40285-12 07/01/1996 1/17

RESTRICTED USE PESTICIDE
DUE TO ACUTE INHALATION TOXICITY OF HIGHLY
TOXIC HYDROGEN PHOSPHIDE (PHOSPHINE, PH_3) GAS

For retail sale to and use only by certified applicators for those uses covered by the applicator's certification or persons trained in accordance with the Applicator's Manual working under the direct supervision and in the physical presence of the certified applicator. Physical presence means on site or on the premises. Read and follow the label and the DEGESCH America, Inc., Applicator's Manual which contains complete instructions for the safe use of this pesticide.

APPLICATOR'S MANUAL
for

ACCEPTED
JUL - 1 1996
Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 40285-12

DEGESCH MAGTOXIN®

PREPAC SPOT FUMIGANT

Patent Nos. 3132067 and 4653644
FOR SPOT TREATMENT OF FOOD AND FEED PROCESSING MACHINERY AND EQUIPMENT

Active Ingredient: Magnesium Phosphide 66%
Inert Ingredients.....34%

KEEP OUT OF REACH OF CHILDREN

DANGER – POISON – PELIGRO

PELIGRO AL USUARIO: Si usted no lee ingles, no use este producto hasta que la etiqueta se le haya sido explicado ampliamente.
(**TO THE USER:** If you cannot read English, do not use this product until the label has been fully explained to you.)

STATEMENT OF PRACTICAL TREATMENT

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

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

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

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

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

DEGESCH AMERICA, INC.
Weyers Cave, Virginia 24486 USA • Telephone (703) 234–9281
EPA Est. No. 40285–VA–01
EPA Reg. No. 40285–12

FORM 18519 (R 11/94)

THIS PRODUCT IS ACCOMPANIED BY AN APPROVED LABEL AND APPLICATOR'S MANUAL. READ AND UNDERSTAND THE ENTIRE LABELING. ALL PARTS OF THE LABELING ARE EQUALLY IMPORTANT FOR SAFE AND EFFECTIVE USE OF THIS PRODUCT. CALL DEGESCH AMERICA, INC., OR EPA IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABELING.

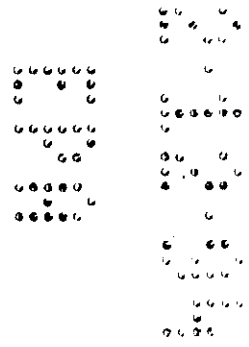
REFER TO THE APPLICATOR'S MANUAL FOR DETAILED PRECAUTIONS, RECOMMENDATIONS AND DIRECTIONS FOR USE.

WARRANTY

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

3/17

TABLE OF CONTENTS



1. INTRODUCTION

DEGESCH metal phosphide products are most often used for the protection of stored commodities from damage by insects. However, the **Magtoxin** Prepac Spot Fumigant has been specially manufactured for the treatment of food and feed processing machinery and equipment to control insect infestations arising inside this equipment. Spot fumigation may be defined as the short term treatment of processing machinery and equipment with toxic vapors for control of the adult and larval life stages of insects which infest food and feed particles remaining within the equipment. These spot treatments are intended to interrupt the life cycles of the insect pests. Since one or more life stages may survive this short term treatment, spot fumigations must be repeated periodically to control insect infestation. DEGESCH metal phosphide fumigants are acted upon by atmospheric moisture to produce hydrogen phosphide (phosphine, PH_3) gas. **Magtoxin** contains magnesium phosphide (Mg_3P_2) as its active ingredient and will liberate hydrogen phosphide via the following chemical reaction:

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

Hydrogen phosphide gas is highly toxic to insects, burrowing pests, humans and other forms of animal life. In addition to its toxic properties, the gas will corrode certain metals and may ignite spontaneously in air at concentrations above its lower flammable limit of 1.8%(v/v). These hazards will be described in greater detail later on in this Applicator's Manual for DEGESCH **Magtoxin** Prepac Spot Fumigant. **Magtoxin** also contains ammonium carbamate which liberates ammonia and carbon dioxide as follows:

$$NH_2COONH_4 \longrightarrow 2NH_3 + CO_2$$

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

The **Magtoxin** Prepac Spot Fumigant consists of a gas–permeable blister pack of **Magtoxin** Pellets. Each **Magtoxin** Prepac strip is roughly 4–1/4" x 16" and contains 33 blisters, each blister containing 2 pellets for a total of 66 pellets per strip. **Magtoxin** pellets weigh approximately 0.6g each and release 0.2g of hydrogen phosphide gas. Each **Magtoxin** Prepac then will release 13.2g of hydrogen phosphide. The strips are connected end–to–end, 5 Prepac strips in a row, and sealed into gas–tight aluminum foil pouches. The pouches are packed into covered metal pails, 12 pouches or 60 **Magtoxin** Prepacs per pail. Each pail contains 3960 **Magtoxin** pellets which weigh a total of 2376g and will liberate 792g of hydrogen phosphide gas. The pails are constructed to conform to D.O.T. Specification 37A; Steel Drums.

