansas Fish and Game Commission to obtain this permit.

7. California

Use of FUMIPHOS tablets, pellets, and bags for chipmunk control is not legal in the State of California.

SECTION 4
PROTECTIVE CLOTHING

Wear dry gloves of cotton or other material if contact with FUMIPHOS tablets, pellets or bags is likely. Wash hands thoroughly after handling aluminum phosphide products. Aerate used gloves and other contaminated clothing in a well ventilated area prior to laundering.

SECTION 5
RESPIRATORY PROTECTION

A. When Respiratory Protection Must Be Worn

NIOSH/MSHA approved respiratory protection must be worn if worker exposure limits cannot be met through controls (such as forced air ventilation) and/or worker practices. Respiratory protection is required if exposure is likely to exceed the TWA of 0.03 ppm during application, or a 0.03ppm ceiling at any time afterwards. For example, respiratory protection is required to be worn upon reentry into a partially aerated structure if the hydrogen Phosphide concentration is above .03 ppm. When required, gas concentration measurements for safety purposes may be made using low level detector tubes. See the section on Applicator and Worker Exposure for Monitoring requirements. Information on hydrogen phosphide (phosphine, PH3) detector tubes may be obtained from

PHOSFUME CHEMICAL CO. a subsidiary of Midland Fumigant Co., Inc.
1805 S. 2nd St., Leavenworth, KS 66048

B. Permissible Gas Concentrations Ranges for Respiratory Protection Devices

A NIOSH/MSHA approved, full-faced has mask-hydrogen phosphide canister combination may be used at levels up to 15 ppm or to escape from levels up to 1500 ppm. Above this level or situations where the hydrogen phosphide concentration is unknown , a NIOSH/MSHA approved, self-contained breathing apparatus (SCBA) or its equivalent must be used. The NIOSH/OSHA Pocket Guide, 8085 DHEW/NIOSH 78-210, lists these and other types of approved respirators and the concentration limits at which they may be used.

C. Requirements for Availability of Respiratory Protection

If FUMIPHOS is to be applied from within the structure to be fumigated, an approved full-face mask gas mask - phosphine canister combination or self-contained breathing apparatus (SCBA) or its equivalent must be available at the site of application in case it is needed. In addition, SCBA or its equivalent must be available locally, for example, at fire station or rescue if it is not available at the fumigation site.

Respiratory protection need not be available for applications from outside the area to be fumigated such as addition of tablets or pellets to automatic dispensing devices, outdoor applications, etc. if exposures above the permitted exposure limits will not be encountered.

If monitoring equipment is not available on a farm and application of fumigant cannot be made from outside the structure, an approved canister respirator must be worn during application from within the structure being treated.

SECTION 6
PLACARDING OF FUMIGATED AREAS

The applicator must placard or post all entrances to the structure under fumigation with signs bearing, in English and Spanish:

1. The signal word DANGER/PELIGRO and the SKULL AND CROSSBONES symbol in red.
2. The statement "Area and/or commodity under fumigation, DO NOT ENTER/NO ENTRE".
3. The statement, This placard may only be removed after the fumigated area is aerated down to 0.3 ppm hydrogen Phosphide or below. Transfer of incompletely aerated commodity to a new site is permissible provided that the new storage is placarded if it contains more than 0.3 ppm Workers must not be exposed to more than 0.3 ppm hydrogen phosphide.
4. The date and time fumigation begins and is completed.
5. Name of fumigant used.
6. Name, address and telephone number of the applicator.

All entrances to a fumigated area must be placarded. Where possible, placards should be placed in advance of the fumigation to keep unauthorized persons away. 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 remove placards until the treated commodity is aerated down to 0.3 ppm hydrogen Phosphide or less. To determine whether aeration is complete, each fumigated site or vehicle must be monitored and shown to contain 0.3 ppm or less hydrogen phosphide gas in the air space around and, if feasible, in the mass of the commodity. Transfer of incompletely aerated commodity to a new site is permissible. However, the new storage must be placarded if it contains more than 0.3 ppm hydrogen phosphide. Workers who handle incompletely aerated commodity must be informed and appropriate measures taken (i.e. ventilation or respiratory protection) to prevent exposures from exceeding 0.3 ppm hydrogen phosphide.

It is recommended that the persons responsible for removing placards be familiar with physical , chemical and toxicological properties of hydrogen phosphide. They should also be knowledgeable in making gas concentration measurements, exposure limits and symptoms and first aid treatment for hydrogen phosphide poisoning.

