This stamp is valid for Degesch Fumi-Cel (EPA Reg. No. 72959-6) only. Space or color limitations require stamp placement on a separate sheet.

Department of Agriculture
STATE OF HAWAII

LICENSED

PERIOD **2014-2016** LIC. NO.

8206.13

Department of Agriculture
STATE OF HAWAII

LICENSED

PERIOD **2011-2013** LIC. NO.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

DANGER: **FUMI-CEL®** or its dust can be fatal if swallowed. Do not get in eyes, on skin or on clothing. Do not eat, drink or smoke while handling magnesium phosphide fumigants. When a foil pouch containing **FUMI-CEL®** 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.

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

Physical and Chemical Hazards

Magnesium phosphide, **FUMI-CEL®** and partially spent dust will release phosphine gas if exposed to moisture from the air or if it comes into contact with water, acids and many other liquids. Piling of **FUMI-CEL®** or its dust from their fragmentation may cause a temperature increase and confine the release of gas so that ignition could occur. It is recommended that you open magnesium phosphide products in open air or near a fan which exhausts outside immediately. Never open in a flammable atmosphere because, on rare occasions, it may flash. When opening, point the pouch 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 humidities.

Metals such as copper, brass, 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 paper and some inorganic pigments, etc. should not be exposed. Immediately after addition of metal phosphide to the structure, turn off any lights and unessential electric equipment. See Section 4.3 of the Applicator's Manual for more detailed Physical and Chemical Hazards.

Note to Physician: Magnesium 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 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 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 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 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 cases 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.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. THIS PRODUCT IS FOR USE AGAINST INSECTS WHICH INFEST STORED COMMODITIES.

FOR BURROWING RODENT APPLICATIONS: THE USE OF THIS PRODUCT IS STRICTLY PROHIBITED WITHIN 100 FEET OF ANY BUILDING WHERE HUMANS AND/OR DOMESTIC ANIMALS DO OR MAY RESIDE ON SINGLE AND MULTI-FAMILY RESIDENTIAL PROPERTIES AND NURSING HOMES, SCHOOLS (EXCEPT ATHLETIC FIELDS), DAYCARE FACILITIES AND HOSPITALS.

General Information: DEGESCH **FUMI-CEL®** is a fumigant which, when applied according to label instructions, is activated by atmospheric humidity. **FUMI-CEL®** 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 directions for use (e.g. pests controlled, specific commodities), precautions and restrictions.

Form #30938 (R4/2012)

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 THE APPLICATOR'S MANUAL FOR REQUIREMENTS OF THE PHYSICAL PRESENCE OF A CERTIFIED APPLICATOR.

THE COMPLETE LABEL FOR THIS PRODUCT CONSISTS OF THE CONTAINER LABEL AND APPLICATOR'S MANUAL WHICH MUST ACCOMPANY THE PRODUCT. READ AND UNDERSTAND THE ENTIRE CONTAINER LABEL AND APPLICATOR'S MANUAL.

A FUMIGATION MANAGEMENT PLAN MUST BE WRITTEN FOR ALL FUMIGATIONS PRIOR TO ACTUAL TREATMENT.

CONSULT WITH YOUR STATE LEAD PESTICIDE REGULATORY AGENCY TO DETERMINE REGULATORY STATUS, REQUIREMENTS, AND RESTRICTIONS FOR FUMIGATION USE IN THAT STATE. CALL D&D HOLDINGS, INC. IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABEL.

DEGESCH

DEGESCH FUMI-CEL®

USA Patent No. 5,015,475

FOR USE AGAINST INSECTS WHICH INFEST STORED COMMODITIES

ACTIVE INGREDIENT: MAGNESIUM PHOSPHIDE	56%
INERT INGREDIENTS	44%
Total	100%

DEGESCH

KEEP OUT OF REACH OF CHILDREN
DANGER — POISON — PELIGRO

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PRECAUCION AL USUARIO: Si usted no puede leer ingles, no use este producto hasta que el marbete le haya sido completamente explicado.

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

FIRST AID

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

If 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.
- Call a poison control center or doctor for treatment advice.

If swallowed:
- Call a poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

If on skin or clothing:
- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

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, label or Applicator's Manual with you when calling a poison control center, doctor, or when going for treatment. **CONTACT 1-800-308-4856 FOR ASSISTANCE WITH HUMAN OR ANIMAL MEDICAL EMERGENCIES.** You may also contact DEGESCH AMERICA, INC. - (540) 234-9281/1-800-330-2525 or CHEMTREC – 1-800-424-9300 for all other chemical emergencies.

See side panel for additional precautionary statements.

EPA Est. No. 33982-DEU-001
EPA Reg. No. 72959-6
Contents: 120 FUMI-CEL®
Net Weight: 14.04 kg

Manufactured for: **D & D HOLDINGS, INC.**

P. O. Box 116 • 153 Triangle Drive
Weyers Cave, VA 24486 USA
Telephone: 540-234-9281 • 1-800-330-2525 • Fax: 540-234-8225
Internet: www.degeschamerica.com
E-mail: degesch@degeschamerica.com

STORAGE AND DISPOSAL

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

Pesticide Storage:

- Store **FUMI-CEL®** in a dry, well ventilated area away from heat, under lock and key. Post as a pesticide storage area.
- Do not store **FUMI-CEL®** in areas where temperature may exceed 130ºF.
- Do not store in buildings where humans or domestic animals reside. Keep out of reach of children.
- **FUMI-CEL®** is supplied in gas-tight containers.
- The shelf life of **FUMI-CEL®** is virtually unlimited as long as the containers are tightly sealed.