Upon opening the aluminum foil pouch, atmospheric moisture penetrates the porous fleece material on the top and bottom of the **Magtoxin** Prepac. The **Magtoxin** pellets then begin to react to produce small quantities of hydrogen phosphide gas which diffuses out through the fleece into the surrounding space. This reaction starts slowly, gradually accelerates and then tapers off as the magnesium phosphide is spent. The rate of decomposition of the **Magtoxin** Prepac will vary depending upon moisture and temperature conditions. For example, when moisture and temperature are high, decomposition of **Magtoxin** Prepac may be complete in less than 10 hours. However, at lower ambient temperatures and relative humidity levels, decomposition may require 4 days or more.

After decomposition, **Magtoxin** leaves a dark gray powder composed almost entirely of magnesium hydroxide and other approved inert ingredients. This powder will be retained inside the fleece of the Prepac strip and may be retrieved after fumigation so as not to contaminate the treated commodity. The spent **Magtoxin** Prepac must not be allowed to contaminate the processed food or feed. Therefore, it must be retrieved after fumigation prior to starting up the processing line unless the spot fumigant has been applied to a fumiport or in some other fashion so as to ensure that it is retained and will not enter the food or feed stream. If properly exposed, the spent **Magtoxin** Prepac will normally contain only a small amount of unreacted magnesium phosphide and may be disposed of without hazard. This is not considered a hazardous waste. However, partially spent residual from incompletely exposed **Magtoxin** Prepacs will require special care. Precautions and instructions for further deactivation and disposal will be given later in this Manual.

Magtoxin Prepacs are supplied in gas–tight containers, and their shelf life is unlimited as long as the packaging remains intact. However, once opened for fumigation, the entire contents of the aluminum

foil pouch must be used as it cannot be resealed. Storage and handling instructions will be given in detail later in the Applicator's Manual.

A summary of safety recommendations is outlined below:

SAFETY RECOMMENDATIONS SUMMARY

1. Carefully read the labeling and follow instructions explicitly.
2. Post warning placards on fumigated areas.
3. Prior to fumigation, notify appropriate company employees. Provide to local officials (fire department, rescue squad, police, etc.) on an annual basis relevant safety information for use in the event of an emergency. It is recommended that they be notified prior to each fumigation.
4. Never fumigate alone from inside structures.
5. Person supervising must be a certified fumigator and personnel assisting must be trained in the use of **Magtoxin** Prepac Spot Fumigant. Never allow uninstructed personnel to handle **Magtoxin**.
6. Approved respiratory protection must be available for the fumigation of structures from within. Because of its rapid rate of hydrogen phosphide gas production, it frequently will be necessary to wear respiratory protection during the application of **Magtoxin** Prepac Spot Fumigant.
7. It is not necessary to wear gloves or other protective clothing when handling **Magtoxin** Prepacs. However, wear dry gloves of cotton or other materials if contact with metal phosphide tablets, pellets or dust is likely. Wash hands thoroughly after handling metal phosphide materials.
8. Never open metal phosphide fumigant pouches in a flammable atmosphere. It is preferable to open them in open air, near a fan or other appropriate ventilation which will rapidly exhaust contaminated air. Containers may be opened inside the structure housing equipment to be fumigated provided worker's exposure to hydrogen phosphide gas does not exceed allowable limits.
9. Do not allow **Magtoxin** Prepacs to contact liquid water or to pile up.
10. Dispose of empty containers and spent Prepacs in a proper manner consistent with the label instructions.
11. Hydrogen phosphide fumigants are not to be used for vacuum fumigations.
12. Exposures to hydrogen phosphide must not exceed the eight hour TWA of 0.3 ppm during application, or a ceiling concentration of 0.3 ppm after application is completed.
13. Fumigated areas must be aerated to 0.3 ppm hydrogen phosphide or less prior to reentry by unprotected workers.
14. Finished foods and feed which have been fumigated with **Magtoxin** must be aerated for 48 hours prior to offering to the end consumer.
15. Transfer of a treated commodity to another site without complete aeration is permissible provided that the new storage site is placarded if its concentration is above 0.3 ppm.
16. Do not open pouches until just prior to application of the Prepacs.
17. Protect materials containing metals such as copper, silver, gold and their alloys and salts from corrosive exposure to hydrogen phosphide.
18. Do not use metal phosphide fumigant containers for any purpose other than recycling or reconditioning.
19. OSHA recommended preexposure screening of employees to detect impaired pulmonary function. They recommend that any employees developing this condition be transferred for medical examination.