SECTION 7
AERATION OF FUMIGATED COMMODITIES

A. Foods and Feeds

Tolerances for hydrogen phosphide residues have been established at 0.1 ppm for animal feeds and 0.01 ppm for finished foods. To guarantee compliance with these tolerances, it is necessary to aerate these commodities for 48 hours prior to offering to the end use consumer.

B. Tobacco

Tobacco must be aerated for at least three days (72 hours) when fumigated in hogshead and for at least two days (48 hours) when fumigated in other containers. Tobacco fumigated in containers with plastic liners will probably require longer aeration periods to reach 0.3 ppm

SECTION 8
EXPOSURE

A. Hydrogen Phosphide Exposure Limits

Exposure to hydrogen phosphide may not exceed 0.3 ppm measured as an eight hour time weighted average (TWA), for applicators and workers during application. Application is defined as the time period covering the opening of the first containers, applying the appropriate dosage of fumigant and closing up the site to be fumigated. All persons in the treated site and in adjacent indoor areas are covered by its exposure standard.

After application, exposure for any person may not exceed a 0.3 ppm ceiling for hydrogen phosphide. Such exposures may occur if the commodity or space under fumigation leaks, when treated commodity is transferred or handled, if an unaerated or partially aerated space is entered, etc.

B. Application of Fumigant

Depending upon temperature and humidity, FUMPHOS tablets, pellets and bags release hydrogen phosphide gas slowly upon exposure to moisture from the air. In most cases, this release is slow enough to permit applicators to deposit fumigant in the desired areas and then vacate the premises without significant exposure to the gas. If the fumigators is likely to exceed the eight hour TWA of 0.3 ppm, approve respiratory protection must be worn. When required gas concentration measurements for safety purposes may be made using low level detector tubes. See the write-up below on Industrial Hygiene Monitoring. Information on hydrogen phosphide (phosphine, PH 3) detector tubes may be obtained from **PHOSFUME CHEMICAL CO. a subsidiary of Midland Fumigant Co., Inc., 1805 S. 2nd St., Leavenworth, KS 66048.**

It is often advisable to use respiratory protection during application of fumigant under hot and humid conditions, particularly when considerable time must be spent inside the structure being treated.

C. Leakage from Fumigated Sites

Hydrogen phosphide is highly mobile and given enough time may penetrate seemingly gas tight materials such as concrete and cinder blocks. Therefore, adjacent, enclosed areas likely to be occupied should be examined to ensure that significant leakage has not occurred. Sealing of the fumigated site and/or air flow into the occupied areas must be sufficient to meet exposure standards.

D. Aeration and Reentry

If the area is to be entered after fumigation, it must be aerated until the level of hydrogen phosphide gas is 0.3 ppm or below. The area or site must be monitored to ensure that liberation of gas from the treated commodity does not result in the development of unacceptable levels of hydrogen phosphide. Do not allow reentry into treated areas by any persons before this time unless protected by an approved respirator.

E. Handling Unaerated Commodities

Workers must not be exposed to hydrogen phosphide in excess of 0.3 ppm during moving, storage or processing of incompletely aerated commodities.

F. Industrial Hygiene Monitoring

It is recommended that hydrogen phosphide exposures be documented in an operations log or manual for each site and operation where exposure may occur. The purpose of monitoring is to prevent excessive exposures and to determine when and where respiratory protection is required. This mandatory although, once exposure have been adequately characterized, subsequent monitoring is not routinely required. However, spot checks should be made occasionally, especially if conditions change significantly or an unexpected garlic odor is detected. Gas measurements should be made in the workers breathing zone. Monitoring is not required for outdoor operations.

If monitoring shows that workers are exposed to concentrations in excess of the permitted limits, then engineering controls (such as forced air ventilation) and/ or appropriate work practices should be used, where possible, to reduce exposure to within permitted limits.

There are a number of devices on the market for measurement of hydrogen phosphide gas levels for industrial hygiene purposes. One of these is the hydrogen sampling pump. These devices are reliable, portable, simple to use , do not require extensive training and are relatively rapidly, inexpensive and accurate. Low level industrial hygiene monitoring.

SECTION 9
STORAGE INSTRUCTIONS

Store FUMIPHOS in a dry, well ventilated area away from heat under lock and key. Post as pesticide storage area. Do not contaminate water, food or feed by storing pesticides in the same areas used to store these commodities.

Do not store in buildings where humans or domestic animals reside. Keep out of reach of children.