Pesticide Disposal:

Unreacted or partially reacted **FUMI-CEL®** 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 Handling:

The pails are non-refillable containers. Do not reuse or refill. Offer for recycling, if available.
Triple rinse pails, lids and pouches with water if they have been contacted by magnesium phosphide dust. Then offer pails 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 pails to atmospheric conditions until residue 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 **FUMI-CEL®** will be a grayish-white powder and contain only a small amount of unreacted magnesium phosphide. However, residual dust from incompletely exposed **FUMI-CEL®** requires 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 phosphine gas and, therefore, attending personnel must wear self-contained breathing apparatus (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 **FUMI-CEL®**. Water in contact with unreacted **FUMI-CEL®** will greatly accelerate the production of phosphine gas which could result in a toxic and/or fire hazard. Wear dry gloves of cotton or other material if contact with magnesium phosphide is likely.

Return all intact pouches to pails or other suitable packaging which has been properly marked according to DOT regulations.

Notify consignee and shipper of damaged cases.

If pails or pouches have been punctured or damaged so as to leak, the container may be temporarily repaired with aluminum tape or the **FUMI-CEL®** may be transferred to a sound metal container which should be sealed and properly labeled as magnesium phosphide. Transport the damaged pails/pouches to an area suitable for pesticide storage for inspection. Refer to the Applicator's Manual - Section 25 - for more detailed Spill and Leak Procedures. Further information and recommendations may be obtained, if required, from DEGESCH AMERICA, 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 reasonably fit for the purposes stated on the label. To the extent consistent with applicable law, the Seller makes no other warranty, either expressed or implied, and Buyer assumes all risks should the product be used contrary to label instructions.

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'S MANUAL FOR REQUIREMENTS OF THE PHYSICAL PRESENCE OF A CERTIFIED APPLICATOR.

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CONSULT WITH YOUR STATE LEAD PESTICIDE REGULATORY AGENCY TO DETERMINE REGULATORY STATUS, REQUIREMENTS, AND RESTRICTIONS FOR FUMIGATION USE IN THAT STATE. CALL 540-234-9281/1-800-330-2525 IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABELING.

APPLICATOR'S MANUAL FOR

DEGESCH

DEGESCH FUMI-CEL® AND FUMI-STRIP®

FOR USE AGAINST INSECTS WHICH INFEST STORED COMMODITIES

Active Ingredient: Magnesium Phosphide..... 56%
Inert Ingredients: 44%
Total: 100%

KEEP OUT OF REACH OF CHILDREN
DANGER - POISON - PELIGRO

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

MANUFACTURED FOR:
D & D HOLDINGS, INC.
P. O. Box 116 • 153 Triangle Drive
Weyers Cave, VA 24486 USA
Telephone: (540) 234-9281
1-800-330-2525
Fax: (540)234-8225

Form #17949 (R4/2012)

Internet:
www.degeschamerica.com

E-mail:
degesch@degeschamerica.com

EPA Est. Nos. 33982-DEU-001; 40285-VA-001; 40285-VA-002; 40285-OR-001; 40285-LA-001; 36301-TX-001
EPA Reg. No. 72959-6

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. To the extent consistent with applicable law, the Seller makes no other warranty, either expressed or implied, and Buyer assumes all risks should the product be used contrary to label instructions.

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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.
- ➢ Call 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 sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor.
- ➢ Do not give anything by mouth to an unconscious person.

If on skin or clothing:

- ➢ Take off contaminated clothing.
- ➢ Rinse skin immediately with plenty of water for 15-20 minutes.
- ➢ Call a poison control center or doctor for treatment advice.

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, label or Applicator's Manual with you when calling a poison control center, doctor, or when going for treatment. CONTACT 1-800-308-4856 FOR ASSISTANCE WITH HUMAN OR ANIMAL MEDICAL EMERGENCIES.

You may also contact DEGESCH AMERICA, INC. - (540) 234-9281/1-800-330-2525 or CHEMTREC – 1-800-424-9300 for all other chemical emergencies.

2. NOTE TO PHYSICIAN

Magnesium 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 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 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 magnesium 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.

3. PRODUCT INFORMATION

DEGESCH **FUMI-CEL®** and **FUMI-STRIP®** fumigants are used to protect stored commodities from damage by insects and other vertebrate pests. Fumigation of stored products with these products in the manner prescribed in the labeling does not contaminate the marketed commodity.

DEGESCH metal phosphide fumigants are acted upon by atmospheric moisture to produce phosphine gas. The **FUMI-CEL®** and **FUMI-STRIP®** contain magnesium phosphide Mg_3P_2 as their active ingredient and will liberate phosphine via the following chemical reaction:

$$Mg_3P_2 + 6H_2O \rightarrow 3Mg(OH)_2 + 2PH_3$$

Phosphine gas is highly toxic to insects, 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 (18,000 ppm). These hazards will be described in greater detail later on in this Applicator's Manual for DEGESCH **FUMI-CEL®** Plates and **FUMI-STRIP®**.

The **FUMI-CEL®** Plates and **FUMI-STRIP®** will liberate only phosphine gas. The Plates and Strips do not liberate ammonia and carbon dioxide since they contain no ammonium carbamate, as do **MAGTOXIN®** and **PHOSTOXIN®** products.

The **FUMI-CEL®** Plates and **FUMI-STRIP®** have a polyethylene matrix which is impregnated with magnesium phosphide along with some inert ingredients. The Plate measures about 6-3/4 by 11 inches and is 5/32 inches in thickness. The **FUMI-STRIP®** is formed by attaching together, end-to-end, 20 of the **FUMI-CEL®** Plates. The Strip measures 18 feet 4 inches in length and will liberate 660g (20 x 33) of phosphine gas. Strips and Plates are packaged individually in gas-tight aluminum foil pouches. These pouches are **not** resealable. The pouches are, in turn, packed in a removable head drum, 120 plates or 6 strips, with a net weight of 14.04 kg and will evolve a total of 3960g of phosphine gas.