6/17

2. PRECAUTIONARY STATEMENTS

2.1 Hazards to Humans and Domestic Animals

DANGER: Magnesium phosphide from DEGESCH **Magtoxin** Prepac Spot Fumigant may 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. If a sealed container is opened, or if the material comes into contact with moisture, water or acids, these products will release hydrogen phosphide (phosphine, PH_3) which is an extremely toxic gas. If a garlic odor is detected, refer to the Industrial Hygiene Monitoring section on Page 9 of the Applicator's Manual for appropriate monitoring procedures. Pure hydrogen phosphide gas is odorless; the garlic odor is due to a contaminant. Since the odor of hydrogen phosphide may not be detected under some circumstances, the absence of a garlic odor does not mean that dangerous levels of hydrogen phosphide gas are absent. Observe proper reentry procedures specified elsewhere in the labeling to prevent overexposure.

2.2 Statement of Practical Treatment

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

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

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

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

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

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

Magnesium phosphide from Plates, Strips, pellets, Prepacs or dust reacts with moisture from the air, acids and many other liquids to release hydrogen phosphide (phosphine, PH_3) gas. Mild exposure by inhalation causes malaise (indefinite feeling of sickness), ringing in the ears, fatigue, nausea and pressure in the chest which is relieved by removal to fresh air. Moderate poisoning 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 judgement:

In its milder forms, symptoms of poisoning may take some time (up to 24 hours) to make their appearance, and the following is suggested.

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

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

1. Where pulmonary edema is observed, steroid therapy should be considered and close medical supervision is recommended. Blood transfusions may be necessary.
2. In case of manifest pulmonary edema, venesection should be performed under vein pressure control. Heart glycosides (I.V.) (in case of hemoconcentration, venesection may result in shock). On progressive edema of the lungs: immediate intubation with a constant removal of edema fluid and oxygen overpressure respiration, as well as any measures required for shock treatment. In case of kidney failure, extracorporeal hemodialysis is necessary. There is no specific antidote known for 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. Thereafter, apply medicinal charcoal.

2.4 Physical and Chemical Hazards

Magnesium phosphide in Plates, Strips, Prepacs, pellets, and partially spent dust will release hydrogen phosphide 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 in aluminum phosphide and will liberate gas more rapidly. This is particularly true in the presence of liquid water and at higher temperatures. Since hydrogen phosphide may ignite spontaneously at levels above its lower flammable limit of 1.8% v/v, it is important not to exceed this concentration. Ignition of high concentrations of hydrogen phosphide can produce a very energetic reaction. Explosions can occur under these conditions and may cause severe personal injury. Never allow the buildup of hydrogen phosphide to exceed explosive concentrations. Do not confine spent or partially spent metal phosphide fumigants as the slow release of hydrogen phosphide from this material may result in formation of an explosive atmosphere. Magnesium phosphide fumigants should not be stacked or piled up or contacted with liquid water. This may cause a temperature increase, increase 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 which will rapidly exhaust contaminated air. When opening pouches of **Magtoxin** Prepacs, 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 hydrogen phosphide.

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

3. DIRECTIONS FOR USE

3.1 General

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

3.1.1 DEGESCH **Magtoxin** Prepac Spot Fumigant is a Restricted Use Pesticide due to the acute inhalation toxicity of hydrogen phosphide (phosphine, PH_3) gas. These products are for retail sale to and use only by certified applicators for those uses covered by the applicator's certification or persons trained in accordance with the Applicator's Manual working under the direct supervision and in the physical presence of the certified applicator. Physical presence means on site or on the premises. Read and follow the label and the DEGESCH America, Inc., Applicator's Manual which contains complete instructions for the safe use of this pesticide.

3.1.2 **Magtoxin** Prepacs are highly hazardous materials and should be used only by individuals trained in their proper use. Before using, read and follow all label precautions and directions.

Additional copies of this Manual are available from:

DEGESCH America, Inc.
P. O. Box 116
Weyers Cave, VA 24486
Telephone: (703) 234–9281

Persons working with **Magtoxin** Prepacs should be knowledgeable of the hazards of this product and trained in the use of required respiratory equipment and detector devices, emergency procedures, and use of this fumigant.

3.1.3 At least two persons trained in the use of **Magtoxin** Prepacs must be present during spot fumigation of food and feed processing machinery and equipment. Two trained persons must also be present during reentry into fumigated and/or partially aerated structures or rooms housing treated equipment.

3.1.4 Exposure to hydrogen phosphide gas may not exceed an eight hour time–weighted average of 0.3 ppm for applicators and workers during application. Thereafter, exposure for any person may not exceed a 0.3 ppm ceiling during such operations as aeration or recovery and deactivation of exposed Prepacs.

3.1.5 Do not fumigate food processing machinery or equipment with **Magtoxin** Prepacs when air temperature is below 40°F (5°C).

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

3.1.7 It is not necessary to wear gloves or other protective clothing when handling **Magtoxin** Prepacs. However, wear dry gloves of cotton or other material while handling **Phostoxin** or **Magtoxin** tablets or pellets or their dust. Wash hands thoroughly after use.

