

72959-3

09/23/2003

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF  
PREVENTION, PESTICIDES  
AND TOXIC SUBSTANCES

SEP 23 2003

Ms. Betty Lilyquist  
Pestcon Systems Inc./Sunzon International Inc.  
1808 Firestone Parkway  
Wilson, NC 27893

Subject: Revised Labeling to Require a FMP and Other MOA Revisions  
Fumitoxin® Bags  
EPA Reg. No. 72959-3  
Your Application Dated May 19, 2003

Dear Ms. Lilyquist:

The labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable subject to the comments listed below.

- The center panel of the container labeling must include the Skull and Crossbones Symbol. Draft labeling submitted to, and accepted by, the Agency should indicate that this symbol is present since this is the labeling that is stamped and placed on the Agency's website.
- On the first page of the Applicator's Manual, replace the word "there" with "their" in the Restricted Use Statement, ie. "For retail sale to Dealers..."
- Delete "...and Control of Burrowing Pests" in the claim statement on the first page of the Applicator's Manual. The Agency has not accepted the use of this product against burrowing pests. Additionally, the Manual does not contain any directions for use to control these pests. You must also delete the vertebrate pest listing on page 8 (woodchucks, etc).
- On page 6 of the Manual, in the fourth paragraph, change "section 24" to "section 25" in the reference for further deactivation and disposal.
- On page 7, please add the "Directions for Use" heading, followed by the misuse statement

("It is a violation...") prior to section 5.

- The Manual does not include directions for use to control "Africanized bees and Honeybees infested with tracheal mites" (page 7) or to treat beekeeping equipment. These must be deleted from the Pests Controlled listing or the appropriate directions must be provided.
- On page 12 of the Manual, in section 10.1, please define "STELs". It is spelled out on page 13, in section 15.1, however, it should be defined where the acronym first appears.
- In section 10.3 on page 12 of the Manual, delete the instruction appearing in parentheses regarding availability of SCBA, "(for example, at a fire station or rescue squad)". As Dr. Oonnithan indicated in an earlier review of this text, a rescue squad would not be apt to lend its equipment. Therefore, SCBA must be present at the site as part of the mandatory equipment for use of PH3.
- On page 13, in item 12.d., please define "TWA" since this is the first place this acronym appears in the Manual.
- In section 14.2 on page 13, the last sentence is missing text. Add "40 CFR Part 159" to complete the sentence.
- On page 14, in section 15.5, change the word "take" to "taken".
- On page 16, delete the last sentence of section 18.3 which refers to tolerance levels for tobacco.
- As you discussed with Meredith Laws on August 11, 2003, please insert the words "and follow" in the first sentence of section 21, "Fumigation Management Plan" on page 17. The sentence should read:
 

"The certified applicator is responsible for working with the owners and/or responsible employees of the structure and/or area to be fumigated to develop and follow a Fumigation Management Plan (FMP)."
- On page 18, in the third paragraph of the "Purpose" of the Fumigation Management Plan, revise the fourth sentence to read: "If the type of fumigation that you are to perform is not listed in this Guidance Document you will want to construct a similar set of procedures *using this document as a guide or contact Pestcon Systems, Inc. for assistance.*"
- Delete item A.1.b. "Elimination of vertebrate pests" on page 18.
- At the bottom of page 20, delete the word "registrants" in item F.1.

- In section 22.3 on page 23, add the phrase “and any openings” to item no. 4, ie. “Prior to the fumigation, seal the vents near the bin top and any openings which connect to adjacent bins.”
- On page 25, item no. 6 under Bulk Rail Cars, and item no. 6 under Boxcars both refer to “Warning” placards. These placards must read ‘Danger’.
- In section 22.7.4 on page 28, correct the referenced section for fumigation of raw commodities or processed foods in transport units to section 22.5 (not 3.6.6).
- The section numbers are confused beginning on page 29, where section 23.4 follows section 24.3, and section number 24.1 is repeated again on page 30. Please make the appropriate adjustments.
- On page 31, delete the final sentence: “The EPA has determined that proper disposal of aluminum phosphide will cause no unreasonable adverse effects to the environment.”

The Memorandum of Agreement between the Agency and the Registrants of phosphine based fumigants requires that within six (6) months of receiving stamped and approved labels from the Agency, all phosphine products released for shipment shall bear the amended and approved labels and be accompanied by the Applicator’s Manuals. Additionally, please submit two (2) copies of the finished, corrected labeling to the Insecticide-Rodenticide Branch of the Registration Division prior to releasing the product for shipment. A stamped copy of the label is enclosed for your records. If you have any questions regarding this action, please contact me at (703) 305-7546.

Sincerely,  


Dan Kenny  
 Product Manager 1  
 Insecticide-Rodenticide Branch  
 Registration Division (7505C)

Enclosure

**THIS PRODUCT MUST BE ACCOMPANIED BY AN APPROVED LABEL AND APPLICATOR'S MANUAL. READ AND UNDERSTAND THE ENTIRE LABELING AND APPLICATOR'S MANUAL. ALL PARTS OF THE LABELING AND APPLICATOR'S MANUAL ARE EQUALLY IMPORTANT FOR SAFE AND EFFECTIVE USE OF THESE PRODUCTS. CONSULT WITH YOUR STATE LEAD PESTICIDE REGULATORY AGENCY TO DETERMINE REGULATORY STATUS, REQUIREMENTS, AND RESTRICTIONS FOR FUMIGATION USE IN THAT STATE. CALL 252-237-7923/1-800-548-2778 IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABEL.**

**RESTRICTED USE PESTICIDE  
DUE TO ACUTE INHALATION TOXICITY OF PHOSPHINE GAS**

For retail sale to Dealers and Certified Applicators only.  
For use by Certified Applicators or persons under their direct supervision, and only for those uses covered by the Certified Applicator's certification. Refer to the directions in this applicator manual for requirements of the physical presence of a Certified Applicator.

**FUMITOXIN®  
BAGS**

ACTIVE INGREDIENT - ALUMINUM PHOSPHIDE.....	55%
INERT INGREDIENTS.....	45%
Total.....	100%

**KEEP OUT OF REACH OF CHILDREN  
DANGER/PELIGRO - POISON**

*Shelf =  
CBS*

**FIRST AID**

Symptoms of exposure to this product are headaches, 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 inhaled:**

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, begin artificial respiration, preferably by mouth-to-mouth if possible.
- Keep warm and make sure person can breathe freely.
- Call a poison control center or doctor for further treatment advise.

**If swallowed:**

- Call a Poison control center or doctor immediately for treatment advice.
- Have person drink one or two glasses of water and induce vomiting by touching back of throat with finger, or if available administer syrup of ipecac.
- Do not give anything by mouth to an unconscious person.

**If 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 in eyes:**

- Hold eye open and rinse slowly and gently with water for 15 - 20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a poison control center or doctor for treatment advice.

**HOT LINE NUMBER**

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact PESTCON SYSTEMS, INC. - (252) 237-7923/1-800-548-2778 or CHEMTREC - 1-800-424-9300 for emergency medical treatment.

See side panels for additional precautionary statements.  
Manufactured for:

D & D HOLDINGS, INC.  
P.O. BOX 116  
153 Triangle Drive  
Weyers Cave, VA 24486 USA  
Telephone: (252) 237-7923/1-800-548-2778  
Fax: (252) 237-3259  
Internet: [www.pesticon.com](http://www.pesticon.com)  
EPA Est. No. 073926-CHN-001  
EPA Reg. No. 72959-3

ACCEPTED  
with COMMENTS  
in EPA Letter Dated  
Sept. 23, 2003  
Under the Federal Insecticide,  
Fungicide, and Rodenticide Act,  
as amended, for the pesticide  
registered under EPA Reg. No.  
72959-3

Contents: \_\_\_\_\_ Net Weight: \_\_\_\_\_

LEFT PANEL

**PRECAUTIONARY STATEMENTS**

**Hazards To Humans And Domestic Animals**

**DANGER:** The dust from FUMITOXIN® Bags can 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. When a sealed container is opened, allowing material to come in contact with moisture, water or acids, toxic phosphine gas will be released. If a garlic odor is detected, refer to the section on Industrial Hygiene Monitoring in the Applicator's Manual for appropriate monitoring procedures. Pure phosphine gas is odorless: the odor is due to a contaminant. 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.

**Physical and Chemical Hazards**

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

It is recommended that you open aluminum phosphide products in open air or near a fan, which exhausts outside immediately. Never open in flammable atmosphere because on rare occasions a flash may occur. When opening, point the container away from the face and body. These precautions will also reduce the applicators exposure to phosphine gas.

Pure phosphine 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 humidity's.

Metal such as copper, brass, and other copper alloys, and precious metals such as gold and silver are susceptible to corrosion by phosphine, especially at high temperatures and humidity. Thus items such as small electric motors, smoke detectors, brass sprinkler heads, batteries and battery chargers, forklifts, temperature monitoring systems, electrical switchgear, communication devices, computers, calculators, watches, and other electronic equipment should be protected or removed before fumigation. Phosphine will also react with certain metallic salts and, therefore such items as photographic film, copying papers and some inorganic pigments, etc. should not be exposed. Immediately after addition of phosphine to the structure, turn off any lights and unessential electric equipment.

**Note to Physician:** Aluminum phosphide bags react with moisture from the air, water, acids and many other liquids to release phosphine gas. Mild exposure by inhalation causes malaise (indefinite feeling of sickness), ringing of ears, fatigue, nausea, and pressure in the chest, which is relieved by removal to fresh air. Moderate poisoning causes weakness, vomiting, pain just above the stomach, chest pain, diarrhea and dyspnea (difficulty in breathing). Symptoms of severe 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 a body part), small perivascular brain hemorrhage 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 blood tissue). Frequent exposure to sub acute concentrations over a period of days or weeks may cause poisoning. Treatment is symptomatic.