Upon exposure to air, **FUMI-CEL®** and **FUMI-STRIP®** begin to react with atmospheric moisture to produce small quantities of phosphine gas. This reaction starts slowly, gradually accelerate and then taper off again as the magnesium phosphide is spent. Strips and Plates react at about the same rate. Their rates of decomposition will vary depending upon moisture and temperature conditions. For example, when moisture and temperature of the fumigated commodity are high, decomposition may be complete in less than 2 days. However, at lower ambient temperatures and humidity levels, decomposition may require 4 days or more. **FUMI-CEL®**, **FUMI-STRIP®**, **MAGTOXIN®** and other magnesium phosphide products are much more reactive than **PHOSTOXIN®** which contains aluminum phosphide as its active ingredient. Therefore, these products are better suited for fumigations conducted under cooler and drier conditions.

The **FUMI-CEL®** and **FUMI-STRIP®** remain intact after fumigation and retain all of the spent material. Plates and Strips must be retrieved for disposal at the end of the fumigation period. If properly exposed, the spent Plates and Strips will contain virtually no unreacted magnesium phosphide and may be disposed of without hazard. While not considered a hazardous waste, partially spent Plates and Strips will require special care. Precautions and instructions for further deactivation and disposal are given in Section 24 of this manual.

DEGESCH **FUMI-CEL®** and **FUMI-STRIP®** are supplied in gas-tight containers and their shelf life is unlimited as long as the packaging remains intact. Once pouches are opened for fumigation, the Plates and Strips must be used following label instructions or deactivated for disposal. Storage and handling instructions are given in detail in Section 19 of this Applicator's Manual.

4. PRECAUTIONARY STATEMENTS

4.1 Hazards to Humans and Domestic Animals

DANGER: Magnesium phosphide from DEGESCH **FUMI-CEL®, FUMI-STRIP®** or dust 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 magnesium 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 absent. Observe proper re-entry procedures specified in Section 15.4 of this manual to prevent overexposure.

4.2 Environmental Hazards

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

4.3 Physical and Chemical Hazards

Magnesium phosphide-based fumigants such as Plates, Strips, Prepac Spot Fumigant and partially spent materials will release phosphine gas if exposed to moisture from the air or if it comes into contact with water, acids and many other liquids. Magnesium phosphide is considerably more reactive than is aluminum phosphide and will liberate gas more rapidly. This is particularly true in the presence of liquid water and at higher temperatures. Since phosphine gas may ignite spontaneously at levels above its lower flammable limit of 1.8% v/v (18,000 ppm), 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. Magnesium phosphide fumigants should not be stacked, 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 magnesium 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 pouches of **FUMI-CEL®** or **FUMI-STRIP®**, point the pouch away from the face and body and tear or cut open the far end. Although the chances for a flash are very remote, never open containers of metal phosphide fumigants in a flammable atmosphere. These precautions will also reduce the fumigator's exposure to phosphine gas. If containers are opened inside the structure to be fumigated, air monitoring must be conducted to ensure worker's exposure to phosphine gas does not exceed the allowable limit of 8-hour Time Weighted Average (TWA) of 0.3 ppm or the 15-minute Short-Term Exposure Limit (STEL) of 1.0 ppm phosphine.

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 metal phosphide to the structure, turn off any lights and unessential electric equipment.

DEGESCH **FUMI-CEL®** and **FUMI-STRIP®** are Restricted Use Pesticides due to the high acute inhalation toxicity of phosphine gas. Read and follow the complete label which contains instructions for the safe use of this product. Additional copies are available from:

DEGESCH AMERICA, INC.
153 TRIANGLE DRIVE
P. O. BOX 116
WEYERS CAVE, VA 24486 USA
Telephone: (540)234-9281/1-800-330-2525
FAX: (540)234-8225

Internet: www.degeschamerica.com email: degesch@degeschamerica.com

DIRECTIONS FOR USE

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

5. PESTS CONTROLLED

FUMI-CEL® and **FUMI-STRIP®** have been found effective against 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 beetle	Khapra beetle	tobacco moth
dried fruit beetle	lesser grain borer	yellow mealworm
dried fruit moth	maize weevil	pea weevil

Although it is possible to achieve total control of the listed insect pests, this is frequently not realized in actual practice. Factors contributing to less than 100% control are leaks, poor gas distribution, unfavorable exposure conditions, etc. In addition, some insects are less susceptible to 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 FUMI-CEL® AND FUMI-STRIP®

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

6.1 Raw Agricultural Commodities, Animal Feed and Feed Ingredients

almonds	flower seed	sesame seed
animal feed & feed ingredients	grass seed	seed & pod vegetables
barley	millet	sorghum
Brazil nuts	oats	soybeans
cashews	peanuts	sunflower seed
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 **FUMI-CEL®** and **FUMI-STRIP®**. Under no condition shall any processed food or bagged commodities come in contact with residual dust from Plates or Strips.

Processed Foods Which May Be Fumigated With FUMI-CEL® and FUMI-STRIP®

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, non-dairy creamers and non-fat 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)
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 Non-Food Commodities Including Tobacco

The listed non-food items that may be fumigated with **FUMI-CEL®** and **FUMI-STRIP®**. Tobacco, psyllium seed and psyllium seed husks intended for drug use and certain other of the non-food commodities should not be contacted by residual dust from metal phosphide fumigants. Only lots of psyllium seed and psyllium seed husks destined for shipment to pharmaceutical manufacturers may be fumigated. Such dedicated lots may be fumigated in transport vehicles (truck trailers, railcars, containers, etc.) prior to shipment. In addition, psyllium seed and husks may be fumigated at other locations only under direct instructions from the pharmaceutical company.

Non-Food Commodities Which May Be Fumigated With FUMI-CEL® and FUMI-STRIP®

processed or unprocessed cotton, wool and other natural fibers or cloth, clothing
straw and hay
feathers
human hair, rubberized hair, vulcanized hair and 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
psyllium seed and psyllium seed husks

dried plants and flowers
seeds (such as grass seed, ornamental herbaceous plant seed and vegetable seed)
other non-food commodities

7. EXPOSURE CONDITIONS FOR ALL FUMIGATIONS

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

Temperature	FUMI-CEL® & FUMI-STRIP® Minimum Exposure Periods
40°F (5°C)	Do not fumigate
41°-53°F (5°-12°C)	4 days (96 hours)
54°-68°F (12°-20°C)	3 days (72 hours)
above 68°F (20°C)	2 days (48 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 Plates and Strips with moisture so that little or no unreacted magnesium 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 magnesium 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 **FUMI-CEL®** and **FUMI-STRIP®** is lower at lower temperatures and humidities.