FUMIPHOS tablets, pellets and bags are supplied in gas tight, resealable aluminum flasks. Do not expose the product to atmospheric moisture any longer than is necessary and seal tightly before returning opened flasks to storage.

The shelf life of FUMIPHOS is virtually unlimited as long as the containers are tightly sealed.

SECTION 10
DISPOSAL INSTRUCTIONS

A. General

1. Do not contaminate water, food or feed by storage or disposal.
2. Unreacted or partially reacted FUMIPHOS is acutely hazardous. Improper disposal of excess pesticides is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance. For specific instructions, see Section 11 of this manual, Spill and Leak Procedure
3. Some local and state waste disposal regulations may vary from the following recommendations. Disposal procedures should be reviewed with appropriate authorities to ensure compliance with local regulations. Contact your state Pesticide or Environmental Control Agency or Hazardous Waste Specialist at the nearest EPA regional Office for guidance.
4. Triple rinse flasks and stoppers with water. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or by other procedures approved by state and local authorities. Rinsate may be disposed of in a sanitary landfill by pouring it out onto the ground or by other approved procedures. Or , it is permissible to remove lids and expose empty flasks to atmospheric conditions until residue in flasks is reacted. Then puncture and dispose of in a sanitary landfill or other approved site, or by other procedures by state and local authorities.

If properly exposed, the residual dust remains after a fumigation with FUMIPHOS will be a grayish-white powder. This will be a non-hazardous waste and contain only a small amount of unreacted aluminum phosphide. However, residual dust from incompletely exposed FUMIPHOS , so called "green dust" will require special care.

B. Directions for Disposal of Residual Dust from FUMIPHOS

1. Confinement of partially spent residual dust, as in a closed container, or collection and storage of large quantities of dust may result in a fire hazard. Small amounts of hydrogen phosphide may be given off from unreacted aluminum phosphide, and confinement of the gas may result in a flash.
2. In open areas, small amounts of residual dust, up to about 5 to 8 kg., may be disposed of on site by burial or by spreading over the land surface away from inhabited buildings.
3. Spent residual dust from FUMIPHOS may also be collected and disposed of at a sanitary landfill, incinerator or other approved sites or by other procedures approved by Federal, State or Local authorities . "Green Dust" must be further deactivated before disposal at a landfill.
4. From 2 to 3 kg (4 to 7 lbs.) of spent dust from 2 to 3 flasks of FUMIPHOS may be collected for disposal in a 1 gallon bucket. Larger amounts, up to about one-half case, may be collected in burlap, cotton or other types of porous cloth bags for transportation in an open vehicle to the disposal site. Do to collect dust from more than 7 flasks of tablets or 10 flasks of pellets (about 11 kg. or 25 lbs) in a single bag. Do not pile cloth bags together. Do not use this method for partially spent or "green" dust. Caution: Do not collect dust in large drums, dumpsters, plastic bags or other containers where confinement may occur.

C. Directions for Deactivation of Partially Spent Residual Dust from FUMIPHOS

1. Partially spent dust must be deactivated prior to ultimate disposal. This is especially true in cases of incomplete exposure which has resulted in so-called "green dust" or following a fumigation which has produced large quantities of partially spent material. "Green dust" must be further deactivated prior to disposal in landfills.
2. Residual dust from FUMIPHOS may be deactivated as follows using the "Wet Method".

a. Deactivating solution is prepared by adding the appropriate amount of low sudsing detergent or surface active agent to a water in a drum or other suitable container. A 2% solution of detergent is suggested. The container should be filled with deactivating solution to within a few inches of the top.

b. Residual dust is poured slowly into deactivating solution and stirred so as to thoroughly wet all of the particles. This should be done in the open air and not in the fumigated structure. Dust from FUMIPHOS tablets, pellets, or bags should be mixed into no less than 10 gallons of water-detergent solution for each case of material used. Wear appropriate respiratory protection during wet deactivation of partially spent dust.

c. Dispose of the deactivated dust-water suspension, with or without preliminary decanting, at a sanitary landfill or other suitable site approved by local authorities. Where permissible, the slurry may be poured out onto the ground. If the slurry has been held for 36 hours or more, it may be poured into a storm sewer.

d. Caution: Respiratory protection is required during wet deactivation of partially spent material. Do not cover the container at any time. Do not dispose of dust in a toilet. Do not allow quantities of dry residual dust from FUMIPHOS to be collected or stored without deactivation.