**DIRECTIONS FOR USE**

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. **FOR USE AGAINST LISTED INSECTS, WHICH INFEST STORED COMMODITIES, SPECIFIED PROCESSED FOODS, AND ANIMAL FEEDS.**

**General Information:** PESTCON FUMITOXIN® is a fumigant which when applied according to label instructions is activated by atmospheric humidity. FUMITOXIN has been found effective against many stored products insects and their pre-adult stages - that is eggs, larvae, and pupae. Refer to the Applicator's Manual for specific species and commodities, which may be fumigated.

Refer to the Applicator's Manual for detailed precautions, recommendations and directions for use.

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RIGHT PANEL

### STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storing pesticides in the same areas used to store these commodities.

#### Storage Instructions:

- |  |
|--|
| <ol style="list-style-type: none"> <li>1. Store FUMITOXIN in a dry, well ventilated area away from heat, under lock and key. Post as a pesticide storage area.</li> <li>2. Do not store in buildings where humans or domestic animals reside. Keep out of reach of children.</li> <li>3. FUMITOXIN bags are supplied in foil pouches in gas-tight, resealable drums. The drum is resealable; however the foil pouch is not and once opened the entire contents must be used.</li> <li>4. The shelf life of FUMITOXIN is virtually unlimited as long as the containers are tightly sealed.</li> </ol> |
|--|

#### Pesticide Disposal:

Do not contaminate water, food or feed by storage or disposal.

Unreacted or partially reacted FUMITOXIN is acutely hazardous. Improper disposal of excess pesticide 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 Disposal Instructions and Spill and Leak Procedures in the Applicator's Manual.

Some local and state waste disposal regulations may vary from the following. 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.

#### Container Disposal:

Triple rinse drum, foil pouch and drum lid 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. It is permissible to remove lids and expose empty pouch to atmospheric conditions until any residue in the pouch is reacted. Then puncture and dispose of in a sanitary landfill or other approved site, or by other procedures approved by state and local authorities.

If properly exposed the residual dust remaining after a fumigation with FUMITOXIN will be a grayish-white powder and contain only a small amount of unreacted aluminum phosphide. However, residual dust from incompletely exposed FUMITOXIN may require special care.

#### Spill and Leak Procedures:

##### 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 phosphine 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 FUMITOXIN. Water in contact with unreacted FUMITOXIN will greatly accelerate the production of hydrogen phosphide gas, which could result in a toxic and/or fire hazard. Wear gloves of cotton or other material when handling aluminum phosphide dust.

Return all intact foil pouches to the metal drum or other suitable packaging which as been properly marked according to DOT regulations.

Notify consignee and shipper of damaged cases.

If the pouches have been punctured or damaged so as to leak, the product may be immediately used, the container may be temporarily repaired with aluminum tape, the intact pouches of bags may be transferred from the damaged drum to a sound metal container which should be sealed and properly labeled as aluminum phosphide, any bags from damaged pouches may be deactivated and disposed of. Refer to the Applicator's Manual for more detailed Spill and Leak Procedures. Further information and recommendations may be obtained, if required, from Pestcon systems, Inc.

**WARRANTY:** Seller warrants that this product conforms to its commercial description and when used according to label directions under normal conditions of use, it is reasonable 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 UL Inc. as to fire hazard only when used specifically as directed in the instructions on this container, and supplemental labeling. FUMITOXIN is noncombustible, but exposure to moist air or water releases flammable and toxic phosphine gas. Spontaneous ignition may result if contacted by water, acids or chemicals.

**NOTE TO PHYSICIAN**

PESTCON aluminum phosphide fumigants react with moisture from the air, water, acids and many other liquids to release phosphine gas. Mild inhalation exposure causes malaise (indefinite feeling of sickness), ringing of ears, fatigue, nausea, and pressure in the chest, which is relieved by removal to fresh air. Moderate poisoning cause's weakness, vomiting, pain just above the stomach, chest pain, diarrhea and dyspnea (difficulty in breathing). Symptoms of severe poisoning may occur within a few hours to several days, resulting in pulmonary edma (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 a body part), 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 concentrations 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 judgment:

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). Upon progressive edema of the lungs: immediate intubations with a constant removal of edema fluid and oxygen over-pressure respiration, as well as measures required for shock treatment are recommended. In case of kidney failure, extracorporeal hemodialysis is necessary. There is no specific antidote known for this 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 or a solution of magnesium peroxide until flushing liquid ceases to smell of carbide, is recommended. Thereafter, apply medicinal charcoal.

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ACCEPTED  
with COMMENTS  
In EPA Letter Dated  
Sept. 23, 2003

Under the Federal Insecticide,  
Fungicide, and Rodenticide Act,  
as amended, for the pesticide  
registered under EPA Reg. No.  
72959-3

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APPLICATOR'S MANUAL  
FOR  
FUMITOXIN® BAGS

THIS PRODUCT MUST BE ACCOMPANIED BY AN APPROVED LABEL AND APPLICATOR'S MANUAL. READ AND UNDERSTAND THE ENTIRE LABELING AND APPLICATOR'S MANUAL. ALL PARTS OF THE LABELING AND APPLICATOR MANUAL ARE EQUALLY IMPORTANT FOR SAFE AND EFFECTIVE USE OF THESE PRODUCTS. CONSULT WITH YOUR STATE LEAD PESTICIDE REGULATORY AGENCY TO DETERMINE REGULATORY STATUS, REQUIREMENTS, AND RESTRICTIONS FOR FUMIGATION USE IN THAT STATE. CALL 252-237-7923/1-800-548-2778 IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABELING.

RESTRICTED USE PESTICIDE

DUE TO HIGH ACUTE INHALATION TOXICITY OF PHOSPHINE GAS

For retail sale to Dealers and Certified Applicators only.  
For use by Certified Applicators or persons under their direct supervision, and only for those uses covered by the Certified Applicator's certification. Refer to the directions in this applicator manual for requirements of the physical presence of a Certified Applicator.

FOR USE AGAINST INSECTS WHICH INFEST STORED  
COMMODITIES AND CONTROL OF BURROWING PESTS

Active Ingredient: Aluminum Phosphide.....55.0%  
Inert Ingredients.....45.0%  
Total.....100.0%



KEEP OUT OF REACH OF CHILDREN  
DANGER - POISON - PELIGRO



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

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

D & D Holdings Inc.  
PO Box 116, Weyers Cave, VA 24486  
Telephone: 252-237-7923/1-800-548-2778  
Fax: 252-237-3259  
Internet: [www.pestcon.com](http://www.pestcon.com)  
Email: [blilyquist@pestcon.com](mailto:blilyquist@pestcon.com)  
EPA Registration Number: Bags 72959-3  
EPA Establishment Number: 073926-CHN-001

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



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implied, and buyer assumes all risk should the product be used contrary to label instructions.

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**SPILL AND LEAK PROCEDURES**

General Precautions and Directions  
Directions for Deactivation by the Wet Method

**1. FIRST AID**

Symptoms of exposure to this product are headaches, 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 inhaled:**

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth if possible.
- Keep warm and make sure person can breathe freely.
- Contact a poison control center or doctor for further treatment advice.

**If swallowed:**

- Call a poison control center or doctor immediately for treatment advice.
- Have person drink one or two glasses of water and induce vomiting by touching back of throat with finger, or if available administer syrup of ipecac.
- Do not give anything by mouth to an unconscious person.

**If 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.

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- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a poison control center or doctor for further treatment advice

<p><b>HOT LINE NUMBER</b></p> <p>Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact Pestcon Systems, Inc. - 252-237-7923/1-800-548-2778 or Chemtrec - 1-800-422-9300 for emergency medical treatment.</p>
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**2. NOTE TO PHYSICIAN**

PESTCON aluminum phosphide fumigants react with moisture from the air, water, acids and many other liquids to release phosphine gas. Mild inhalation exposure causes malaise (indefinite feeling of sickness), ringing of ears, fatigue, nausea, and pressure in the chest, which is relieved by removal to fresh air. Moderate poisoning cause's weakness, vomiting, pain just above the stomach, chest pain, diarrhea and dyspnea (difficulty in breathing). Symptoms of severe poisoning may occur within a few hours to several days, resulting in pulmonary edma (fluid in lungs) and may lead to dizziness, cyanosis (blue or purple skin color), unconsciousness, and death.

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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.
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2. NOTE TO PHYSICIAN

PESTCON Aluminum phosphide in bags reacts with moisture from the air, water, acids and many other liquids to release hydrogen phosphide (phosphine) gas. Mild inhalation exposure causes malaise (indefinite feeling of sickness, ringing of ears, fatigue, nausea, and pressure in the chest, which is relieved by removal to fresh air. Moderate poisoning causes weakness, vomiting, and pain just above the stomach, chest pain, diarrhea and dyspnea (difficulty in breathing). Symptoms of severe 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 (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 lack of urination). Pathology is characterized of hypoxia (oxygen deficiency in body tissue). Frequent exposure to sub acute concentrations over a period of days or weeks may cause poisoning. Treatment is symptomatic.

The following measures are suggested for use by the physicians in accordance with their own judgment:

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 the 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.

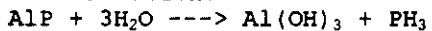
In case of severe poisoning (intensive care unit recommended):

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 hemocentration, venesection may result in shock). On progressive edema of 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, extra-corporeal hemodialysis is necessary. There is no specific antidote known for this poisoning.
3. Mention should be made here of suicidal attempts by taking solid phosphine by the mouth. After swallowing, emptying of the stomach by vomiting, flushing of the stomach with diluted potassium permanganate solution or a solution of magnesium peroxide until flushing liquid ceases to smell of carbide. Thereafter, apply medicinal carbon.