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

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 DEGESCH AMERICA, INC., if assistance is required in designing the recirculation system.

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 the Plates and Strips. Since they are more reactive, magnesium phosphide fumigants such as **FUMI-CEL®** and **FUMI-STRIP®** are the products of choice under condition of lower temperature and/or low humidity.

8. DOSAGE RATE GUIDELINES FOR COMMODITIES

Phosphine gas 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 number of Plates is required to treat a 10,000-bushel silo whether it is empty or full of grain unless, of course, the surface of the commodity is sealed off by a tarpaulin.

8.1 Maximum Allowable Dosages for Fumigation with Fumi-Cel®/Fumi-Strip®

One (1) **FUMI-CEL®** (33g of phosphine gas) per 230 cu.ft.
One (1) **FUMI-STRIP®** (660g of phosphine gas) per 4600 cu.ft.

The above dosages are not to be exceeded. It is important to be aware that a shortened exposure period cannot be fully compensated for with an increased dosage of phosphine gas.

Somewhat higher dosages are usually recommended under cooler, drier conditions or where exposure periods are relatively short. However, the major factor in selection of dosage is the ability of the structure to hold phosphine gas during the fumigation. A good illustration of this point is comparison of the low dosages recommended to treat modern, well-sealed warehouses with the higher ranges used for poorly constructed buildings that cannot be sealed adequately. In certain other fumigations, proper distribution of lethal concentrations of phosphine gas reaching all parts of the structure becomes a very important factor in dose selection. An example where this may occur is in the treatment of grain stored in tall silos. Poor gas distribution frequently results when the fumigant cannot be uniformly added to the grain and it must be treated by surface application. The use of a low-flow recirculation system is recommended under these circumstances.

8.2 Advisory Dosages for Various Types of Fumigations

Although it is permissible to use the maximum dosage listed above, the following dosage ranges can be used as a guideline for the various types of fumigations:

Do not exceed the maximum allowable rates specified above in Section 8.1.

Type of Fumigation	Volume Range	
	Cubic Feet/FUMI-CEL®	CubicFeet/FUMI-STRIP®
1. Space		
mills, warehouses, etc.	550 - 1650	11,000 - 33,000
bagged commodities	550 - 1100	11,000 - 22,000
processed dried fruits and nuts	825 - 1650	16,500 - 33,000
stored tobacco	825 - 1650	16,500 - 33,000
2. Bulk Stored Commodities		
vertical storages	550 - 1100	11,000 - 22,000
tanks	470 - 1100	9,400 - 22,000
flat storages (loose construction)	230 - 660	4,600 - 13,200
farm bins	230 - 470	4,800 - 9,400
bunkers & tarped ground storages	410 - 1100	8,200 - 22,000
railcars	510 - 1100	10,200 - 22,000
barges	230 - 660	4,600 - 13,200
shipholds	500 - 1100	10,000 - 22,000

Higher dosages should be considered 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

It is not necessary to wear gloves or other protective clothing when handling DEGESCH **FUMI-CEL®** or **FUMI-STRIP®**, however:

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

10. RESPIRATORY PROTECTION

10.1 When Respiratory Protection Must Be Worn

Respiratory protection is required when concentration levels of phosphine are unknown or when concentrations exceed permissible exposure limits.

10.2 Permissible Gas Concentration Ranges for Respiratory Protection Devices

A NIOSH/MSHA approved full-face gas mask - phosphine gas 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 the phosphine gas 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 concentration limits at which they may be used.

10.3 Requirements for Availability of Respiratory Protection

If metal phosphide products are 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.

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 and also during the opening of the product containers. 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 Applicator's 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 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 the 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 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 instructions.

13. PHOSPHINE 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 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 complete label 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 PROSAR: 1-800-308-4856 or (540)234-9281/1-800-330-2525 so the incident can be reported to Federal and State Authorities.

14.3 Theft of Products:

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

15. APPLICATOR AND WORKER EXPOSURE

15.1 Phosphine Gas Exposure Limits

Exposures 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, DEGESCH **FUMI-CEL®** and **FUMI-STRIP®** release phosphine gas slowly upon exposure to moisture from the air. This release rate is considerably more rapid than with **PHOSTOXIN®**. However, since the Plates and Strips are so easy and rapid to apply, 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 into 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 Re-entry

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 or site 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 gas). Do not allow re-entry into treated areas by any person before the level of phosphine reaches 0.3 ppm or below unless protected by an approved respirator.

15.5 Handling Unaerated Commodities

Transfer of incompletely aerated commodity via bulk handling equipment such as augers, drag conveyors and conveyor belts to a new storage 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 0.3 ppm phosphine. If the fumigated structure must be entered to complete the transfer, at least two trained 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 gas exposures must be documented in an operations log or manual at each fumigation 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 area 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 structure and/or 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 area must be placarded. Where possible, place placards 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 phosphine gas or less. To determine whether aeration is complete, each fumigated structure or transport vehicle must be monitored and shown to contain 0.3 ppm or less phosphine gas in the air space around and, if feasible, in the mass of the commodity.

17. SEALING OF STRUCTURES

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 affect 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 structure and will decrease the chance of unwanted exposures outside of the fumigated area.

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 Personal Protective Equipment (PPE) must attempt to seal the leak from the exterior of the structure. Failing this, the fumigators, following proper procedures, 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 SUFFICIENTLY SEALED GAS TIGHT.

18. AERATION OF FUMIGATED COMMODITIES

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

18.1 Foods and Feeds

Tolerances for phosphine gas 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 and for at least two days (48 hours) when fumigated in other containers or until the concentration is below 0.3 ppm. When plastic liners are used, longer aeration periods may be required to aerate the commodity down to 0.3 ppm.