3.1.8 Hydrogen phosphide gas may flash at concentrations above its flammable limit. Therefore, never open containers of metal phosphide fumigants in a flammable atmosphere. It is preferable to open them in open air, near a fan or other appropriate ventilation which will rapidly exhaust contaminated air. These precautions will also reduce the applicator's exposure to hydrogen phosphide gas. Containers may be opened inside the structure housing equipment to be fumigated provided worker's exposure to hydrogen phosphide gas does not exceed allowable limits.

3.1.9 Piling of **Magtoxin**, dust from its fragmentation or addition of liquid water may speed up the reaction, cause a temperature increase and confine the gas so that ignition could occur.

3.1.10 As much as is possible, protect unused **Magtoxin** Prepacs from excessive exposure to atmospheric moisture during application.

3.1.11 Hydrogen phosphide gas may react with certain metals and their salts to produce corrosion. This gas is corrosive to copper, copper alloys and precious metals such as silver and gold. Sensitive equipment and items containing these elements should be removed or protected prior to fumigation with **Magtoxin** Prepacs.

3.1.12 Do not allow any portions of the **Magtoxin** Prepac to enter the food processing stream. This will require retrieval of the Prepacs at the end of the fumigation, prior to restarting the machinery, unless applications have been made to fumiports or similar devices within the processing equipment which will retain the fumigant blisters.

3.1.13 Respiratory protection approved for the concentration to which the fumigator will be exposed must be available for spot treatments in rooms or indoor work areas housing food and feed processing machinery and equipment. Respiratory protection need not be available for uses such as outdoor applications to bins, tanks, etc., if exposures above the allowable limits will not be encountered. Because of the reactivity of **Magtoxin** Prepacs it frequently will be necessary to wear respiratory protection during application of the spot fumigant.

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

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

3.2 Efficacy

Spot fumigation is the short term treatment of food and feed processing machinery and equipment with toxic vapors for control of the adult and larval life stages of insects which infest food particles remaining within the equipment. The minimum exposure time of 34 hours is not long enough to ensure destruction of pupae or eggs. In addition, much of the equipment to be treated is of loose or open construction and cannot readily be sealed. Other than in bins and tanks, it is not unusual for virtually all of the hydrogen phosphide gas to have leaked out in 24 hours or less. Since this type of treatment merely interrupts the life cycle of the insect pests, spot fumigations need to be performed at regular intervals, at intervals of one month or less, until the problem is brought under control.

It is recommended that gas concentration measurements be made and/or test insect cages be placed inside the treated equipment to determine efficacy and to ensure that sealing has been adequate. A good rule of thumb for obtaining satisfactory results is a minimum of 50 to 100 ppm hydrogen phosphide remaining 10 hours after application of the **Magtoxin** Prepac Spot Fumigant. Once a particular facility has been treated successfully several times and trouble spots eliminated, the frequency of efficacy checks and/or concentration may be reduced.

There are many situations in which the use of **Magtoxin** Prepac Spot Fumigant alone will not solve the infestation problem, and it is generally necessary to use other sanitation techniques. The equipment should be cleaned and run to empty prior to spot fumigation. Dead stock should be removed by vacuuming or other means. Fogging with DDVP, resmethrin, pyrethrins or other EPA–approved pesticides is recommended in conjunction with spot fumigant to aid in controlling infestations outside of the machinery and in pieces of equipment which is not practical or possible to seal. In addition to careful sealing prior to treatment, it is a good idea to repair and maintain equipment in proper working condition so as to reduce leaks.

3.3 Recommended Dosage and Exposure Conditions

Each **Magtoxin** Prepac contains 33 blisters, each holding 2 **Magtoxin** Pellets. Each **Magtoxin** Pellet will liberate 0.2g of hydrogen phosphide for a total of 13.2g of gas per Prepac. The Prepacs are supplied in a continuous roll of five Prepacs connected end to end. The appropriate amount of fumigant for application to the machinery may be cut from the roll of Prepacs using sharp scissors or other cutting tool. The recommended dosage is 1 – 2 Prepacs per 1320 cubic feet in equipment that is relatively gas tight or which can readily be sealed. This corresponds to a dose of 10 – 20 grams of hydrogen phosphide per 1000 cubic feet. It is permissible to use up to 10 Prepacs per 1320 cubic feet, 100 grams of hydrogen phosphide per 1000 cubic feet, in sifters, purifiers and other pieces of equipment which cannot readily be sealed.However, increased dosage will not completely compensate for gas leaks from poorly sealed or open equipment. In many cases, use of fogging or other sanitation techniques should be relied upon rather than increasing dosage of **Magtoxin** Prepac Spot Fumigant.

Spot fumigations with **Magtoxin** must not be conducted at temperatures below 40°F. The minimum duration of the spot fumigation is 34 hours. This exposure period serves not only to control the infestation, but to allow ample time for reaction of the Prepac. Deactivation and disposal of **Magtoxin** Prepacs that are only partially spent will require extra care and precautions. See recommendations given under "Disposal Instructions".