3. INTRODUCTION

**FUMITOXIN® BAGS** are used to protect stored commodities from damage by insects and other vertebrate pests. Fumigation of stored products with **FUMITOXIN** in the manner prescribed in the labeling does not contaminate the marketed commodity.

**FUMITOXIN bags** and other metal phosphide fumigants are acted upon by atmospheric moisture to produce phosphine gas. **FUMITOXIN Bags** contain aluminum phosphide (AlP) as their active ingredient and once the sealed container is opened the bags will liberate phosphine gas via the following chemical reaction:



Hydrogen phosphide gas is highly toxic to insects, 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 Applicator's Manual.

**FUMITOXIN** also contains ammonium carbamate, which liberates ammonia and carbon dioxide as follows:



These gases are essentially nonflammable and act as inerting agents to reduce fire hazards.

**FUMITOXIN** Bags are packaged in tins of 6, 10 or 100 bags each and in drums of foil pouches of 3, 6, and 10 bags per pouch for a total of 300 bags per drum. Each bag is approximately 3 inches by 3 inches and contains 34 grams of 55% aluminum phosphide. Bags release 11 grams of phosphine gas when exposed to atmospheric conditions.

Upon exposure to air **FUMITOXIN** bags begin to react with atmospheric moisture to produce small quantities of phosphine gas. This reaction starts slowly, gradually accelerates and then tapers off again as the aluminum phosphide is spent. **FUMITOXIN** bags react somewhat faster than do the pellet and tablets. The rates of decomposition will vary depending upon moisture and temperature conditions. For example, when moisture and temperature of the fumigated commodity are high, decomposition of **FUMITOXIN** may be complete in less than 3 days. However, at lower ambient temperatures and humidity levels, decomposition of **FUMITOXIN** may require 5 days or more. The spent bag must be retrieved for disposal after fumigations. If properly exposed, the spent **FUMITOXIN Bag** will normally contain only a small amount of unreacted aluminum phosphide and may be disposed of without hazard. While **FUMITOXIN** is not considered a hazardous waste, partially spent residual dusts from incompletely exposed **FUMITOXIN** will require special care. Precautions and instructions for further deactivation and disposal will be given under section 24 this manual.

**FUMITOXIN** Bags that are supplied in tins are non-resealable and must be completely used when opened. **FUMITOXIN** Bags that are supplied in metal drums do not have to be completely used as long as the bag is not removed from the foil pouch or the foil pouch is not opened. Remove the number of pouches required and reseal the metal drum. The paper bag should never be torn open during the fumigation. Once the hermetically sealed tin or the foil packaging is opened, the bags will begin to release phosphine gas.

**4. PRECAUTIONARY STATEMENTS**

**4.1 Hazards to Humans and Domestic Animals**

**DANGER:** Aluminum phosphide dust from bags may be fatal if swallowed. Do not get the dust 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 into contact with moisture, water or acids, these products will release phosphine gas, which is an extremely toxic gas. If a garlic odor is detected, refer to the Industrial Hygiene Monitoring instructions found in section 15.6 of this manual for appropriate monitoring procedures. Pure phosphine gas is odorless; the garlic odor is due to a contaminant. Since the odor of phosphine gas may not be detected under some circumstances, the absence of a garlic odor does not mean that dangerous levels of phosphine gas are not present. Observe proper reentry procedures specified in section 15.4 of this applicator manual to prevent overexposure.

**4.2 Physical and Chemical Hazards**

Aluminum phosphide bags will release phosphine gas if exposed to moisture from

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the air or if it comes into contact with water, acids and many other liquids. Since phosphine gas may ignite spontaneously at levels above its lower flammable limit of 1.8-% v/v, it is important not to exceed this concentration. Ignition of high concentrations of phosphine gas can produce a very energetic reaction. Explosion can occur under these conditions and may cause severe personal injury. **Never allow the buildup of phosphine gas to exceed explosive concentrations.** Do not confine spent or partially spent metal phosphide fumigants as the slow release of phosphine gas from this material may result in formation of an explosive atmosphere. Aluminum phosphide fumigants should not be stacked or piled up or contacted with liquid water. This may cause a temperature increase, accelerate the rate of gas production and confine the 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. Containers may also be opened near a fan or other appropriate ventilation that will rapidly exhaust contaminated air. When opening point the container away from the face and body and slowly remove the lid. Although the chances for a flash are very remote, never open these containers in a flammable atmosphere. These precautions will also reduce the fumigator's exposure to phosphine gas. Containers may be opened inside the structure to be fumigated provided worker's exposure to phosphine gas does not exceed allowable limits.

Pure phosphine 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. 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. Immediately after addition of FUMITOXIN Bags to the structure, turn off any lights and unessential electric equipment.

FUMITOXIN Bags are Restricted Use Pesticides due to the high acute inhalation toxicity of phosphine gas. Read and follow the label and the Applicator's Manual. The Manual contains complete instructions for the safe use of the pesticide. Additional copies of this Manual are available from:

PESTCON SYSTEMS, INC.  
 1808 FIRESTONE PARKWAY  
 WILSON, NC 27893  
 Telephone: 252-237-7923/1-800-548-2778  
 Fax: 252-237-3259  
 Internet: www.pestcon.com

**5. PESTS CONTROLLED**

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

- |                       |                     |   |
|-----------------------|---------------------|---|
| almond moth           | European grain moth | Mediterranean flour moth                                    |
| Angoumois grain moth  | flat grain beetle   | pink bollworm   |
| bean weevil           | fruit flies         | raisin moth   |
| bees                  | granary weevil      | red flour beetle  |
| cadelle               | greater wax moth    | rice weevil   |
| cereal leaf beetle    | hairy fungus beetle | rusty grain beetle  |
| cigarette beetle      | Hessian fly         | saw-toothed grain beetle                                    |
| confused flour beetle | Indian meal moth    | spider beetles  |
| dermestid beetles     | Khapra beetle       | tobacco moth  |
| dried fruit beetle    | lesser grain borer  | yellow mealworm   |
| dried fruit moth      | maize weevil        | Africanized bees & Honeybee<br>infested with/tracheal mites |

*Ind. for the*

*100  
structures*

16/40

Pea Weevil

DATE

- Woodchucks
- Yellowbelly marmots (rockchucks)
- Prairie dogs (except Utah prairie dogs, Cynomys Parvidens)
- Norway rats
- Roof rats
- Mice
- Ground squirrels
- Moles
- Voles
- Pocket gophers
- chipmunks

Although it is possible to achieve total control of the listed vertebrate and 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 phosphine gas than others. If maximum control is to be attained, extreme care must be taken in sealing, higher dosages must be used, exposure periods lengthened, proper application procedures followed, and temperature and humidity conditions must be favorable.

**6. COMMODITIES, WHICH MAY BE FUMIGATED WITH FUMITOXIN**

FUMITOXIN may be used for the fumigation of listed raw agricultural commodities, animal feed and feed ingredients, processed foods, tobacco and certain other nonfood items when their commodity temperature is above 40°F (5°C).

**6.1 Raw Agricultural Commodities, Animal Feed and Feed Ingredients**

FUMITOXIN Bags may be added directly to animal feed, feed ingredients and raw agricultural commodities stored in bulk, however the bag must be removed after the fumigation is complete. For these commodities not stored in bulk, FUMITOXIN may be placed on trays, etc., and fumigated as with processed foods.

**Raw Agricultural Commodities and Animal Feed and Feed Ingredients  
Which May Be Fumigated with FUMITOXIN**

- |                                |                |                       |
|--------------------------------|----------------|-----------------------|
| almonds                        | flower seed    | sesame seed           |
| animal feed & feed ingredients | grass seed     | seed & pod vegetables |
| barley                         | millet         | sorghum               |
| Brazil nuts                    | oats           | soybeans              |
| cashews                        | peanuts        | sunflower seeds       |
| cocoa beans                    | pecans         | triticale             |
| coffee beans                   | pistachio nuts | vegetable seed        |
| corn                           | popcorn        | walnuts               |
| cottonseed                     | rice           | wheat                 |
| dates                          | rye            |                       |
| filberts                       | safflower seed |                       |

**6.2 PROCESSED FOODS**

Processed foods may be fumigated with FUMITOXIN. Under no condition shall any processed food or bagged commodity come in contact with FUMITOXIN bags or their residual dust except that FUMITOXIN may be added directly to processed brewer's rice, malt, and corn grits for use in the manufacture of beer. We recommend tablet or pellets be used for direct addition to the commodity.

**Processed Foods Which May Be Fumigated With FUMITOXIN**



- 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 byproducts
- chocolate and chocolate products (such as assorted chocolate, chocolate liquor, cocoa, cocoa powder, dark chocolate coating and milk chocolate products)
- 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, nondairy creamers, and nonfat dried milk
- dried or dehydrated fruits (such as apples, dates, figs, peaches, pears, prunes, raisins, citrus and sultanas)
- processed herbs, spices, seasonings and condiments
- malt
- processed nuts (such as almonds, apricot kernels, brazil nuts, cashews, filberts, macadamia nuts, peanuts, pecans, pistachio nuts, walnuts and other processed nuts)
- processed oats (including oatmeal)
- rice (brewer's rice grits, enriched and polished, wild rice)
- soybean flour and milled fractions
- processed tea
- dried and dehydrated vegetables (such as beans, carrots, lentils, peas, potato flour, potato products and spinach)
- yeast (including primary yeast)
- wild rice
- other processed foods

**6.3 Nonfood Commodities, Including Tobacco**

The listed nonfood commodities may be fumigated with FUMITOXIN Bags. The bags or the dust from the bags should not contact tobacco and certain other of the nonfood commodities.