19. STORAGE INSTRUCTIONS

- Do not contaminate water, food or feed by storing pesticides in the same areas used to store these commodities.
- Store **DEGESCH FUMI-CEL®** and **FUMI-STRIP®** in a dry, well-ventilated area away from heat, under lock and key. Post as a pesticide storage area.
- Do not store **DEGESCH FUMI-CEL®** and **FUMI-STRIP®** in areas where temperature may exceed 130ºF.
- Do not store in buildings where humans or domestic animals reside. Keep out of reach of children.
- **DEGESCH FUMI-CEL®** and **FUMI-STRIP®** is supplied in gas-tight containers.
- The shelf life of **DEGESCH FUMI-CEL®** and **FUMI-STRIP®** is virtually unlimited as long as the containers are tightly sealed.

19.1 Labeling of Storage

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

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 magnesium phosphide:

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

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 magnesium 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 magnesium phosphide:

Identification No.:	UN 2011
Proper Shipping Name:	Magnesium phosphide
Hazard Class::	4.3 (6.1)
Packing Group:	PG I
Shipping Label:	Dangerous When Wet/Poison
Shipping Placard:	Dangerous When Wet

20.2 Transportation Special Permit:

Exemption: DOT-SP 11329

Purpose and Limitation: "...The motor vehicles used under the terms of this special permit 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 special permit.)

NOTE: You must have a copy of this special permit with you during transportation. For a copy of this permit, contact:

DEGESCH AMERICA, INC.
153 Triangle Drive
P. O. Box 116
Weyers Cave, VA 24486 USA
Telephone: (540)234-9281/1-800-330-2525; Fax (540) 234-8225 or
Internet: www.degeschamerica.com; Email: degesch@degeschamerica.com

21. REQUIRED WRITTEN FUMIGATION MANAGEMENT PLAN

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). State, county and local authorities may also have specific requirements. The FMP must be written PRIOR TO EVERY fumigation application. 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. For burrowing rodent applications: The use of this product is strictly prohibited within 100 feet of any building where humans and/or domestic animals do or may reside on single or multi-family residential properties and nursing homes, schools (except athletic fields), daycare facilities and hospitals.
2. Inspect the structure and/or area to determine its suitability for fumigation.
3. When sealing is required, consult previous records for any changes to the structure, seal leaks and monitor any occupied adjacent buildings to ensure safety.
4. Prior to each fumigation, review any existing FMP, MSDS, complete product label and other relevant safety procedures with company officials and appropriate employees.
5. 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.
6. 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, fumigation and aeration. This plan must also demonstrate that nearby residents will not be exposed to concentrations above the allowable limits.
7. Consult with company officials to develop procedures for local authorities to notify nearby residents in the event of an emergency.
8. Confirm the placement of placards to secure entrance into any area under fumigation.
9. Confirm the required safety equipment is in place and the necessary manpower is available to complete a safe and effective fumigation.
10. 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 complete label which includes the container label and Applicator's Manual. Follow its directions carefully and abide by all the restrictions. If the applicator has any questions about the development of a FMP, contact DEGESCH AMERICA, INC. for further assistance.

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

STEPS FOR PREPARATION OF THE REQUIRED WRITTEN 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 which includes the container label and 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 using this document as your guide or contact DEGESCH AMERICA, INC. for assistance. Finally, before any fumigation begins you must be familiar with and comply with all applicable federal, state and local regulations. The success of the fumigation is not only dependent on your ability to do your job but also upon 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 fumigations. 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. Plant pest quarantine.
2. Determine the type of fumigation, for example:
   a. Space: tarp, mill, warehouse, food plant or outdoor area
   b. Transport Vehicle: railcar, truck, van or container
   c. Commodity: raw agricultural or processed foods
   d. Type of Storage: vertical silo, farm storage, flat storage
   e. Vessels: ship or barge. In addition to the Applicator's Manual, read the U.S. Coast Guard Regulations 46CFR Part 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. Draw or have a drawing or sketch of structure to be fumigated, delineating features, hazards and other structural characteristics/issues.
   b. The number and identification of persons who routinely enter the area to be fumigated (i.e. 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 the entire label which includes both the container label and Applicator's Manual.

l. Exposure time considerations:
   1. Fumigant 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. Maximum allowable label dosage rates
   4. Temperature, humidity and 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 that each employee initials indicating they have been notified.
2. Instruct all fumigation personnel to read the Applicator's Manual. Fumigation personnel must be trained in the proper method of application, the hazards that may be encountered, and 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 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 site. This log must, at a minimum, contain the timing, number of readings taken and level of concentrations found in each location.
   c. When monitoring log records, document there is no phosphine present above the safe levels, subsequent monitoring is not routinely required. However, spot checks must be made occasionally, especially if conditions change significantly.

2. Efficacy

   a. For stationary structures, phosphine readings MUST 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 re-enter the structure and add additional product.
   b. All phosphine concentration readings must be documented.

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 has been notified and is trained according to Section 12 of this Applicator's Manual.

E. SEALING PROCEDURES

1. Sealing must be adequate to control the pests. Care should be taken to insure that sealing materials would 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 affect 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 label requirements.
2. When entering into the area 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 where appropriate.
4. Provide watchmen when the possibility of entry into the fumigation site by unauthorized persons cannot otherwise be assured.
5. When entering structures, always follow OSHA rules for confined spaces.
6. Document that the receiver of in-transit vehicles under fumigation has been notified.
7. Turn off any electric lights in the fumigated area of the structure as well as all non-essential 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. Ventilate and aerate in accordance with structural limitations.
3. Turn on ventilating or aerating fans where appropriate.
4. Use a suitable gas detector before re-entry into a fumigated structure to determine phosphine concentration.

5. Keep written records of monitoring to document completion of aeration.
6. Consider temperature when aerating.
7. Ensure that aeration is complete before moving a treated vehicle onto 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 re-enter the aerated structure.

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22. APPLICATION PROCEDURES

A FMP must be written PRIOR to all applications.
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 gas and to help attain adequate control of the insect pests.

