



**COMPANY
NUMBER**

2548

**PRODUCT
SERIAL NO.**

63

**LABEL
APPROVAL
DATE**

3-16-87

2548-63, 11-11-74

ACCEPTED
with COMMENTS
In EPA Letter Dated:

MAR 16 1987

DEIA PELLET LABEL --- FRONT PANEL

Under the Federal Insecticide,
Fungicide, and Rodenticide Act
as amended, for the pesticide
registered under EPA Reg. No.
2548-63

RESTRICTED USE PESTICIDE
DUE TO ACUTE INHALATION TOXICITY OF HIGHLY
TOXIC HYDROGEN PHOSPHIDE (PHOSPHINE, PH₃) GAS

For retail sale to and use only by certified applicators for those uses covered by the applicator's certification or persons trained in accordance with the attached product manual working under the direct supervision 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 Research Products Company product manual which contains complete instructions for the safe use of this pesticide.

Deia(R) PELLETS

A fumigant for the control of most stored product insects and their pre-adult stages.

Active Ingredient: Aluminum Phosphide.....57%
Inert Ingredients:.....43%
TOTAL.....100%

KEEP OUT OF REACH OF CHILDREN

DANGER/PELIGRO-POISON

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

STATEMENT OF PRACTICAL TREATMENT

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

IF GAS OR DUST FROM PELLETS IS INHALED: Get exposed person 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.

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02400
 02450 IF THE PELLETS OR THEIR DUST ARE SWALLOWED: Drink or administer
 02500 one or two glasses of water and induce vomiting by touching back
 02600 of throat with finger, or if available, administer syrup of
 02650 ipecac. Do not give anything by mouth if victim is unconscious
 02700 or not alert.

02750
 02800 IF PELLETS OR THEIR DUST GET ON SKIN OR CLOTHING: Brush or
 02850 shake material off clothes and shoes in well ventilated area.
 02900 Allow clothes to aerate in a ventilated area prior to
 02950 laundering. Do not leave contaminated clothing in occupied
 03000 and/or confined areas such as automobiles, vans, motel rooms,
 03050 homes, etc. Wash contaminated skin thoroughly with soap and
 03100 water.

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 03200 IF DUST FROM THE PELLETS GETS IN EYES: Flush with plenty of
 03250 water. Get medical attention.
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03350 See side panels for additional precautionary statements.
 03400

03450 Manufactured by: Detia Freyberg, GMBH
 03500 P. O. Box 10
 03550 6947 Laudenbach
 03600 F.R. of Germany
 03650

03700
 03750 Distributed by: Research Products Company
 03800 Div. of McShares, Inc.
 03850 P. O. Box 1460
 03900 Salina, KS 67402-1460
 03950

04000
 04050 EPA Establishment No. 33982WG01 Net Contents:
 04100 EPA Registration No. 2548-63 Net Weight:
 04150

04200
 04250

04300 LEFT PANEL
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04400 HAZARDS TO HUMANS AND DOMESTIC ANIMALS
 04450

04500 KEEP OUT OF REACH OF CHILDREN
 04550 DANGER/POISON
 04600

04650 Aluminum phosphide in pellets or their dust can be fatal if
 04700 swallowed. Do not get in eyes, in nose, on skin or on clothing.
 04750 Do not eat, drink or smoke while handling aluminum phosphide.
 04800 fumigants. When the container is opened Detia(R) Pellets will
 04850 begin to release hydrogen phosphide (phosphine) which is an
 04900 extremely toxic gas. Contact with water, acids and some other
 04950 liquids will accelerate this reaction. If a garlic odor is
 05000 detected, refer to section on Industrial Hygiene Monitoring
 05050 applicator, worker, exposure for appropriate monitoring

05100 procedures. Pure hydrogen phosphide gas is odorless; the odor
05150 is due to a contaminant. Since an odor may not be detected
05200 under certain circumstances, the absence of a garlic odor does
05250 not mean that hydrogen phosphide gas is absent. Observe proper
05300 application, aeration, reentry and disposal procedures specified
05350 elsewhere in the labeling to prevent overexposure.