**Nonfood Commodities, Which May Be Fumigated With FUMITOXIN**

- 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
- tires (for mosquito control)
- wood, cut trees, wood chips, wood and bamboo products
- paper and paper products
- dried plants and flowers
- seeds (such as grass seed, ornamental herbaceous plant seed and vegetable seed)
- other nonfood commodities

**7. EXPOSURE CONDITIONS**

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

<u>Temperature</u>	<u>Minimum Exposure Periods for FUMITOXIN Bags</u>
40°F (5°C)	Do not fumigate

40°-53°F (5-12°C)	14 days (336 hours)
54°-59°F (12-15°C)	9 days (216 hours)
60°-68°F (16-20°C)	5 days (120 hours)
above 68°F (20°C)	3 days ( 72 hours)

The fumigation must be long enough so as to provide for adequate control of the insect pests that infest the commodity being treated. Additionally, the fumigation period should be long enough to allow for more or less complete reaction of FUMITOXIN with moisture so that little or no unreacted aluminum phosphide remains. This will minimize worker exposures during further storage and/or processing of the treated bulk commodity as well as reduce hazards during 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 phosphine gas production by FUMITOXIN is lower at lower temperatures and humidity.

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 phosphine gas. 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. Application of additional FUMITOXIN is recommended if phosphine concentrations drop below an effective level. If reentry into the treated structure is required follow the requirements for manpower and respiratory protection usage found in section 10 of this manual. 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 commodity mass, for example, by surface application or shallow probing. This is particularly important in the fumigation of bulk commodity contained in large storage areas.

Remember, exposure periods recommended 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 FUMITOXIN.

It is permissible and often desirable to use a low-flow recirculation system for phosphine gas in certain bulk storages. This method may be used in ship's holds, various types of flat storage and vertical storage bins.

Recirculation usually involves the application of fumigant to the surface of the commodity. The phosphine gas is then continuously or intermittently drawn out of the over space and blown into the bottom of the storage using specially designed low volume fans and ductwork. This method facilitates the quick and uniform penetration of phosphine throughout the commodity. In some instances a reduced dosage may be used. Please contact Pestcon Systems, Inc. if assistance is required in designing the recirculation system.

**8. DOSAGE RATE GUIDELINES**

**Allowable and Recommended Dosages Rates**

Phosphine is a mobile gas and 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 FUMITOXIN Bags is required to treat a 30,000-bushel silo whether it is empty or full of grain unless, of course, a tarpaulin seals off the surface of the commodity.

Somewhat higher dosages, not to exceed the maximum, 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 phosphine 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 phosphine 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 is added on top of the grain. In such cases, use of a low flow recirculation system is recommended under these circumstances. Please contact Pestcon Systems, Inc, if assistance is required in designing the recirculation system.

**8.1 Recommended FUMITOXIN Dosages for Various Types of Fumigation**

The following recommended dosage ranges can be used as a guideline for various types of fumigation.

Type of Storage	Recommended Dosage Per 1000 Cu. Ft.
1. Space (including packaged commodities)	
a. Mills, Warehouses, etc.	2-6 Bags
b. Bagged Commodities	3-6 Bags
c. Dried Fruits, Nuts & Dates	2-4 Bags
d. Stored Tobacco	2-4 Bags
2. Bulk Stored Commodities	
a. Vertical Storage	3-6 Bags
b. Tanks	4-6 Bags
c. Flat Storage (loose construction)	5-13 Bags
d. Farm Bins	6-13 Bags
e. Rail Cars	3-6 Bags
f. Bunkers, Tarped Ground Storage	3-6 Bags
g. Barges	3-7 Bags
h. Ship holds	3-6 Bags

Note: The maximum dosage allowed for dates, nuts and dried fruits is 4 bags per 1000 cu. ft.

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

**9. PROTECTIVE CLOTHING**

**GLOVES:**

Gloves are not required to handle intact bags. However, wear dry gloves of cotton or other material if contact with the active or spent material from the bags is likely.

Gloves should remain dry during use.

Wash hands thoroughly after handling aluminum phosphide products.

Aerate used gloves and other clothing that may be contaminated in a well-ventilated area prior to laundering.

**10. RESPIRATORY PROTECTION**

**10.1 When respiratory protection must be worn**

Respiratory protection approved by the National Institute for Occupational

Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA) must be worn during exposure to concentrations in excess of permitted limits or when concentrations are unknown. Self contained breathing apparatus (SCBA) must be worn during entry into sites that are under fumigation if the concentration of phosphine is unknown or known to exceed the STELs for phosphine (1 ppm for 15 minutes).

**10.2 Permissible gas concentration ranges for respiratory protection devices**  
A NIOSH/MSHA approved full-face gas mask - phosphine canister combination may be used at levels up to 15 ppm or following manufacturers use conditions instructions for escape. Above 15 ppm or in situations where phosphine concentration is unknown, a NIOSH/MSHA approved, SCBA must be worn. - The NIOSH/OSHA Pocket Guide DHHS (NIOSH) 97-140 or the NIOSH ALERT - Preventing Phosphine Poisoning and Explosions During Fumigation, lists these and other types of approved respirators and the concentrations limits at which they may be used.

**10.3 Requirements for availability of respiratory protection.**

If FUMITOXIN is to be applied from within the structure to be fumigated, an approved full-face gas mask - phosphine canister combination or SCBA or its equivalent must be available at the site of application in case it is needed.

SCBA or its equivalent must be available locally (for example, at a fire station or rescue squad) 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 FUMITOXIN fumigant cannot be made from outside the structure, an approved canister respirator must be worn during application from within the structure being treated. However, if entry into an on farm structure, that is under fumigation is required, SCBA must be worn if the phosphine gas concentration is unknown or above the permissible limits.

**11. Requirements for Certified Applicator to be present and responsible for all workers as follows:**

- A. A Certified Applicator must be physically present, responsible for, and maintain visual and/or voice contact with all fumigation workers during the application of the fumigant. Once the application is complete and the structure has been made secure the certified applicator does not need to be physically present at the site.
- B. A Certified Applicator must be physically present, responsible for and maintain visual and/or voice contact with all fumigation workers during the initial opening of the fumigation structure for aeration. Once the aeration process is secured and monitoring has established that aeration can be completed safely the certified applicator does not need to be physically present and trained person(s) can complete the process and remove the placards.
- C. Persons with documented training in the handling of Phosphine products must be responsible for receiving, aerating and removal of placards from vehicles, which have been fumigated in transit. Refer to section 12 for training requirements.

**12. AUTHORIZED TRAINING FOR RECEIPT OF IN TRANSIT VEHICLES UNDER FUMIGATION.**

The trained person(s) must be trained by a Certified Applicator following the EPA accepted product applicators manual that must precede or be attached to the outside of a transport vehicle; or by other training which is accepted by local and or state authorities. When training has been completed and the employee demonstrates safety knowledge proficiency, the training date must be

logged and maintained in the employee's safety training record for a minimum of three years. Refresher training must be done on an annual basis.

This training must cover the following items found in this manual:

- a. How to aerate the vehicle and verify that it contains no more than 0.3-ppm phosphine.  
OR
- b. How to transfer the commodity to another storage area without prior aeration and ensure that worker safety limits are not being exceeded during the transfer.
- c. How to determine when respiratory protection must be worn.
- d. How to protect workers and nearby persons from exposure to levels above the 8-hour TWA of 0.3 ppm or the 15 minute TWA Short-Term exposure limit (STEL) of 1.0 ppm phosphine.
- e. Proper removal of placards from the vehicle.
- f. How to follow proper residual disposal instruction.

**13. GAS DETECTION EQUIPMENT**

There are a number of devices on the market for the measurement of phosphine gas at both industrial hygiene and fumigation levels. Glass detection tubes used in conjunction with the appropriate hand-operated air sampling pumps are widely used. These devices are portable, simple to use, do not require extensive training and are relatively rapid, inexpensive and accurate. Electronic devices are also available for both low level and high phosphine gas readings. Such devices should be used in full compliance with manufacturers' recommendations.

**14. NOTIFICATION REQUIREMENTS**

**14.1 Authorities and on-site workers:**

As required by local regulations, notify the appropriate local officials (fire department, police department, etc.) of the impending fumigation. Provide to the officials an MSDS and an Applicator's Manual for the product and any other technical information deemed useful. Offer to review this information with the local official(s).

**14.2 Incidents involving these products:**

Registrants must be informed of any incident involving the use of this product. Please call 252-237-7923/1-800-548-2778 so Pestcon Systems, Inc. can report the incident as per requirements of .

**14.3 Theft of products:**

Immediately report to the local police department thefts of metal phosphide fumigants.

**15. APPLICATOR AND WORKER EXPOSURE**

**15.1 Hydrogen Phosphide Exposure Limits**

Exposure to phosphine must not exceed the 8-hour Time Weighted Average (TWA) of 0.3 ppm or the 15 minute Short-term Exposure Limit (STEL) of 1.0 ppm phosphine. All persons are covered by these exposure standards.

**15.2 Application of Fumigant**

At least two persons, a certified applicator and trained person, or two trained persons under the direct supervision of the certified applicator must be present during fumigation of structures when entry into the structure for application of the fumigant is required. Depending upon temperature and humidity, FUMITOXIN bags release phosphine 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 fumigator's exposure will exceed the allowable limits, approved respiratory protection must be worn.

**15.3 Leakage from Fumigated Sites**

Phosphine gas is highly mobile and given enough time may penetrate seemingly gas-tight materials such as concrete and cinder block. Therefore, adjacent, enclosed areas likely to be occupied must be examined to ensure that significant leakage has not occurred. Sealing of the fumigated site and/or airflow in the occupied areas must be sufficient to bring down the phosphine concentration to a safe level of 0.3 ppm or below.