3.4 General Recommendations for Spot Fumigations with Magtoxin Prepacs

3.4.1 The most important aspect in spot fumigation is a thorough understanding of the equipment and all of the various product and air flow patterns. The fumigator should review schematics and/or diagrams of the facility and a walking survey should be conducted to inspect the food processing machinery and equipment.

An overall plan for the spot fumigation should be developed to include the following items:

- the acquisition of the necessary manpower and supplies to include safety equipment and other essential items.
- a route through the facility for efficient application of the **Magtoxin** Prepac to minimize workers' exposures and time required.
- a plan for security during the fumigation period to include placarding and notification of facility's personnel so that no unauthorized persons can enter the treated areas prior to aeration.
- a plan for sealing the equipment prior to application of the spot fumigant. Recommendations for repair of machinery, transfer lines, bins or other equipment to improve its ability to retain gas should be given to facility maintenance personnel.
- dosage rates and application points. Respiration protection is often required during application of **Magtoxin** Prepacs. Methods of reducing applicator's exposure, such as the wearing of respiratory protection, working near an open window or use of fans or forced ventilation should be planned in advance.
- a log to include dosage rates and application points will facilitate accounting during application of the fumigant and its recovery after exposure and aeration.
- recommendations for the permanent installation of fumiports inside the equipment so as to eliminate the possibility of contamination and the requirement for immediate recovery of the applied dose prior to restart.
- gas readings to characterize worker's exposure during application, efficacy measurements inside equipment during the exposure period and low level measurements to ensure proper aeration prior to turning the fumigated areas over to facility's personnel.
- a plan for recovery, deactivation and disposal of the spot fumigant.

3.5 Directions for Spot Fumigations with Magtoxin Prepacs

DEGESCH **Magtoxin** Prepac Spot Fumigant is recommended for spot treatments to control stored products insects in bins, silos, holding tanks, elevator boots and heads, filters, conveyers, spouting, purifiers, food processing equipment, sifters, rollers, dusters and related equipment in mills, food and feed processing plants, breweries and similar industries.

Spot treatment equipment monthly with **Magtoxin** Prepacs or as needed to supplement general fumigations.

3.5.1 Meet with appropriate facility's personnel to discuss the planned fumigation and to ensure that no unauthorized persons will be permitted to enter treated areas prior to aeration.

3.5.2 If possible, have equipment repaired by plant personnel and fumiports installed at convenient application points.

3.5.3 Seal all equipment to which **Magtoxin** Prepac will be applied. Eliminate drafts inside the equipment by closing off sections which have openings. Take any other steps necessary to prevent air movement inside the equipment. Seal all openings with tape, tarping, etc., to prevent escape of hydrogen phosphide into rooms housing the equipment. Sites to be fumigated must be tightly sealed.

3.5.4 Run machinery to empty the process stream and remove dead stocks where possible prior to application of **Magtoxin** Prepacs.

3.5.5 Windows in rooms housing equipment may be kept open during application to allow for adequate ventilation. A fan or hood area may also be employed to reduce the applicator's exposure to hydrogen phosphide gas. Approved respiratory protection **must** be available and is often required to be worn during application of the spot fumigant. Do not fumigate alone.

3.5.6 Using sharp scissors or similar cutting device, cut the appropriate amount of fumigant from the roll of Prepacs and apply to the equipment. Be careful not to cut into the blisters and allow intact pellets or spent dust to fall into the machinery. Make sure the Prepacs are flat and are not folded over during application. Prominently mark or otherwise indicate the points of application so that the applied dose may be readily located and recovered after aeration.

3.5.7 Under no conditions should processed food be permitted to come in contact with **Magtoxin** or its spent residual.

3.5.8 Immediately after application close all doors and windows so as to reduce drafts and air currents in the building during the exposure period.

3.5.9 All accesses leading to the area under fumigation must be properly placarded with warning signs. Only authorized fumigators are permitted to enter treated areas prior to aeration.

3.5.10 Aeration may be initiated, after the fumigation period, by turning on ventilation equipment and opening doors and windows in the treated areas. Remove covers from bins, vessels and other equipment and turn on dust collector fans. Aeration is generally complete in less than one hour.

3.5.11 Do not remove warning placards or permit entry into treated areas, without respiratory protection, until the gas concentration is 0.3 ppm or below as indicated by a suitable detector for hydrogen phosphide.

3.5.12 Collect all spent or partially spent **Magtoxin** from the treated equipment. Transport this material to an appropriate site for further deactivation and ultimate disposal following recommendations given elsewhere in this Applicator's Manual under "Disposal Instructions".

3.6 Food and Feed Processing Machinery and Equipment

Various pieces of commonly encountered food processing equipment are listed in the following along with comments relating to their successful spot treatment with **Magtoxin** Prepacs.