05400 FREQUENT EXPOSURE TO LOW CONCENTRATIONS ABOVE PERMISSIBLE LEVELS
05450 OVER A PERIOD OF DAYS OR WEEKS MAY CAUSE POISONING.
05500

05600 NOTE TO PHYSICIAN

05700 Aluminum phosphide in pellets or their dust reacts with moisture
05750 from the air, water, acids, and many other liquids to release
05800 hydrogen phosphide (phosphine) gas. Mild exposure by inhalation
05850 causes malaise (indefinite feeling of sickness), ringing of
05900 ears, fatigue, nausea and pressure in chest which are relieved
05950 by removal to fresh air. Moderate poisoning causes weakness,
06000 vomiting, epigastric pain (pain just above the stomach), chest
06050 pain, diarrhea and dyspnea (difficulty in breathing). Symptoms
06100 of severe poisoning may occur within a few hours or up to
06150 several days, resulting in pulmonary edema (fluid in lungs) and
06200 may lead to dizziness, cyanosis (blue or purple skin color),
06250 unconsciousness and death.

064350 In sufficient quantity, hydrogen phosphide affects the liver,
064400 kidneys, lungs, nervous system and circulatory system.
064450 Inhalation can cause lung edema (fluid in lungs) and hyperemia
064500 (excess of blood in a body part), small perivascular brain
064550 hemorrhages and brain edema (fluid in brain). Ingestion can
064600 cause lung and brain symptoms, but damage to the viscera (body
064650 cavity organs) is more common. Hydrogen phosphide poisoning may
064700 result in (1) pulmonary edema, (2) liver elevated serum GOT, LDH
064750 and alkaline phosphatase, reduced prothrombin, hemorrhage and
064800 jaundice (yellow skin color) and (3) kidney hematuria (blood in
064850 urine) and anuria (abnormal or lack of urination). Pathology is
064900 characteristic of hypoxia (oxygen deficiency in body tissue).
064950 Treatment is symptomatic.

07150 CLASSIFIED BY UNDERWRITERS LABORATORIES, INC.(R) AS TO FIRE
07200 HAZARD ONLY WHEN USED SPECIFICALLY AS DIRECTED IN THE SEPARATE
07250 INSTRUCTIONS THAT ARE PART OF THE PRODUCT LABELING. DETIA
07300 PELLETS ARE NONCOMBUSTIBLE, BUT EXPOSURE TO MOIST AIR OR WATER
07350 RELEASES FLAMMABLE AND TOXIC PHOSPHINE GAS. SPONTANEOUS
07400 IGNITION MAY RESULT IF CONTACTED BY WATER, ACIDS OR CHEMICALS.
07450 955P

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07750 P

RIGHT PANEL

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DIRECTIONS FOR USE

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

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THESE BOOKLETS ARE ACCOMPANIED BY THE LABELING LISTED ABOVE. READ AND UNDERSTAND THE ENTIRE LABELING. ALL PARTS OF THE LABELING ARE EQUALLY IMPORTANT FOR SAFE AND EFFECTIVE USE OF THIS PRODUCT. CALL RESEARCH PRODUCTS COMPANY OR EPA IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABELING.

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STORAGE AND DISPOSAL

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STORAGE

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

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Do not store in buildings where humans or domestic animals reside. Refer to the booklet "Application Procedures for Detia(R) Pellets and Detia(R) Tablets" for additional storage instructions.

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DISPOSAL OF UNREACTED OR PARTIALLY REACTED PELLETS (From spills, leaking flasks or other sources)

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Unreacted or partially reacted Detia(R) Pellets are acutely hazardous. Improper disposal of this product is a violation of federal law.