**15.4 Aeration and Reentry**

If the structure is to be entered after fumigation, it must be aerated until the level of phosphine gas is 0.3 ppm or below. The area must be monitored to ensure that liberation of gas from the treated commodity does not result in the development of unacceptable levels i.e., over industrial hygiene levels of phosphine. Do not allow reentry into treated structure by any person before the level of phosphine gas reaches 0.3 ppm or below unless protected by an approved respirator.

**15.5 Handling Un-aerated Commodities**

Transfer of incompletely aerated commodity via bulk handling equipment such as augers, drag conveyors and conveyor belts to a new structure is permissible. A Certified Applicator is responsible for training workers who handle the transfer of incompletely aerated listed commodities, and appropriate measures must be taken (i.e., ventilation or respiratory protection) to prevent exposures from exceeding the exposure limits for phosphine. The new storage structure must be placarded if it contains more than 0.3ppm phosphine. If the fumigation structure must be entered to complete the transfer, at least two persons, wearing proper respiratory protection may enter the structure. A certified applicator must be physically present during the entry into the structure.

REMEMBER: transporting containers or vehicles under fumigation over public roads is prohibited.

**15.6 Industrial Hygiene Monitoring**

Phosphine exposures must be documented in an operations log or manual at each site and operation where exposures may occur. Monitor airborne phosphine concentrations in all indoor areas to which fumigators and other workers have had access during fumigation and aeration. Perform such monitoring in workers' breathing zones. This monitoring is mandatory and is performed to determine when and where respiratory protection is required. Once exposures have been adequately characterized spot checks must be made, especially if conditions change significantly or if an unexpected garlic odor is detected or a change in phosphine level is suspected.

**15.7 Engineering controls and work practices**

If monitoring shows that workers may be exposed to concentrations in excess of the permitted limits, then engineering controls (such as forced air ventilation) and/or appropriate work practices must be used to reduce exposure to within permitted limits. In any case, appropriate respiratory protection must be worn if phosphine exposure limits are exceeded.

**16. PLACARDING OF FUMIGATED AREAS**

All entrances to the fumigated structure must be placarded. Placards must be made of substantial material that can be expected to withstand adverse weather conditions, and must bear the wording as follows:

1. The signal word DANGER/PELIGRO and the SKULL AND CROSSBONES symbol in red.
2. The statement "Structure and/or commodity under fumigation, DO NOT ENTER/NO ENTRE".
3. The Statement, "This sign may only be removed by a certified applicator or a person with documented training after the commodity is completely aerated (contains 0.3 ppm or less of phosphine gas). If incompletely aerated commodity is transferred to a new storage structure, the new structure must also be placarded if it contains more than 0.3 ppm. Workers exposure during this transfer must not exceed allowable limits."
4. The date the fumigation begins.
5. Name and EPA registration number of fumigant used.
6. Name, address and telephone number of the Fumigation Company and/or applicator.
7. A 24-hour emergency response telephone number.

All entrances to a fumigated structure 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 structure 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.

**17. SEALING OF STRUCTURE**

The structure to be fumigated must first be inspected to determine if it can be made sufficiently gas tight. Careful sealing is required so that adequate gas levels are retained. Turn off all ventilation, supply air, air conditioning, and any other air moving systems, which could negatively effect the fumigation. Thoroughly inspect the structure to be fumigated and seal cracks, holes and openings. These areas could include, but are not limited to: windows, doors, vents, chimneys open pipes and structural flaws. Sealing techniques can vary, but most often include polyethylene sheeting, adhesive tapes and adhesive sprays. Expandable foam or caulking material can work well on structural flaws. Proper sealing will insure sufficient gas levels within the fumigated area and will decrease the chance of unwanted exposures outside of the fumigated structure.

As with all fumigations, it is required that sealing be inspected for leaks. If phosphine above 0.3 ppm is found in an area where exposure to workers or bystanders may occur, the fumigator, using proper respiratory protective equipment must attempt to seal the leak from the exterior of the structure. Failing this, the fumigators, following proper procedure, may enter the structure and seal the leaks from the interior. If the concentration inside the structure has decreased below the target level as a result of the leakage, additional fumigant may be added following the sealing repairs.

DO NOT FUMIGATE A STRUCTURE THAT CANNOT BE SEALED SUFFICIENTLY GAS TIGHT.

**18. AERATION OF FUMIGATED COMMODITIES**

As an alternative to the aeration time periods listed below each container of the treated commodity may be analyzed for residues using accepted analytical methods.

**18.1 Foods and feeds**

Tolerances for phosphine 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 them to the end consumer.

**18.2 Non-food commodities**

Aerate all non-food commodities to 0.3 ppm or less of phosphine. Monitor densely packed commodities to ensure that aeration is complete.

**18.3 Tobacco**

Tobacco must be aerated for at least three days (72 hours) when fumigated in hogsheads or until concentration is below 0.3 ppm and for at least two days (48 hours) when fumigated in other containers. When plastic liners are used, longer aeration periods will probably be required to aerate the commodity down to 0.3 ppm. ~~If residues are less than tolerance levels, the commodity may be shipped to the consumer regardless of the above holding periods.~~

*delete*

**19. STORAGE INSTRUCTIONS**

FUMITOXIN Bags must be stored in a dry, well-ventilated area away from heat, under lock and key. Post as a pesticide storage area. Do not contaminate food, water or feed by storing pesticides in the same areas used to store these commodities. Do not store in buildings where humans or domestic animals may reside. Keep out of reach of children.

**19.1 Labeling of Storage**

The labeling of the storage area should take into account the needs of a variety of organizations. These include, but are not limited to: company policy, insurance carrier, Occupational Safety and Health Administration (OSHA), Emergency Planning and Community Right to Know and local emergency response professionals. At a minimum, the storage must be marked with the following signs:

1. Danger, Poison (with skull and cross bones)
2. Authorized Personnel Only
3. National Fire Protection Association (NFPA) Hazard Identification Symbols for the pesticide storage.

The NFPA has developed Hazard Identification Symbols. This standardized system is designed to provide, at a glance the information regarding the health, fire and reactivity hazards associated with hazardous materials. The following are the hazard categories and degree of hazard for aluminum phosphide:

Category	Degree of Hazard
Health	4 (Severe Hazard)
Flammability	4 (Severe Hazard)
Reactivity	2 (Moderate)
Special Notice Key	W

NOTE: When using the NFPA Hazard Identification System, the characteristics of all hazardous materials stored in a particular area must be considered. The local fire protection district should be consulted for guidance on the selection and placement of such signs.



**20. TRANSPORTATION INSTRUCTIONS**

The United States Department of Transportation (DOT) classifies aluminum phosphide as Dangerous When Wet material and it must be transported in accordance with DOT regulations.

**20.1 TRANSPORT DESIGNATIONS** - The following transport designations apply to aluminum phosphide

Proper Shipping Name:	Aluminum phosphide,
Hazard Class:	4.3
Identification No.:	UN 1397
Packing Group:	PG I
Shipping Label:	Dangerous When Wet/Poison
Shipping Placard:	Dangerous When Wet

**20.2 Transportation exemption:**

Exemption: DOT-E 10753

Purpose and Limitation: "...The motor vehicles used under the terms of this exemption are not required to be placarded..."

Modes of Transportation Authorized: Motor vehicle (Only private motor vehicles used in pest control operations are authorized to transport the packages covered by the terms of this exemption.)

NOTE: You must have a copy of this exemption with you during transportation. For a copy of this exemption contact Pestcon Systems, Inc., 1808 Firestone Parkway, Wilson, NC 27893 phone: 252-237-7923/1-800-548-2778, fax: 252-237-3259 or internet [www.pestcon.com](http://www.pestcon.com) for a copy of this exemption

**21. FUMIGATION MANAGEMENT PLAN**

The certified applicator is responsible for working with the owners and/or responsible employees of the structure or area to be fumigated to develop a Fumigation Management Plan (FMP). The FMP is intended to ensure a safe and effective fumigation. The FMP must address characterization of the structure and/or area, and include appropriate monitoring and notification requirements, consistent with, but not limited to, the following:

1. Inspect the structure and/or area to determine its suitability for fumigation.
2. When sealing is required, consult previous records for any changes to the structure, seal leaks, and monitor any occupied adjacent buildings to ensure safety.
3. Prior to each fumigation, review any existing FMP, MSDS, Applicators Manual and other relevant safety procedures with company officials and appropriate employees.
4. Consult company officials in the development of procedures and appropriate safety measures for nearby workers that will be in and around the area during application and aeration.
5. Consult with company officials to develop an appropriate monitoring plan that will confirm that nearby workers and bystanders are not exposed to levels above the allowed limits during application/aeration. This plan must also demonstrate that nearby residents will not be exposed to concentrations above the allowable limits.
6. Consult with company officials to develop procedures for local authorities to notify nearby residents in the event of an emergency.
7. Confirm the placement of placards to secure entrance into any structure under fumigation.
8. Confirm the required safety equipment is in place and the necessary manpower is available to complete a safe effective

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fumigation.

- 9. Written notification must be provided to the receiver of a vehicle that is fumigated in transit.

These factors **must** be considered in putting a FMP together. It is important to note that some plans will be more comprehensive than others. All plans should reflect the experience and expertise of the applicator and circumstances at and around the structure and/or area.

In addition to the plan, the applicator must read the entire label and applicator manual and follow its directions carefully. If the applicator has any questions about the development of a FMP contact **Pestcon Systems, Inc.** for further assistance.

The FMP and related documentation, including monitoring records, must be maintained for a minimum of 2 years.