1. Remove **FUMI-CEL®** and **FUMI-STRIP®** entirely from their pouches for application.
2. Do not subdivide **FUMI-CEL®** or **FUMI-STRIP®** for fumigations.

22.1 Fumigation of Railcars, Containers, Trucks, Vans and Other Transport Vehicles

Develop an appropriate Fumigation Management Plan.

Do not use Fumi-Cel®/Fumi-Strip® in cars or other personal vehicles.

Railcars and containers, trucks, vans and other transport vehicles shipped piggyback by rail may be fumigated in transit. 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.

Care must be taken to seal all doors, hatches, vents, cracks or other leaks, particularly if the fumigation is to be carried out in transit. **FUMI-CEL®** plates may be applied to bulk or bagged materials in railcars by placing them in porous, drawstring bags, one plate per bag. **Caution: Do not put more than one Plate in a single bag. Do not use bags which will confine the gas.** The porous bags containing the Plates may then be suspended from the hatch cover, from a bulkhead, from a nail in the wall of the railcar, etc. Porous bags containing Plates may be placed in contact with the commodity, after they have been suitably anchored, to take advantage of higher commodity temperatures during periods of cooler weather. The temperature of the commodity is frequently higher than ambient air, particularly in in-transit railcar fumigations conducted during winter months. The higher temperatures may be of considerable benefit in deactivating of the Plates. Cloth bags with drawstrings are available from DEGESCH AMERICA, INC., or from your supplier of DEGESCH products.

See Section 16 of this Applicator's Manual for recommendations on placarding. Both doors of boxcars must be placarded. Place fumigation warning placards on both sides of hopper cars near the ladders and atop the hatches to which **FUMI-CEL®** has been applied. If the transport vehicle is to be shipped under fumigation, attach a packet of information for the consignee (available from DEGESCH AMERICA, INC.). The Shipper and/or the fumigator must provide written notification to the receiver of railcars, railroad boxcars, shipping containers or vehicles which are fumigated in transit. If the Applicator's Manual is sent with the transport vehicle, it must be placed securely on the outside of the vehicle.

Consignees Responsibilities

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 transport vehicles, a Certified Applicator and/or persons with documented, authorized training must supervise the aeration process and removal of the placards.

Unless prior arrangements have been made to return the railcar containing the spent fumigant back to the shipper, consignees must also be familiar with proper procedures for deactivation and disposal of spent fumigant. Unaerated railcars being returned in this manner must bear fumigation warning placards and must be carefully sealed. If the railcar containing spent fumigant is not being returned to the shipper, the consignee must:

1. Aerate the railcar and verify that it contains no more than 0.3 ppm phosphine gas.
2. Remove the fumigation warning placards.
3. Remove and properly dispose of the spent fumigant.
4. Ensure that worker exposure limits have not been exceeded.
5. Transfer the fumigated commodity from the railcar, with or without prior aeration.
6. Placard the new storage if it contains more than 0.3 ppm phosphine gas.

22.2 Fumigations Under Tarpaulins and in Small Sealable Structures and Enclosures

Develop an appropriate Fumigation Management Plan.

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 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 form a plastic bunker storage capable of holding 600,000 bushels of grain or more.

An enclosure suitable for fumigation may be formed by covering bulk or packaged commodity with poly sheeting. The sheets may be taped together to provide a sufficient width of material to ensure that adequate sealing is obtained. If the flooring upon which the commodity rests is of wood or other porous material, it must be repositioned onto poly prior to covering for fumigation. The plastic covering of the pile may be sealed on 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 must 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.

FUMI-CEL® and **FUMI-STRIP®** may be applied to the tarped stack or bunker storage of bulk commodity. Do not apply **FUMI-CEL®** or **FUMI-STRIP®** directly under the tarp or in other areas where there is little free air space. Avoid application of large numbers of Plates or Strips to any one point. Do not apply in areas where water may leak onto the product or where condensation may occur. Plates and Strips are recommended for the treatment of bagged commodities and

processed foods where direct contact with spent dust is prohibited or not desired.

Distribution of phosphine 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. Recirculation or other techniques may be necessary to attain satisfactory fumigation levels throughout the bulk commodity. Place warning placards at conspicuous points on the enclosure.

Excellent results may be attained in the treatment of small enclosures or structures since it is often possible to control the temperature during fumigation and also to make the enclosure virtually gas tight. Take care not to overdose during these fumigations. A single **FUMI-CEL®** will treat a space from 230 to 1650 cubic feet. A single **FUMI-STRIP®** will treat a volume from 4600 to 33,000 cubic feet.

22.3 Fumigation of Mills, Food Processing Plants and Warehouses

1. Develop an appropriate Fumigation Management Plan.
2. Using the label, calculate the duration of the fumigation and the dosage of **FUMI-CEL®** or **FUMI-STRIP®** to be applied based upon volume of the building, air and/or commodity temperature and the general tightness of the structure.
3. Carefully seal and placard the space to be fumigated.
4. Apply **FUMI-CEL®** and/or **FUMI-STRIP®** to the area to be treated. Lean the Plates against walls, columns, pallet or other support which will allow free access of air to both sides of the Plates. **FUMI-STRIP®** is to be opened, accordion style, and stood on end so that the surfaces of each Plate are exposed.
5. Doors leading to the fumigated space should be closed, sealed, locked and placarded with warning signs.
6. The fumigation period usually lasts from 2 to 5 days, depending upon the temperature. Upon completion of the exposure period, windows, doors, vents, etc. should be opened and the fumigated structure allowed to aerate for at least two hours before entering. When required, gas concentration readings may be taken using low level detector tubes or similar devices to ensure safety of personnel who re-enter the treated area.
7. Collect the spent **FUMI-CEL®** and **FUMI-STRIP®** for disposal, with or without further deactivation, following guidelines given under **Disposal Instructions.**
8. Remove fumigation warning placards from the aerated structure when the phosphine gas concentration is 0.3 ppm or less.