3.6.1 **Mills and Roll Stands** – These are frequently separated front and back, and the dosage should be applied in both sections. Mills and roll stands are generally sufficiently gas tight or can readily be sealed so as to obtain satisfactory results.

3.6.2 **Shaker Boxes and Sifters** – Shaker boxes and sifters are generally not gas tight but may be spot treated without further sealing if air currents within the process stream are eliminated. It is recommended that the **Magtoxin** Prepac dose be applied at the bottom.

3.6.3 **Purifiers** – Purifiers cannot be successfully spot fumigated unless they are completely sealed. Fogging with an EPA–approved pesticide is recommended in facilities where sealing of the purifiers is not practical or too labor intensive.

3.6.4 **Hoppers and Bins** – Hoppers and bins are generally sufficiently gas tight with little or no sealing. Valves and vents should be closed prior to dosing.

3.6.5 **Boots, Closed Conveyors and Transfer Lines, Down Spouts and Pneumatic Tubes –**

These structures are relatively gas tight and easy to fumigate. Hydrogen phosphide gas will travel readily through open lines, however, it is recommended that they be dosed at intervals of no greater than 50 feet apart.

3.6.6 **Air Filter** – Sealing of the air filters is required to eliminate or minimize air currents in the process stream. The filter itself should be carefully sealed along with all roof vents leading from the filter.

4. PROTECTIVE CLOTHING

It is not necessary to wear gloves or other protective clothing when handling DEGESCH **Magtoxin** Prepac Spot Fumigant. However, wear dry gloves of cotton or other material if contact with metal phosphide tablets, pellets or dust 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.

12/17

5. RESPIRATORY PROTECTION

5.1 When Respiratory Protection Must Be Worn

NIOSH/MSHA approved respiratory protection must be worn if worker exposure limits cannot be met through engineering controls (such as forced air ventilation) and/or appropriate worker practices. Respiratory protection is required if exposure is likely to exceed the eight hour TWA of 0.3 ppm during application, or a 0.3 ppm ceiling at any time afterwards. For example, respiratory protection is required to be worn upon reentry into a partially aerated structure if the hydrogen phosphide concentration is above 0.3 ppm. It will often be necessary to wear respiratory protection during application of **Magtoxin** Prepac Spot Fumigant because of its rapid rate of hydrogen phosphide gas production. When required, gas concentration measurements for safety purposes may be made using low level detector tubes. See the section on "Applicator and Worker Exposure" for monitoring requirements. Information on hydrogen phosphide (phosphine, PH_3) detector tubes may be obtained from DEGESCH America, Inc., or your DEGESCH distributor.

5.2 Permissible Gas Concentration Ranges for Respiratory Protection Devices

A NIOSH/MSHA approved, full–face gas mask – hydrogen phosphide canister combination may be used at levels up to 15 ppm or to escape from levels up to 1500 ppm. Above this level or in situations where the hydrogen phosphide concentration is unknown, a NIOSH/MSHA approved, self–contained breathing apparatus (SCBA) or its equivalent must be used. The NIOSH/OSHA Pocket Guide, 8-85, DHEW/NIOSH 78–210, lists these and other types of approved respirators and the concentration limits at which they may be used.

5.3 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 self–contained breathing apparatus (SCBA) or its equivalent must be available at the site of application in case it is needed. In addition, SCBA or its equivalent must be available locally, for example, at fire station or rescue squad if it is not available at the fumigation site.

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

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

6. PLACARDING OF FUMIGATED AREAS

The applicator must placard or post all entrances to the structures and/or room containing equipment under fumigation with signs bearing, in English and Spanish:

1. The signal word DANGER/PELIGRO and the SKULL AND CROSSBONES symbol in red.
2. The statement, "Area and/or commodity under fumigation, DO NOT ENTER/NO ENTRE".
3. The statement, "This sign may only be removed after the commodity is completely aerated (contains 0.3 ppm or less of hydrogen phosphide gas). If incompletely aerated commodity is transferred to a new site, the new site must also be placarded if it contains more than 0.3 ppm. Workers must not be exposed to more than 0.3 ppm hydrogen phosphide."
4. The date and time fumigation begins and is completed.
5. Name of fumigant used.
6. Name, address and telephone number of the applicator.

All entrances to a fumigated area must be placarded. Where possible, placards should be placed in advance of the fumigation to keep unauthorized persons away. Do not remove placards until the treated equipment and surrounding work areas are aerated down to 0.3 ppm hydrogen phosphide or less. To determine whether aeration is complete, each fumigated area must be monitored and shown to contain 0.3 ppm or less hydrogen phosphide gas. If a partially filled bin or tank has been treated,

monitor the air space around and, if feasible, in the mass of the commodity prior to removing the placard. Transfer of incompletely aerated commodity to a new site is permissible. However, the new storage must be placarded if it contains more than 0.3 ppm hydrogen phosphide. No placarding is required if aeration occurs during transfer. Workers who handle incompletely aerated commodity must be informed and appropriate measures taken (i.e., ventilation or respiratory protection) to prevent exposures from exceeding 0.3 ppm hydrogen phosphide.