**GUIDANCE FOR PREPARATION OF A FUMIGATION MANAGEMENT PLAN**

**Purpose**

A Fumigation Management Plan (FMP) is an organized, written description of the required steps involved to help ensure a safe, legal, and effective fumigation. It will also assist you and others in complying with pesticide product label requirements. The guidance that follows is designed to help assist you in addressing all the necessary factors involved in preparing for and fumigating a structure and/or area.

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

Before any fumigation begins, carefully read and review the label and the Applicator's Manual. This information must also be given to the appropriate company officials (supervisors, foreman, safety officer, etc.) in charge of the site. Preparation is the key to any successful fumigation. If the type of fumigation that you are to perform is not listed in this Guidance Document you will want to construct a similar set of procedures. Finally, before any fumigation begins you must be familiar with and comply with all applicable state and local laws. The success and future of fumigation are not only dependent on your ability to do your job but also by carefully following all rules, regulations, and procedures required by governmental agencies.

**A CHECKLIST GUIDE FOR A FUMIGATION MANAGEMENT PLAN**

This checklist is provided to help you take into account factors that must be addressed prior to performing all fumigation's. It emphasizes safety steps to protect people and property. The checklist is general in nature and cannot be expected to apply to all types of fumigation situations. It is to be used as a guide to prepare the required plan. Each item must be considered. However, it is understood that each fumigation is different and not all items will be necessary for each fumigation structure and or area.

**A. PRELIMINARY PLANNING AND PREPARATION**

- 1. Determine the purpose of the fumigation.
  - a. Elimination of insect infestation
  - b. Elimination of vertebrate pests
  - c. Plant pest quarantine.
- 2. Determine the type of fumigation, for example
  - a. Space; tarp, mill, warehouse, food plant, outdoor area

*... using this document as a guide or contact Pestcon Systems, Inc. for assistance*

- b. Vehicle; railcar, truck, van, container
  - c. Commodity; raw agricultural or processed foods or nonfood
  - d. Type of Storage vertical silo, farm storage, flat storage, etc.
  - e. Vessels; ship or barge. In addition to the Applicator's Manual, read the US Coast Guard Regulations 46CFR 147A.
3. Fully acquaint yourself with the structure and/or area and commodity to be fumigated, including.
- a. The general structure layout, construction (materials, design, age, maintenance), of the structure fire or combustibility hazards, connecting structures and escape routes, above and below ground, and other unique hazards or structure characteristics. Prepare, with the owner/operator/person in charge, a drawing or sketch of structure to be fumigated, delineating features, hazards, and other structural issues.
  - b. The number and identification of persons who routinely enter the area to be fumigated (ie. Employees, visitors, customers, etc.)
  - c. The specific commodity to be fumigated, its mode of storage, and its condition.
  - d. The previous treatment history of the commodity, if available.
  - e. Accessibility of utility service connections.
  - f. Nearest telephone or other means of communication, and mark the location of these items on the drawing/sketch.
  - g. Emergency shut-off stations for electricity water and gas. Mark the location of these items on the drawing/sketch.
  - h. Current emergency telephone numbers of local Health, Fire, Police, Hospital and Physician responders.
  - i. Name and phone number (both day and night) of appropriate company officials.
  - j. Check, mark and prepare the points of fumigation application locations if the job involves entry into the structure for fumigation.
  - k. Review labeling and Applicator's Manual
  - l. Exposure time considerations.
    - 1. Product (bags) to be used.
    - 2. Minimum fumigation period, as defined and described by the label use directions.
    - 3. Down time required to be available
    - 4. Aeration requirements
    - 5. Cleanup requirements, including dry or wet deactivation methods, equipment, and personnel needs, if necessary.
    - 6. Measured and recorded commodity temperature and moisture.
  - m. Determination of dosage
    - 1. Cubic footage or other appropriate space/location calculations.
    - 2. Structure sealing capability and methods.
    - 3. Label recommendations
    - 4. Temperature, humidity, wind
    - 5. Commodity/space volume
    - 6. Past history of fumigation of structure
    - 7. Exposure time.

#### B. PERSONNEL

- 1. Confirm in writing that all personnel in and around the structure and/or area to be fumigated have been notified prior to application of the fumigant. Consider using a checklist each one initials indicating they have been notified.
- 2. Instruct all fumigation personnel to read the Applicator's Manual concerning the hazards that may be encountered, the selection of personal protection devices, including detection equipment.
- 3. Confirm that all personnel are aware of and know how to proceed in case of an emergency situation.

- 4. Instruct all personnel on how to report any accident and/or incidents related to fumigant exposure. Provide a telephone number for emergency response reporting.
- 5. Instruct all personnel to report to proper authorities any theft of fumigant and/or equipment related to fumigation.
- 6. Establish a meeting area for all personnel in case of an emergency.

C. MONITORING

1. Safety

- a. Monitoring of phosphine concentrations must be conducted in areas to prevent excessive exposure and to determine where exposure may occur. Document where monitoring will occur.
- b. Keep a log or manual of monitoring records for each fumigation structure. This log must at a minimum contain the timing, number of readings taken and level of concentrations found in each location.
- c. When monitoring, document even if there is no phosphine present above the safe levels. In such cases, subsequent monitoring is not routinely required. However spot checks must be made occasionally, especially if conditions change significantly.
- d. Monitoring must be conducted during aeration and corrective action must be taken if gas levels exceed the allowed levels in an area where bystanders and/or nearby residents or domestic animals may be exposed.

2. Efficacy

- a. Phosphine readings should be taken from within the fumigated structure to insure proper gas concentrations. If the phosphine concentrations have fallen below the targeted level the fumigators, following proper entry procedures may reenter the structure and add additional product.
- b. All phosphine readings should be documented.
- c.

D. NOTIFICATION

- 1. Confirm all local authorities (fire departments, police departments, etc.) have been notified as per label instructions, local ordinances if applicable, or instructions of the client.
- 2. Prepare written procedure ("Emergency Response Plan"), which contains explicit instructions, names, and telephone numbers so as to be able to notify local authorities if phosphine levels are exceeded in an area that could be dangerous to bystanders and or domestic animals.
- 3. Confirm that the receiver of in transit vehicles under fumigation have been notified and are trained according to Section 12 of this applicator manual.

E. SEALING PROCEDURES

- 1. Sealing must be adequate to control the pests. Care should be taken to insure that sealing materials will remain intact until the fumigation is complete.
- 2. If the structure has been fumigated before, review the previous FMP for previous sealing information.
- 3. Make sure that construction/remodeling has not changed the building in a manner that will effect the fumigation.
- 4. Warning placards must be placed on every possible entrance to the fumigation structure.

F. APPLICATION PROCEDURES & FUMIGATION PERIOD

- 1. Plan carefully and apply all fumigants in accordance with the registrants label requirements.

*[Handwritten signature]*

2. When entering into the structure under fumigation, always work with two or more people under the direct supervision of a certified applicator, wearing appropriate respirators.
3. Apply fumigant from the outside the structure where appropriate.
4. Provide watchmen when the possibility of entry into the fumigation structure by unauthorized persons cannot otherwise be assured.
5. When entering structures always follow OSHA rules for confined spaces.
6. Document that the receiver of vehicles fumigated in transit has been notified.
7. Turn off any electric lights in the fumigated storage as well as all nonessential electrical motors.

#### G. POST-APPLICATION OPERATIONS

1. Provide watchmen when the fumigation structure cannot be secured from entry by unauthorized persons during the aeration process.
2. Aerate in accordance with structural limitations.
3. Turn on ventilating or aerating fans where appropriate.
4. Use a suitable gas detector before reentry into a structure to determine fumigant concentration.
5. Keep written records of monitoring to document completion of aeration.
6. Consider temperature when aerating.
7. Ensure aeration is complete before moving a treated vehicle into public roads.
8. Remove warning placards when aeration is complete.
9. Inform business/client that employees/other persons may return to work or otherwise be allowed to reenter the aerated structure.

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## 22. APPLICATION PROCEDURES

A FMP must be devised to cover application and exposure period, aeration and disposal of the fumigant so as to keep to a minimum any human exposure to phosphine and to help assure adequate control of the insect pests.

The following instructions are intended to provide general guidelines for typical fumigations.

### 21.1 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 a storage that will be entered by humans or domestic animals prior to aeration. Do not fumigate areas which house sensitive equipment containing copper or other metals likely to be corroded by phosphine gas.

1. Read the label, Applicator's Manual, MSDS and related safety material.
2. Inspect the bin to determine if you can fumigate effectively.
3. If the bin is located in an area where nearby workers, domestic animals or bystanders would be exposed to phosphine gas because of leakage from the bin:
  - (i) Develop a monitoring procedure that will confirm if leakage from the bin is above the allowable limits in an area that would affect nearby workers, domestic animals or bystanders.
  - (ii) Advise local authorities when and where you will be fumigating. Provide and review with them the MSDS, Applicator's Manual and other relevant safety information.

4. If the bin is in an isolated area on private property (i) and (ii) above are not required.
5. Seal the bin as tightly as possible. It is recommended that the surface of the grain be covered with poly after **FUMITOXIN** has been applied. Tarping the grain surface will greatly reduce the leak rate of the gas as well as reduce the amount of **FUMITOXIN** 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.
6. **FUMITOXIN** bags may be scattered over the surface or probed into the grain.
7. Use about 8-16 bags per 1000 bu. Or 6-13 bags per 1000 cu. Ft. Probe the dosage uniformly over the surface.
8. Immediately cover the surface of the grain with a plastic tarpaulin.
9. 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 **FUMITOXIN**. Addition of **FUMITOXIN** to water in an aeration duct may result in a fire.
10. Seal the aeration fan with 4-mil plastic sheeting.
11. Place fumigation warning signs on entrances to the bin and near the ladder.
12. Following aeration of the bin, the surface of the grain may be sprayed with an approved protectant to discourage reinfestation.
13. Following aeration of the bin, the surface of the grain may be sprayed with an approved protectant to discourage reinfestation.