22.4 Fumigation of Ships – A FMP must be written for all fumigations PRIOR TO ACTUAL TREATMENT

22.4.1 General Information

1. Important - shipboard, in-transit ship or ship hold fumigation is also governed by U.S. Coast Guard Regulation 46 CFR Part 147A. Refer to this regulation prior to fumigation.
2. DEGESCH **FUMI-CEL®** and **FUMI-STRIP®** are classified by EPA as restricted use pesticides due to the acute inhalation toxicity of phosphine gas.

22.4.2 Pre-Voyage Fumigation Procedures – A FMP must be written for all fumigations PRIOR TO ACTUAL TREATMENT.

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 that the vessel does not meet these requirements, then the vessel must not be fumigated unless all crew members are removed from the vessel. The crew members are not permitted to reoccupy the vessel until it has been properly aerated and the master of the vessel and the certified applicator have 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 respiratory protection, detection equipment and that a person qualified in the use of this equipment must accompany the vessel with cargo under fumigation. Emergency procedures, cargo ventilation, periodic monitoring and inspections, and first aid measures must be discussed with and understood by the master of the vessel or his representative.

3. Seal all openings to the cargo hold or tank and lock or otherwise secure all openings, man ways, 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 Certified Applicator 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 test spaces adjacent to spaces containing fumigated cargo and all regularly occupied spaces for fumigant leakage. If leakage of the fumigant is detected, the person in charge of the fumigation shall take action to correct the leakage, or shall inform the master of the vessel, or his representative, of the leakage so that corrective action can be taken.

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

22.4.3 Application Procedures for Bulk Dry Cargo Vessels and Tankers

1. **FUMI-STRIP®** is recommended for the treatment of ship's holds and tanks. **FUMI-CEL®** Plates may also be used if they are secured and marked for easy retrieval.

2. **FUMI-STRIP®** may be applied directly atop the surface of the commodity if they are secured to prevent them from shifting during the voyage. They may also be applied in trenches or inserted

edgewise into the commodity.

3. Take care to ensure that the FUMI-STRIPS are spread out and are applied at least several feet apart. Do not apply Plates or Strips in areas where contact with liquid water is likely.

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

22.4.4 In-Transit Fumigation of Transport Units (Containers) Aboard Ships

In-transit fumigation of transport units on ships is also governed by D.O.T. RSPA 49 CFR Part 176.76 (h) transport vehicles, freight containers and portable tanks containing hazardous materials and International Maritime Dangerous Goods Code P9025-1 Amdt. 27-94. 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

Application procedures for fumigation of raw commodities or processed foods in containers and other transport vehicles are described in Section 22.1 of this manual.

22.4.5 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.

22.4.6 Precautions and Procedures During Discharge

If necessary to enter a treated area prior to discharge, test spaces directly above commodity 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. FUMIGATION OF BARGES

Develop an appropriate Fumigation Management Plan.

Barge fumigation is also regulated by U. S. Coast Guard Regulation 46 CFR Part 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 **FUMI-CEL®** or **FUMI-STRIP®** and seal, if necessary. Placard the barge. Notify consignee if the barge is to be fumigated in transit.

24. DISPOSAL INSTRUCTIONS

24.1 General

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

Unreacted or partially reacted **FUMI-CEL®** or **FUMI-STRIP®** 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 25 of this manual, Spill and Leak Procedures.

Some local and state waste disposal regulations may vary from the following recommendations. Disposal procedures should be reviewed with appropriate authorities to ensure compliance with local regulations. Contact your state Pesticide or Environmental Control Agency or Hazardous Waste Specialist at the nearest EPA Regional Office for guidance.

If properly exposed during the fumigation period, **FUMI-CEL®** and **FUMI-STRIP®** will contain virtually no unreacted magnesium phosphide. This will be a grayish-white powder. This will be a non-hazardous waste. However, incompletely exposed Plates and Strips will require special care for disposal.

Container Disposal:
The pails are non-refillable containers. Do not reuse or refill. Offer for recycling, if available. Triple rinse pails, lids and pouches with water if they have been contacted by magnesium phosphide dust. Then offer pails 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 pails to atmospheric conditions until residue 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 FUMI-CEL® or FUMI- STRIP® will be a grayish-white powder and contain only a small amount of unreacted magnesium phosphide. However, residual dust from incompletely exposed FUMI-CEL® or FUMI-STRIP® requires special care.

24.2 Directions for Disposal of Exposed FUMI-CEL® and FUMI-STRIP®

Confinement of partially spent **FUMI-CEL®** or **FUMI-STRIP®**, as in a closed container or plastic bag, may result in a fire hazard. Small amounts of phosphine gas may be given off from unreacted magnesium phosphide and confinement of the gas may result in a flash. In open areas, Plates and Strips may be disposed of on site by burial.

Unreacted or improperly exposed Plates and Strips **must** be further deactivated before disposal at a landfill.

Spent Plates and Strips may be collected for disposal in well-ventilated containers such as wire baskets (available from DEGESCH AMERICA, INC.) or porous cloth bags of burlap, cotton or other suitable material. The Plates and Strips may be loaded directly into open vehicles for transportation to the disposal site or they may be transported in the ventilated containers used for collection. Do not pile the cloth bags together. Do not use this method for partially spent **FUMI-CEL**S or FUMI-STRIPS.

24.3 Directions for Deactivation of Partially Spent FUMI-CEL® and FUMI-STRIP®

Partially spent **FUMI-CEL®** Plates and **FUMI-STRIP®** must be further deactivated prior to ultimate disposal. This is particularly true in cases of incomplete exposure or following a fumigation which has produced large quantities of partially spent material.

Partially spent Plates and Strips may be deactivated as follows using the “Wet Method”.

Water is used for deactivation of Plates and Strips and other magnesium phosphide fumigants by the “Wet Method”. Detergent solution is not required for magnesium phosphide fumigant. Fill a drum or other container to be used for wet deactivation with water to within an inch or two of the top. Do not allow a large headspace above the surface of the water.