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If this product cannot be disposed of by ordinary use or according to labeling instructions, contact your state pesticide or environmental control agency or the hazardous waste representative at the nearest EPA regional office for guidance. Do not contaminate water by disposal.

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Reacted pellets are not hazardous. For complete disposal, spill and leak procedures refer to the booklet "Application Procedures for Detia(R) Pellets and Detia(R) Tablets".

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10450 DISPOSAL OF EMPTY FLASKS

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10550 METHOD ONE: Triple rinse flasks and stoppers with water. Then
10600 offer for recycling or reconditioning, or puncture and dispose
10650 of them in a sanitary landfill or other approved site or by
10700 other procedures approved by state and local authorities.

10750 Dispose of rinsate in a sanitary landfill or by other approved
10800 procedures.

10850

10900 METHOD TWO: Remove lids and place empty flasks outdoors or in
10950 structure being fumigated until residue in flasks is reacted.

11000 Puncture and dispose of them in a sanitary landfill or other
11050 approved site or by other procedures approved by state and local
11100 authorities.

11150

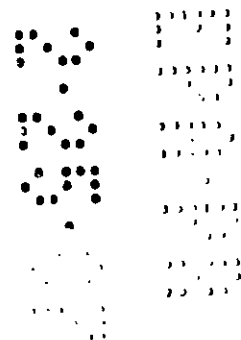
11200 GENERAL

11250

11300 Consult federal, state and local disposal authorities for
11350 approved procedures other than those given above. Approved
11400 procedures vary for different types of generators.

11450

11500 *If in doubt concerning whether the dust is reacted and/or
11550 concerning proper disposal techniques contact Research Products
11600 Company.



6144
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TOXIC HYDROGEN PHOSPHIDE (PHOSPHINE, PH₃) GAS

For retail sale to and use only by certified applicators for
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persons trained in accordance with the ~~attached~~ ^{this} product
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 Research Products Company product manual
which contains complete instructions for the safe use of
this pesticide.

APPLICATION PROCEDURES

FOR

Detia(R)

PELLETS

AND

Detia(R)

TABLETS

HYDROGEN PHOSPHIDE FUMIGANTS
FOR

USE AGAINST LISTED INSECTS
WHICH INFEST LISTED RAW AGRICULTURAL
COMMODITIES, ANIMAL FEEDS, PROCESSED FOODS,
NONFOOD PRODUCTS AND STORED TOBACCO

Research Products Company

Div. of McShares, Inc.

P. O. Box 1460

Salina, Kansas 67402-1460

EPA Establishment No. 33982WG01

EPA Registration No. 2548-63

EPA Registration No. 2548-62

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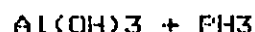
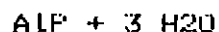
I. INTRODUCTION

A. HISTORY

The history of Detia(R) pesticides is long, dating back to the mid-1930's. In 1970 Detia(R) Gas EX-B was introduced into the United States. Detia(R) Tablets and Detia(R) Pellets were introduced in 1977. The manufacturer, Detia Freyberg GMBH, West Germany was the early pioneer in the development of hydrogen phosphide as a fumigant gas.

B. PRODUCT DESCRIPTION

Both Detia(R) Pellets and Detia(R) Tablets are a mixture of aluminum phosphide (57% by weight), ammonium carbamate and urea which is pressed into tablet and/or pellet form. The nearly spherical pellets are about 3/8" in diameter and weigh 0.6 grams each. The tablets are either disc shaped (4/5" in diameter and 1/5" thick) or spherical in shape (5/8" in diameter) and weigh 3.0 grams each. A pellet will produce about 0.2 grams hydrogen phosphide, the tablet about 1.0 gram. Both react with atmospheric moisture to produce hydrogen phosphide (PH₃) in the following way:



Warm, humid air accelerates the reaction while cool, dry air has the opposite effect. For example, when moisture and temperature of the fumigated commodity are high, decomposition of Detia(R) may be complete in less than 3 days. However at moderate temperatures and low humidities decomposition may require 5 days or more. This reaction starts slowly, gradually accelerates and then tapers off again as the aluminum phosphide is spent.