**Note:** If monitoring equipment is not available on a farm and application cannot be done from outside of a structure, an approved canister respirator must be worn during application from within an enclosed indoor area.

#### 22.2 Flat storage

Treatments of these types of storages often require considerable physical effort. Therefore, sufficient manpower should be available to complete the work rapidly enough to prevent excessive exposure to hydrogen phosphide gas. Vent containers outside the storage, conduct fumigations during cooler periods, and employ other work practices to minimize exposures. It is likely that respiratory protection will be required during application of fumigant to flat storages. Refer to the sections on Applicator and Worker Exposure and Respiratory Protection.

1. Inspect the structure to determine its suitability for fumigation.
2. Determine if the structure is in an area where leakage during fumigation or aeration would adversely effect nearby workers or bystanders if concentrations were above the permitted exposure levels.
3. Develop an appropriate Fumigation Management Plan. (Refer to FMP guidelines.)
4. Consult previous records for any changes to the structure that would effect the fumigation. Seal vents, cracks and other sources of leaks.
5. Using the label, determine the length of the fumigation and calculate the dosage of bags to be applied based upon volume of the building, air

and/or commodity temperature and the general tightness of the structure.

- 6. Apply bags by surface application, shallow probing, or deep probing. It is advisable to place about 25 percent of the dosage in the floor level aeration ducts. Check the ducts prior to addition of **FUMITOXIN** to make sure that they contain no liquid water.
- 7. Placement of plastic tarp over the surface of the commodity is often advisable, particularly if the overhead of the storage cannot be well sealed.
- 8. Lock all entrances to the storage and post fumigation warning placards.
- 9. Bins need not be aerated unless re-entry into the storage is required.
- 10. Remove and dispose of bags prior to emptying bin or during emptying if the bags cannot be retrieved otherwise.

**22.3 Vertical storages** (concrete upright bins and other silos in which grain can be rapidly transferred) **FUMITOXIN** Bags may be added to the commodity as the bin is filled, but must be removed as the bin is emptied. **FUMITOXIN** tablets or pellets are most suited to this application since they can be automatically added to the commodity and are not removed after fumigation. Refer to the Tablet and Pellet applicator manual for instructions.

- 1. Inspect the site to determine its suitability for fumigation.
- 2. Determine if the structure is in an area where leakage during fumigation or aeration would expose nearby workers or bystanders to concentrations above the permitted levels.
- 3. Develop an appropriate Fumigation Management Plan. (Refer to FMP guidelines.)
- 4. Consult previous records for any changes to the structure that will effect the fumigation. Close openings and seal cracks to make the structure is as airtight as possible. Prior to the fumigation, seal the vents near the bin top, which connect to adjacent bins.
- 5. Using the label, determine the length of the fumigation and calculate the dosage of bags to be applied based upon volume of the building, air and/or commodity temperature and the general tightness of the structure.
- 6. Bags may be applied continuously by hand on the headhouse/gallery belt or into the fill opening as the commodity is loaded into the bin. All Bags must be removed when the bin is emptied.
- 7. Keep an accurate count of bags added since the bags must be removed when the bin is emptied. Bags can be removed by transfer of the commodity through a screen or scale operator.
- 6. Seal the bin deck openings after the application has been completed.
- 7. Bins requiring more than 24 hours to fill should not be fumigated by continuous addition into the commodity stream. Probing, surface application, or other appropriate means may be used to fumigate these bins. Exposure periods should be lengthened to allow for diffusion of gas to all parts of the bin if **FUMITOXIN** has not been applied uniformly throughout the commodity mass.

- 8. Place warning placards on the discharge gate and on all entrances.

**22.4 Mills, food processing plants and warehouses**

- 1. Inspect the structure to determine its suitability for fumigation.
- 2. Determine if the structure is in an area where leakage during fumigation or aeration would expose nearby workers or bystanders if concentrations were above the permitted exposure levels.
- 3. Develop an appropriate Fumigation Management Plan. (Refer to Fumigation Management Plan guidelines.)
- 4. Using the label, determine the length of the fumigation and calculate the dosage of bags to be applied based upon volume of the building, air and/or commodity temperature and the general tightness of the structure.
- 5. Read the directions found in section 4.2 Physical and Chemical Hazards and remove or cover any of the listed items that can become damaged from exposure to phosphine gas.
- 6. Consult previous records for any changes in the structure that would effect the fumigation. Carefully seal and placard the space to be fumigated.
- 7. Place bags on floor in a systematic manner, beginning at the point furthest from the exit door. Do not toss bags into inaccessible areas. Do not pile bags. Spread bags so they are not touching.
- 8. FUMITOXIN bags are not to be placed in or attached to commodity packages containing processed food. If bags cannot be placed on the floor, attach to walls or other support. Bags may be taped to a cardboard disc and disc attached to commodity packaging.
- 9. Turn off any lights within the treated area and shut off all electrical motors not essential to operations of the storage. Doors leading to the fumigated space must be closed, sealed, and placarded with warning signs.
- 10. Upon completion of the exposure period, windows, doors, vents, etc., should be opened and the fumigated structure allowed to aerate. The structure should not be entered without proper PPE unless gas readings have been taken and the concentration is below the allowable limits. Gas concentration readings may be taken using low-level detector tubes or similar devices to ensure safety of personnel who reenter the treated structure.
- 11. Collect the spent **FUMITOXIN** bags and dispose of them, with or without further deactivation. Refer to Disposal Instructions in this manual.
- 12. Remove fumigation warning placards from the aerated structure.

**22.5 Railcars, containers, trucks, vans, and other transport vehicles**

**22.5.1 General**

Railcars and containers, trucks, vans, and other transport vehicles shipped piggyback by rail may be fumigated intransit. However, the aeration of railcars, railroad boxcars, containers and other vehicles is prohibited en-route. It is not legal to move trucks, trailers, containers, vans, etc., over public roads or highways until they have been aerated.



Transport vehicles loaded with bulk commodities, to which FUMITOXIN bags may be added directly are treated in essentially the same way as any other flat storage facility. FUMITOXIN may be added as the vehicle is being filled, the dose may be scattered over the surface after loading has been completed or the bags may be probed below the surface. Carefully seal any vents, cracks or other leaks, particularly if the fumigation is to be carried out in-transit. See Section 16 of this Applicator's Manual for recommendations on placarding.

*PHOSTOXIN Prepacs or Fumi-Cel® plates (not classified by UL) are recommended for the treatment of transport vehicles or similar storages containing processed foods for which no direct contact is allowed with tablets or pellets or bags.*

**22.5.2 Procedures for Processed Foods**

Fumitoxin bags must not come into contact with processed foods. Bags must be applied in such a way as to prevent contact with the commodity or its packaging.

**Bulk Rail Cars.**

1. Close and secure all hatch cover except those being utilized for the fumigation.
2. Seal all other openings. Pay particular attention to vents.
3. Clean the flange lip of hatch (or hatches) being utilized. If the commodity extends into the throat of the hatch, force it away as far as possible.
4. Open bag containers and tape bags to a cardboard disc. Be sure to only tape across the bag ends only.
5. Place the disc into position, bag side up, and secure with masking tape.
6. Lower the cover into place and secure. Tape "Warning" placards securely to the hatch cover.

**Procedures for Boxcars:**

1. Close and secure one of the doors from the inside. Seal all openings and joints. If possible, caulk joints and drape entire doorway with polyethylene film, securing the edges to the inner wall, floor and ceiling with masking tape.
2. Inspect the roof, floor and walls for holes and/or cracks. Seal all openings.
3. If possible, drape remaining doorway with polyethylene film before door is closed. Secure edges to door jams and floor. Close door and secure. If doorway is draped with polyethylene it may not be necessary to seal the door from the outside. If door is not draped, seal all cracks, openings and joints from the outside.
4. Open containers of bags and tape bags to cardboard discs. Be sure to tape across the bag ends only.
5. Place the loaded discs inside the boxcar and secure, bag side up, with tap or nail to the wall.
6. Post "warning" placards on each door.

**Procedures for Containers:**

1. Procedures for trucks, vans and other transport containers are essentially the same as boxcars, except their doors tend to be more gas tight, and they often have only a rear door, which must be sealed after application is completed.

The Shipper and/or the fumigator must provide written notification to the receiver of railcars, railroad boxcars, shipping containers and other vehicles, which are being fumigated in-transit. A copy of the applicator's Manual must precede or accompany all transportation containers or vehicles. If the applicator manual is sent with the transport vehicle it must be placed securely on the outside of the vehicle.

Proper handling of treated railcars at their destination is the responsibility of the consignee. Upon receipt of the railcar, railroad boxcars, shipping containers and other vehicles a certified applicator and/or persons with documented authorized training must supervise the aeration process and removal of the placards.

**22.6 Tarpaulin and bunker fumigations**

Use of plastic sheeting or tarpaulins to cover commodities is one of the easiest and least expensive means for providing relatively gas tight enclosures which are very well suited for fumigation. Poly tarps are penetrated only very slowly by phosphine 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.

1. Develop an enclosure suitable for fumigation by covering bulk or packaged commodities 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, the commodity to be fumigated 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.
2. Determine if the enclosure is in an area where leakage during fumigation or aeration would effect nearby workers or bystanders if concentrations were above the permitted exposure levels.
3. Develop an appropriate Fumigant Management Plan. (Refer to Fumigation Management Plan guidelines.)
4. Using the guidance given under Section 7, Exposure Conditions, determine the length of the fumigation and calculate the dosage of bags to be applied based upon volume of space under the tarp, air and or commodity temperature.
5. 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 **FUMITOXIN** at any one point. The **FUMITOXIN** 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. **PHOSTOXIN Prepac** (not classified by UL) are recommended for the treatment of bagged commodities and processed foods although bags taped to cardboard discs may be used. Care should be taken to see that the poly is not allowed to cover the **FUMITOXIN** and prevent contact with moist air or confine the gas.
6. 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.
7. Place warning placards at conspicuous points on the enclosure.