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

7. APPLICATOR AND WORKER EXPOSURE

7.1 Hydrogen Phosphide Exposure Limits

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

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

7.2 Application of Fumigant

Depending upon temperature and humidity, DEGESCH **Magtoxin** Spot Fumigant will release hydrogen phosphide gas slowly upon exposure to moisture from the air. However, this release rate is much more rapid than with **Phostoxin**. Considerable handling of the **Magtoxin** Prepac may be required during application of the product to processing equipment. Therefore, the use of respiratory protection is often required during the application step. If the fumigator's exposure exceeds the eight hour TWA of 0.3 ppm, approved respiratory protection must be worn. When required, gas concentration measurements for safety purposes may be made using low level detector tubes. See the writeup below on Industrial Hygiene Monitoring. Information on hydrogen phosphide (phosphine, PH_3) detector tubes may be obtained from DEGESCH America, Inc., or your DEGESCH distributor.

It is often advisable to wear respiratory protection during application of fumigant under hot and humid conditions, particularly when considerable time must be spent in preparation of the **Magtoxin** Prepac for application.

7.3 Leakage from Fumigated Sites

Hydrogen phosphide is highly mobile and given enough time may penetrate seemingly gas–tight materials such as concrete, wood and cinder block and may escape from sealed or partially sealed equipment. This is generally of no consequence if the tank or bin is out of doors. However, leakage into rooms housing treated machinery, equipment, transfer lines, etc., may result in hydrogen phosphide gas levels above 0.3 ppm. Doors leading to work areas housing treated equipment should be placarded and entry prior to aeration prohibited unless approved respiratory protection is worn or gas levels less than 0.3 ppm have been measured. Adjacent, enclosed areas likely to be occupied should be examined to ensure that significant leakage has not occurred. Sealing of the fumigated site and/or air flow in the occupied areas must be sufficient to meet exposure standards.

7.4 Aeration and Reentry

Treated machinery and equipment and work areas housing this equipment must be aerated after spot fumigation until the level of hydrogen phosphide gas is 0.3 ppm or below. Significant quantities of commodity in treated tanks or bins must be monitored to ensure that liberation of gas from the treated commodity does not result in the development of unacceptable levels of hydrogen phosphide. Do not allow reentry into treated areas by any person before this time unless protected by an approved respirator.

14/17

7.5 Handling Unaerated Commodities

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

7.6 Industrial Hygiene Monitoring

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

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

There are a number of devices on the market for the measurement of hydrogen phosphide gas levels for industrial hygiene purposes. One of these is the hydrogen phosphide detector tube used in conjunction with the appropriate hand–operated air sampling pump. These devices are reliable, portable, simple to use, do not require extensive training and are relatively rapid, inexpensive and accurate. Low level detector tubes are available which can detect 0.1 ppm and are suitable for industrial hygiene monitoring.

8. STORAGE INSTRUCTIONS

1. Store DEGESCH **Magtoxin** Prepac Spot Fumigant in a dry, well ventilated area away from heat, under lock and key. Maintain temperature below 130°F. Post as a pesticide storage area. Do not contaminate water, food or feed by storing pesticides in the same areas used to store these commodities.
2. Do not store in buildings where humans or domestic animals reside. Keep out of reach of children.
3. DEGESCH **Magtoxin** Prepacs are supplied in gas–tight, aluminum foil pouches. These pouches are not resealable, and the Prepacs must be used immediately or disposed of once they have been opened.
4. The shelf life of **Magtoxin** Prepacs is virtually unlimited as long as the pouches are sealed.

9. DISPOSAL INSTRUCTIONS

9.1 General

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

9.1.2 Unreacted or partially reacted **Magtoxin** 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 10 of this manual, Spill and Leak Procedures.

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

9.1.4 Dispose of containers in a sanitary landfill or by other procedures approved by state and local authorities.

9.1.5 If properly exposed during the fumigation period, **Magtoxin** Prepacs will contain virtually no unreacted magnesium phosphide. However, because of the short term of the spot treatment and because these fumigations are sometimes performed under cooler and drier conditions, it is required that all Prepacs be subjected to further deactivation prior to ultimate disposal.

9.2 Directions for Disposal of Exposed Magtoxin Prepacs

9.2.1 Confinement of partially spent **Magtoxin**, as in a closed container or plastic bag, may result in a fire hazard. Hydrogen phosphide gas may be given off from unreacted magnesium phosphide, and confinement of the gas may result in a flash.