Detia(R) Pellets and Tablets also contain ammonium carbamate which liberates ammonia and carbon dioxide as follows:



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

Spent Detia(R) is a gray-white powder composed almost entirely of aluminum hydroxide and other approved inert ingredients. If properly exposed, the spent Detia(R) will normally contain only a small amount of unreacted aluminum phosphide and may be disposed of without hazard. It is not considered a hazardous waste. However, the partially spent residue from incompletely exposed Detia(R) requires special care. Precautions and instructions for further deactivation and disposal will be given later in this manual.

C. PRODUCT PACKAGING

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00154 The tablets are packaged 500 to a flask. The pellets are
00155 packaged 1660 to a flask.
00156

00157 The aluminum flasks in which they are packaged are
00158 resealable and seamless. Their shelf life is almost
00159 unlimited as long as the packaging remains well sealed and
00160 intact. Once opened, the flasks may be tightly resealed and
00161 stored for future use.
00162

00163 D. WHAT IS HYDROGEN PHOSPHIDE?

00164 Hydrogen phosphide, more commonly referred to as phosphine,
00165 is a colorless gas which is toxic to insects, humans, and
00166 other forms of animal life. It is very mobile with a high
00167 vapor pressure. Thus the penetrating capability of hydrogen
00168 phosphide is great. The combination of high molecular
00169 activity, vapor pressure and toxicity to insects at low
00170 dosages accounts for its wide acceptance as a fumigant.
00171

00172 E. SAFETY RECOMMENDATIONS

- 00173 1. Carefully read the labeling and follow instructions
00174 explicitly.
00175 2. Never work alone when applying fumigant from within the
00176 storage structure.
00177 3. Never allow uninstructed persons to handle Detia(R).
00178 4. Approved respiratory protection must be available
00179 for the fumigation of structures from within.
00180 5. Wear dry gloves made of cotton or other material when
00181 contact with tablets, pellets or their dust is likely.
00182 6. It is preferable to open fumigant containers in open air
00183 or near a fan that exhausts outside immediately. Never
00184 open in a flammable atmosphere.
00185 7. Do not allow Detia(R) to contact liquid water or to
00186 pile up.
00187 8. Dispose of empty containers and spent residual dust in a
00188 proper manner consistent with the label instructions.
00189 9. Post "DANGER" signs on fumigated areas.
00190 10. Notify appropriate company employees, and provide
00191 relevant safety information to local officials annually
00192 for use in the event of an emergency.
00193 U 11. Hydrogen phosphide fumigants are not to be used for vacuum
00194 fumigations.
00195 12. Exposure to hydrogen phosphide must not exceed the
00196 8 hour TWA of 0.3 ppm during application or a maximum
00197 concentration of 0.3 ppm after application is completed.
00198 This includes reentry into a structure.
00199 13. Fumigated finished foods and feeds must be aerated
00200 48 hours prior to offering to the end consumer.
00201 U 14. Transfer of a treated commodity to another site without
00202 complete aeration (down to 0.3 ppm maximum) is
00203 permissible provided the new site is placarded.
00204 15. Aerate contaminated clothing in well ventilated area
00205 prior to washing.
00206 16. Keep containers tightly closed except when removing
00207
00208

- product.
17. Do not reuse aluminum phosphide containers for any purpose other than recycling or reconditioning.
 18. OSHA recommends that the exposure screening of employees be conducted to detect impaired pulmonary function. OSHA recommends that any employees developing the above condition be referred for medical attention.