## 22.7 Intransit Shiphold Fumigation

### 22.7.1 General Information

1. Important - Intransit ship or shiphold fumigation is also governed by U.S. Coast Guard Regulation 46 CFR 147A, Interim Regulations for Shipboard Fumigation. Refer to this regulation prior to fumigation. For further information contact:

Commandant  
U.S. Coast Guard  
Hazardous Materials Standards Division  
GMSO-3  
Washington, DC 20593-0001

### 22.7.2 Pre-Voyage Fumigation Procedures

1. Prior to fumigating a vessel for in transit cargo fumigation, the master of the vessel, or his representative, and the certified applicator 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 the vessel does not meet these requirements the vessel must not be fumigated unless all crew members are removed from the vessel. Crew members are not be permitted to reoccupy the vessel until the vessel has been properly aerated and the master of the vessel and the certified applicator has made a determination that the vessel is safe for occupancy.
2. The certified applicator 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.

*\*Note: 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. SCBA 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 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 certified applicator 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, certified

applicator 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.

**22.7.3 Application Procedures for Bulk Dry Cargo Vessels and Tankers**

- 1. After a hold has been filled or completed, open containers and distribute bags uniformly onto commodity surface with spacing between each. Do not place bags within 10 feet of sidewalls. Step on each bag after placement or probe bags into commodity.
- 2. Immediately after application of the fumigant, observe the closing of all hatch covers, tank tops, butterworth valves, manways, etc. Stop the closing if the cover snags an individual bag. Reposition the bag and resume closing.

**22.7.4 In transit Fumigation of Transport Units (Containers) Aboard Ships**

In transit fumigation of transport units on ships is also governed by DOT RSPA 49 CFR 176.76(h) Transport Vehicles, Freight Containers, and Portable Tanks Containing Hazardous Materials and International Maritime Dangerous Goods Code P9025-1 Amdt. 27-94.

Application procedures for fumigation of raw commodities or processed foods in transport units (containers) are described in Section 3.6-6 of this manual.

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**22.7.5 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.

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

**23. BARGE**

Barge fumigation is also regulated by U. S. Coast Guard Regulation 46 CFR 147A as modified by U. S. Coast Guard Special Permit 2-75. This permit, which must be obtained prior to the fumigation, is available from:

Commandant  
 U. S. Coast Guard  
 Hazardous Materials Standards Div.  
 GMSO-3  
 Washington, DC 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 FUMITOXIN and seal, if necessary. Placard the Barge. Notify consignee if the barge is to be fumigated in transit and provide safety instructions for receipt and unloading.

**24. DISPOSAL INSTRUCTIONS**

**24.1 General**

Do not contaminate water, food or feed by storage or disposal.

Unreacted or partially reacted FUMITOXIN is acutely hazardous. Improper disposal of excess pesticide 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 24 of this manual, Spill and Leak Procedures. Some local and state waste disposal regulations may vary from these general 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.

**24.2 Container disposal.**

Triple rinse cans, drums or foil pouches with water if they have been contacted with spent or partially reacted dust from FUMITOXIN BAGS. They may then be recycled or reconditioned, or punctured and disposed 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. It is also permissible to expose empty containers to atmospheric conditions until any residue is reacted. In this case puncture and dispose of in a sanitary landfill or other approved site, or by other procedures approved by state and local authorities.

**24.3 Residual Dust general.**

If properly exposed, the residual dust remaining after a fumigation with FUMITOXIN will be a grayish-white powder. This will be a nonhazardous waste and contain only a small amount of unreacted aluminum phosphide. However, residual dust from incompletely exposed FUMITOXIN, (so called green dust) requires special care. Do not confine spent or partial spent bags in a closed container as this may result in a fire hazard. Small amounts of hydrogen phosphide may be given off from the unreacted aluminum phosphide, and confinement of the gas may result in a flash. Unless it can be determined with certainty that the bags are spent, they must be deactivated as described below prior to disposal.

**24.4. Disposal of Unreacted or Partially Reacted FUMITOXIN bags: (From spills, leaking containers or other sources).**

Unreacted or partially reacted FUMITOXIN bags are acutely hazardous. Improper disposal of this product is a violation of federal law. If this product cannot be disposed of by ordinary use or according to the instructions that follow, contact your state pesticide or environmental control agency or the hazardous waste representative at the nearest EPA regional office for guidance. Do not contaminate water by disposal. 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.

**Caution:** - Wear a NIOSH/MSHA approved full-face gas mask - hydrogen phosphide

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canister combination if exposed to levels between 0.3 ppm to 15 ppm or a Self Contained Breathing Apparatus (SCBA) if exposure is unknown or above 15 ppm must be worn during wet deactivation of partially spent material. Do not cover the container being used for wet deactivation. Do not dispose of FUMITOXIN dust from bags in a toilet.

**24. SPILL AND LEAK PROCEDURES**

**24.1 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 FUMITOXIN. Water in contact with unreacted bags will greatly accelerate the production of hydrogen phosphide gas that could result in a toxic and/or fire hazard. Wear dry gloves of cotton or other material when handling aluminum phosphide.

Return all intact containers 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 containers have been punctured or damaged so as to leak, the container may be temporarily repaired with aluminum tape or the FUMITOXIN 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, if required, from Pestcon Systems, Inc.

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

If the age of the spill is unknown or if the bags have been contaminated with soil, debris, water, etc., gather up the spillage and place it into small open buckets having a capacity no larger than about 1 gallon to transport to a secure site for deactivation. Alternatively, small amounts of spillage may be spread out in an open area away from inhabited buildings to be deactivated by atmospheric moisture.

**25 DEACTIVATION PROCEDURES**

The methods below may be used for deactivating used or unused FUMITOXIN bags regardless of the extent to which the aluminum phosphide has decomposed.

**25.1 Dry Deactivation:**

Collect bags and place them into a well ventilated holding container such as wire cage or other similar devices. Store the bags in one of these devices until the bags are spent. Unused or partially spent bags can be spread out on the ground in a secure open area away from occupied buildings to be deactivated by atmospheric moisture. Care should be taken so that they are not carried away by the wind. Dry deactivation is the recommended procedure for unused or partially spent bags. If in doubt, as to whether the bags are spent, contact Pestcon Systems, Inc.

Ignition may occur if large numbers of incompletely reacted bags are contacted by liquid water. This can occur in open or perforated storage containers. Therefore, such storage should be out of doors in a relative isolated area protected from rain.

**25.2 Wet Deactivation - Method One:**

Fill an appropriate sized container with water a few inches from the top. Submerge bags for 36 hours. A metal grid works well to keep bags submerged. **Do not cover container.** Wear a NIOSH/MSHA approved full-face gas mask - hydrogen phosphide canister combination (if exposed to levels up to 15 ppm) or a Self Contained Breathing Apparatus (SCBA) (if exposure is unknown or above 25 ppm). This should be done outdoors. The water may be disposed of in a storm sewer or by pouring it out on the ground.

**25.3 Wet Deactivation - Method Two:**

Fill an appropriate sized metal container 2/3 full with water. For each gallon of water add ¼ cup of low sudsing detergent or surfactant. Use no less than 1 gallon of water/detergent solution for 60 FUMITOXIN bags. Open each bag and dump contents into the container as the water is stirred. Wear a NIOSH/MSHA approved full face gas mask - hydrogen phosphide canister combination (if exposed to levels up to 15 ppm) or a Self Contained Breathing Apparatus (SCBA) (if exposure is unknown or above 25 ppm). **DO NO COVER THE CONTAINER AT ANY TIME.** This should be done outdoors.

**26 DISPOSAL PROCEDURES**

In open areas small amounts (up to 7.0 kg) of the spent bags may be disposed of on site by burial of the bags or by opening the bags and spreading the dust over the land surface away from inhabited buildings.

Spent bags may also be collected and disposed of at a sanitary landfill, approved pesticide incinerator or other approved sites or by other procedures approved by federal, state and local authorities.

Do not dispose of dust in a toilet.

Dispose of water/dust mixture (slurry) (with or without preliminary pouring out of excess water) in a sanitary landfill or other suitable burial site approved by local authorities. Where permissible, the slurry may be poured out on the ground. If it is held 36 hours it may be poured into a storm sewer.

**Caution:** - Wear a NIOSH/MHS approved full-face gas mask - hydrogen phosphide canister combination if exposed to levels between 0.3 to 15 ppm or a Self Contained Breathing Apparatus (SCBA) if exposure is unknown or above 15 ppm during wet deactivation of unexposed or incompletely exposed FUMITOXIN. **Never place Bags or their dust in a closed container such as a dumpster, sealed drum, plastic bag, etc., as flammable concentrations and a flash of hydrogen phosphide gas are likely to develop.**

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

**FOR ASSISTANCE, CONTACT:** PESTCON SYSTEMS, INC.  
1808 FIRESTONE PARKWAY  
WILSON, NC 27893  
PHONE: 252-237-7923  
FAX: 252-237-3259  
WEB PAGE: [www.pestcon.com](http://www.pestcon.com)

or

CHEMTREC (800) 424-9300

USED SPECIFICALLY AS DIRECTED IN THE MANUFACTURER'S INSTRUCTIONS.  
FUMITOXIN® TABLETS AND PELLETS 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.  
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