3. Residual dust from FUMIPHOS may also be deactivated as follows using the "Dry Method."

a. Extension of the fumigation period is the simplest method for further deactivation of "green dust" or partially spent dust prior to ultimate disposal

b. Small amounts of partially spent dust, from 2 to 3 kg. (4 to 7 lbs) may be further deactivated by storage in a 1-gallon bucket. Larger amounts of dust (about 11 kg. or 25 lbs) may be held for deactivation in porous cloth bags (burlap, cotton, etc.) Caution: Transport these bags in open vehicles, do not pile up bags and do not use this method for "green dust".

SECTION 11
SPILL AND LEAK PROCEDURE

A. General Precautions and Directions

A spill other than incidental to application or normal handling, may produce high levels of gas and, therefore attending personnel must wear SCBA or its equivalent when the concentration of hydrogen phosphide gas is unknown. Other NIOSH/MSHA approved respiratory protection may be worn if the concentration is known. Do not use water at any time to clean up a spill of FUMIPHOS. Water in contact with unreacted tablets, pellets or bags will greatly accelerate the production of hydrogen phosphide gas which could result in a toxic and/ or fire hazard. Wear cotton gloves or other material when handling aluminum phosphide .

Return all intact aluminum flasks to fiberboard cases or other packaging which has been suitably constructed and marked according to DOT regulations. Notify consignee and shipper of damaged cases.

If aluminum flasks have been punctured or damaged so as to leak, the container may be temporarily repaired with aluminum tape or the FUMIPHOS may be transferred from the damaged flask to a sound metal container which should be sealed and properly labeled as aluminum phosphide. Transport the damaged containers to an area suitable for pesticide storage for inspection. Further instructions and recommendations may be obtained from

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If a spill has occurred which is only a few minutes old, collect the tablets , pellets and bags and place them back into the original flasks, if they are intact, and stopper tightly. Place the collected tablets, pellets, and bags in a sound metal container if the original flasks are damaged. Caution: these flasks may flash upon opening at some later time.

If the age of the spill is unknown or if the tablets, pellets, and bags have been contaminated with soil, debris, water, etc. gather up the spillage and place it into small open bucket having a capacity no larger than about 1 gallon. Do not add more than one flask of spilled material, 1 to 1.5 kg. (2 to 3 lbs) to the bucket. If on-site, wet deactivation is not feasible , these containers should be transported in open vehicles to a suitable area. Wet deactivation may then be carried out as described in 11g. Alternatively, small amounts of spillage from 4 to 5 flasks (4 to 8 kg. 9 to 18 lbs) may be spread out in an open area from inhabited buildings by atmospheric moisture.

B. Directions for Deactivation by the Wet Method

If the contaminated material is not to be held until completely reacted by exposure to atmospheric moisture, deactivate the product by the wet Method as follows:

1. Deactivating solution is prepared by adding the appropriate amount of low sudsing detergent or surface active agent to water in a drum or other suitable container. A 2% solution or 4 cups in 30 gallons is suggested. The container should be filled with deactivation solution to within a few inches of the top.

2. The tablets, pellets, or bags are poured slowly into the deactivating solution and stirred so as to thoroughly wet all of the FUMIPHOS. This should be done in the open air. FUMIPHOS tablets, pellets, and bags should be mixed into no less than about 15 gallons of water-detergent solution for each case of spent material. Wear appropriate respiratory during wet deactivation.

3. Allow the mixture to stand, with occasional stirring, for about 36 hours. The resultant slurry will then be safe to dispose of.

4. Dispose of the slurry of deactivated material, with or without preliminary decanting, at a sanitary landfill or other suitable site approved by local authorities. Where permissible, this slurry may be poured into a storm sewer or out onto the ground.

5. Caution: Respiratory protection is required during wet deactivation of unexposed FUMIPHOS. Never place pellets, tablets, or bags in a closed container such as a dumpster, sealed drum, plastic bag, etc. as flammable concentrations and a flash of hydrogen phosphide gas likely to develop.

6. The EPA has determined that proper disposal of aluminum phosphide will cause no unreasonable effects to the environment.

FOR ASSISTANCE, CONTACT:

PHOSFUME CHEMICAL CO.,
a subsidiary of Midland Fumigant Co., Inc.
1805 S. 2nd St.
Leavenworth, KS 66048

FUMIPHOS Pellets EPA Reg. No. 43568-1
FUMIPHOS Bags EPA Reg. No. 43568-2
FUMIPHOS Tablets EPA Reg. No. 43568-3