II. PRECAUTIONARY STATEMENTS

A. HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Keep Out of Reach of Children

DANGER-POISON

Aluminum phosphide in pellets, tablets or their dust can be fatal if swallowed. Do not get in eyes, in nose, on skin or on clothing. Do not eat, drink or smoke while handling aluminum phosphide fumigants. When the container is opened Detia(R) Tablets or Pellets will begin to release hydrogen phosphide (phosphine) which is an extremely toxic gas. Contact with water, acids and some other liquids will accelerate this reaction. If a garlic odor is detected, refer to section on ~~Industrial Hygiene Monitoring on page~~ ~~applicator~~ ~~200-201~~ exposure for appropriate monitoring procedures. Pure hydrogen phosphide 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 hydrogen phosphide gas is absent. Observe proper application, aeration, reentry and disposal procedures specified elsewhere in the labeling to prevent overexposure.

FREQUENT EXPOSURE TO CONCENTRATIONS ABOVE PERMISSIBLE LEVELS OVER A PERIOD OF DAYS OR WEEKS MAY CAUSE POISONING.

B. STATEMENT OF PRACTICAL TREATMENT

Symptoms of overexposure to hydrogen phosphide 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.

1. If gas or dust from tablets or pellets 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.
2. If the pellets, tablets or their dust are swallowed: Drink or administer one or two glasses of water and induce

vomiting by touching back of throat with finger, or if available, administer syrup of ipecac. Do not give anything by mouth if victim is unconscious or not alert.

3. If pellets, tablets or their dust gets on skin or clothing: Brush or shake material off clothes and shoes in well ventilated area. Allow clothes to aerate in a ventilated area prior to laundering. Do not leave contaminated clothing in occupied and/or confined area such as automobiles, vans, motel rooms, homes, etc. Wash contaminated skin thoroughly with soap and water.

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

C. NOTE TO PHYSICIAN

Aluminum phosphide tablets, pellets or their dust reacts with moisture from the air, water, acids and many other liquids to release hydrogen phosphide (phosphine) gas. Mild exposure by inhalation causes malaise (indefinite feeling of sickness), ringing of ears, fatigue, nausea and pressure in chest which are relieved by removal to fresh air. Moderate poisoning causes weakness, vomiting, epigastric pain (pain just above the stomach), chest pain, diarrhea and dyspnea (difficulty in breathing). Symptoms of severe poisoning may occur within a few hours or up 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 hydrogen phosphide 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. Hydrogen phosphide 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 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:

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

a. Complete rest 1-2 days during which the patient must be kept quiet and warm.

b. If the patient suffers from vomiting or increased blood sugar, appropriate solutions should be administered. Treatment with oxygen is recommended as is the administration of cardiac and circulatory stimulants.

2. In cases of severe poisoning (intensive care unit recommended):

a. Where pulmonary edema is observed, steroid therapy should be considered and close medical supervision is recommended. Blood transfusions may be necessary.

b. In case of manifest pulmonary edema, venesection should be performed under vein pressure control. Heart glycosides (I.V.) can be used in case of hemoconcentration. Venesection may result in shock. In the case of progressive edema of the lungs, immediately intubate and remove edema fluid and administer oxygen over-pressure respiration, as well as any measures required for shock treatment. In case of kidney failure, extracorporeal hemodialysis is necessary. There is no specific antidote known for this poisoning.

c. If pellets or tablets are ingested, induce vomiting. Flush the stomach with a diluted potassium permanganate solution or a solution of magnesium peroxide until flushing liquid ceases to smell of carbide. Thereafter, apply carbomedicinalis.

D. PHYSICAL AND CHEMICAL HAZARDS

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

It is preferable to open flasks of Detia(R) Tablets or Pellets in open air or near a fan which exhausts outside immediately. Never open in a flammable atmosphere because on rare occasions they may flash. When opening, point the container away from the face and body and slowly loosen the cap. These precautions will also reduce the applicator's exposure to hydrogen phosphide gas.