Magnesium phosphide will react quite rapidly and very vigorously with liquid water. Therefore, small amounts of partially spent material should be tested initially by immersion in water prior to proceeding with large scale wet deactivation. One or two individual Plates, or Plates cut off of **FUMI-STRIP®**, should be evaluated first to determine their level of activity.

In a well-ventilated area, out-of-doors, submerge the entire Plate or Strip in water. The Plates and Strips may float to the surface and, therefore, it is necessary to hold them under water by use of a suitable weight. **Caution**: Partially spent Plates and Strips may ignite if they are allowed to float to the surface. Active Plates and Strips should be submerged at least 4 to 6 inches to prevent smoking of the liberated phosphine gas. Plates and Strips may be placed in wire baskets for immersion in water.

Reaction of the magnesium phosphide with water is practically complete within about 15 to 30 minutes. However, Plates and Strips should be totally immersed for at least 6 hours to ensure total hydrolysis. **Caution: Removal of Plates or Strips from water before they are largely deactivated may result in a fire.** They may then be taken to an approved site for disposal. Dispose of the water at a sanitary landfill or other approved site or means. Where permissible, the water may be poured out onto the ground or it may be poured into a storm sewer.

Caution: Wear a NIOSH/MSHA approved full-face gas mask - hydrogen phosphide 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 during wet deactivation of partially spent material. Do not cover the container being used for wet deactivation. Do not dispose of dust in a toilet.

Partially Spent Plates and Strips may be deactivated as follows using the “Dry Method”.

Extension of the fumigation period is the simplest method for further deactivation of partially spent Plates or Strips prior to ultimate disposal.

Alternatively, partially spent materials may be further deactivated by storing the Plates and Strips out of doors, protected from rain and ground water, in locked wire baskets or other similarly ventilated containers. As time permits, or when the container is full, the deactivated Plates and Strips may be taken to an approved site for disposal. Storage of partially spent Plates or Strips in a closed container may result in a fire hazard. Large numbers of partially spent Plates or Strips stored in open containers may ignite if contacted by liquid water.

Plates and Strips may also be "dry deactivated" by spreading them out onto the ground in a secure, open area away from inhabited buildings to be deactivated by atmospheric moisture. Care should be taken to ensure that the Plates or Strips are not carried away by the wind. If desired, they may be weighted down by several inches of sand or soil or by other suitable means. Do not use this procedure during periods of rain or if the soil is wet. After deactivation, the spent Plates and Strips may be gathered for disposal at approved sites.

25. SPILL AND LEAK PROCEDURES

25.1 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 self-contained breathing apparatus (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 **FUMI-CEL®** or **FUMI-STRIP®**. Water in contact with unreacted metal phosphide will greatly accelerate the production of phosphine gas which could result in a toxic and/or fire hazard. Wear dry gloves of cotton or other material if contact with magnesium phosphide is likely.

Return all intact pouches of **FUMI-CEL®** or **FUMI-STRIP®** to pails or other suitable packaging which has been properly marked according to DOT regulations. Notify consignee and shipper of damaged packaging.

If pails or pouches have been punctured or damaged so as to leak, the container may be temporarily repaired with aluminum tape or the pouch may be transferred to a sound metal container which should be sealed and properly labeled as magnesium phosphide. Transport the damaged pails/pouches to an area suitable for pesticide storage for inspection. Further information and recommendations may be obtained, if required, from **DEGESCH AMERICA, INC.**
Caution: The punctured pouches may flash upon opening at some later time.

If foil pouches of **FUMI-CEL®** or **FUMI-STRIP®** have been damaged so severely that they cannot be temporarily repaired, these materials may be wet deactivated on site using the procedure described in Section 24.3. If on-site, wet deactivation is not feasible, the damaged containers should be transported in open vehicles to a suitable area. Wet deactivation may then be carried out as described in Section 25.2. Alternatively, spillage may be spread out in an open area away from inhabited buildings to be deactivated by atmospheric moisture. Care should be taken to ensure that the Plates or Strips are not carried away by the wind. If desired, they may be weighted down by several inches of sand or soil or by other suitable means. Do not use this procedure during periods of rain or if the soil is wet. After deactivation, the spent Plates and Strips may be gathered for disposal at approved sites.

25.2 Directions for Deactivation by the Wet Method

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

Water is used for deactivation of **FUMI-CEL®** or **FUMI-STRIP®** and other magnesium phosphide fumigants. Detergent solution is not required. For wet deactivation, fill several drums or other containers with water to within an inch or two of the top. Do not allow a large headspace above the surface of the water.

Magnesium phosphide reacts very vigorously with water and, therefore, only 1 or 2 unexposed Plates should be wet deactivated at one time. Plates should be cut from **FUMI-STRIP®** rather than attempting deactivation of an entire Strip. Unexposed Plates or Strips will likely ignite if they are allowed to float to the surface of the water. They may be placed into wire baskets or similar containers, weighted and dropped into the water for deactivation. The Plates should be submerged to at least 4 to 6 inches to prevent smoking of the liberated phosphine gas.

Reaction of magnesium phosphide with water is practically complete within about 15 to 30 minutes. However, the Plates and Strips should be totally immersed for at least 6 hours to ensure total hydrolysis. **Caution: Removal of Plates or Strips from water before they are largely deactivated may result in fire.** Deactivated Plates and Strips may then be taken to an approved site for disposal. Dispose of the water at a sanitary landfill or other approved site or means. Where permissible, the water may be poured out onto the ground or it may be poured into a storm sewer.

Caution: If worker protection standards will be exceeded during wet deactivation of unexposed or incompletely exposed FUMI-CEL® and FUMI-STRIP®, NIOSH/MSHA approved respiratory protection must be worn. Wear a full-face gas mask - phosphine gas 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. Never place Fumi-Cel®, Fumi-Strip® or dust in a closed container such as a dumpster, sealed drum, plastic bag, etc., as flammable concentrations and a flash of phosphine gas are likely to develop. Do not cover the deactivation vessel at any time.

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