9.2.2 Unreacted or incompletely exposed **Magtoxin** must be further deactivated before disposal at a landfill.

9.2.3 Spent or partially spent **Magtoxin** Prepacs 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. **Caution:** Confinement and the danger of a flash may result from overfilling the ventilated or porous containers. It is preferable to carry out deactivation at the fumigation site. If this is not possible, the Prepacs may be loaded directly into open vehicles for transportation to the deactivation site. **Caution:** Protect the spent or partially spent Prepacs from contact with water as this might result in a flash. Do not pile the cloth bags together.

9.3 Directions for Deactivation of Magtoxin Prepacs

9.3.1 **Magtoxin** Prepac Spot Fumigant 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.

9.3.2 Spent or partially spent **Magtoxin** Prepacs may be deactivated as follows using the "Wet or Dry Method".

9.3.2.1 Water is used for deactivation of **Magtoxin** Prepacs and other magnesium phosphide fumigants by the "Wet Method". Detergent solution is not required for magnesium phosphide fumigants. 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.

9.3.2.2 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 Prepacs should be evaluated first to determine their level of activity.

9.3.2.3 In a well ventilated area, out of doors, completely submerge in water the entire mass of exposed Prepacs. They may float to the surface and, therefore, it is necessary to hold them under water by use of a suitable weight. **Caution:** Partially spent Prepacs may ignite if they are allowed to float to the surface. Active **Magtoxin** Prepacs should be submerged at least 4 to 6 inches to prevent smoking of the liberated hydrogen phosphide gas. Prepacs may be placed in wire baskets or porous bags for immersion in water.

9.3.2.4 Reaction of the magnesium phosphide with water is practically complete within about 15 to 30 minutes. However, **Magtoxin** Prepacs should be totally immersed for at least 6 hours to ensure total hydrolysis. **Caution:** Removal of Prepacs from water before they are largely deactivated may result in a fire. They may 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.

9.3.2.5 **Caution:** Wear appropriate respiratory protection during wet deactivation of partially spent material. Do not cover the deactivation vessel at any time.

9.3.3 Partially Spent **Magtoxin** Prepacs may be Deactivated as Follows Using the "Dry Method".

9.3.3.1 Extension of the fumigation period is the simplest method for further deactivation of partially spent **Magtoxin** prior to ultimate disposal.

9.3.3.2 Alternatively, exposed materials may be further deactivated by storing the Prepacs 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 **Magtoxin** Prepacs may be taken to an

approved site for disposal. Storage of partially spent Prepacs in a closed container may result in a fire hazard. Large numbers of partially spent Prepacs stored in open containers may ignite if contacted by liquid water.

10. SPILL AND LEAK PROCEDURES

10.1 General Precautions and Directions

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

Return all intact aluminum foil pouches of **Magtoxin** Prepacs to original pails or other packaging which has been suitably constructed and marked according to DOT regulations. Notify consignee and shipper of damaged pails.

If the foil pouches have been punctured or damaged so as to leak, they may be temporarily repaired with aluminum tape. Transport the damaged pouches, thus sealed, to an area suitable for pesticide storage for inspection. **Caution:** The punctured pouches may flash upon opening at some later time. Further instructions and recommendations may be obtained, if required, from DEGESCH America, Inc.

If foil pouches of **Magtoxin** Prepacs have been damaged so severely that they cannot be temporarily repaired, these materials may be wet deactivated on site using the procedure described in 10.2. 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 10.2. 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 Prepacs 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 **Magtoxin** Prepacs may be gathered for disposal at approved sites.

10.2 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:

10.2.1 Water is used for the wet deactivation of **Magtoxin** Prepacs and other magnesium phosphide fumigants. Detergent solution is **not** required. Fill several drums or other containers to be used for wet deactivation with water to within an inch of the top. Do not allow a large headspace above the surface of the water.

10.2.2 Magnesium phosphide reacts very vigorously with water and, therefore, only 1 or 2 unexposed **Magtoxin** Prepacs should be wet deactivated at one time. Individual Prepacs should be cut from roll of 5 connected Prepacs rather than attempting deactivation of an entire roll. Unexposed Prepacs 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 Prepacs should be submerged to at least 4 to 6 inches to prevent smoking of the liberated hydrogen phosphide gas.

10.2.3 Reaction of magnesium phosphide with water is practically complete within about 15 to 30 minutes. However, the **Magtoxin** Prepacs should be totally immersed for at least 6 hours to ensure total hydrolysis. It is suggested that one or more drums or barrels be set up for the first half hour's immersion, until bubbling has practically ceased, after which the Prepacs are transferred to a second drum for the remainder of the wet deactivation period. **Caution:** Removal of **Magtoxin** Prepacs from water before they are largely deactivated may result in fire. Deactivated Prepacs 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.

17/17

10.2.4 **Caution:** Wear appropriate respiratory protection during wet deactivation of unexposed or incompletely exposed Prepacs. Never place metal phosphide products or their dust in a closed container such as a dumpster, sealed drum, plastic bag, etc., as flammable concentrations and a flash of hydrogen phosphide gas are likely to develop. Do not cover the deactivation vessel at any time.

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

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