Pure hydrogen phosphide gas is practically insoluble in

water and oils and is stable at normal fumigation temperatures. However, it may react with certain metals and cause corrosion, especially at higher temperatures and relative humidities. Metals such as copper, brass and other copper alloys, and precious metals such as gold and silver are susceptible to corrosion by hydrogen phosphide. 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 electronic or electrical equipment should be protected or removed before fumigation. In most cases all electronic equipment must be removed. Hydrogen phosphide gas will also react with certain metallic salts and therefore, sensitive items such as photographic film, some inorganic pigments, etc., should not be exposed.

III. DIRECTIONS FOR USE

A. GENERAL

1. It is a violation of federal law to use this product in a manner inconsistent with its labeling. Detia(R) Tablets and Pellets are Restricted Use Pesticides due to the acute inhalation toxicity of hydrogen phosphide (phosphine, PH₃) gas. For retail sale to and use only by certified applicators for those uses covered by the applicator's certification or persons trained in accordance with ~~the attached~~ ^{this} product manual working under the direct supervision and in the physical presence of the certified applicator. Physical presence means on site or on the premises.
2. Detia(R) is a highly hazardous material and may be used only by individuals trained in its proper use. Before using, read and follow the label precautions and directions on the label and in labeling.

Additional copies of this manual are available from:

Research Products Company
P. O. Box 1460
Salina, Kansas 67402-1460
913-825-2181

3. At least two trained persons must be present when Detia(R) Pellets or Detia(R) Tablets are applied from within the space being treated or during reentry into a fumigated or partially aerated site. Only one trained person is required when the fumigant is applied from outside the area to be treated.

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4. Prior to applying this product, you must inspect the storage structure to determine if it can be made sufficiently gas tight. Decide how personal exposure monitoring should be conducted. Notify appropriate company employees and provide relevant safety information to local officials annually for use in the event of an emergency. Apply this fumigant in an effective and safe manner including emergency procedures etc.
 5. Shipholds, barges, containers on ships, railroad cars and containers shipped piggyback by rail may be fumigated intransit. However, fumigated trucks, vans, trailers and similar transport vehicles cannot be moved over public roads or highways until they are aerated.
 6. Pellets and/or tablets or their reacted residues must not come into contact with any processed food with the EXCEPTION that both can be added directly to processed brewers rice, malt, and corn grits used in the manufacture of beer.
 7. Protect copper, silver, gold and their alloys from corrosive exposure to hydrogen phosphide.
 8. Do not fumigate commodities with this product when commodity temperature is below 40 degrees F (5 degrees C).

B. EFFICACY

Complete control of listed insect pests is frequently not achieved. Factors contributing to less than 100% control are gas leakage, poor gas distribution, unfavorable exposure conditions, etc. In addition, some insects are less susceptible to hydrogen phosphide than others. To maximize control, extreme care must be observed in sealing, higher dosages must be used, exposure periods must be lengthened, proper application procedures must be followed, and temperature and humidity must be favorable.

C. USE PATTERN

1. INSECT PESTS

Both pellets and tablets are registered with the U. S. Environmental Protection Agency as an aid in the control of the following insects:

almond moth	khapra beetle
angoumois grain moth	lesser grain borer
bean weevil	maize weevil
cadelle	Mediterranean flour moth
cereal leaf beetle	pink bollworm
cigarette beetle	raisin moth
confused flour beetle	red flour beetle

00486	dermestid beetles	rice weevil
00488	dried fruit beetle	rusty grain beetle
00489	dried fruit moth	saw-toothed grain beetle
00490	European grain moth	spider beetles
00491	flat grain beetle	tobacco moth
00492	fruit fly	yellow meal worm
00493	granary weevil	Africanized bee
00494	greater wax moth	honey bee invested
00495	hairy fungus beetle	with tracheal mite
00496	Hessian fly	
00497	Indian meal moth	

2. COMMODITIES

Both Detia(R) Pellets and Tablets are registered by EPA for the fumigation of the following commodities.

a. Raw Agricultural Commodities

almonds	pistachio nuts
barley	popcorn
Brazil nuts	rice
cashews	rye
cocoa beans	safflower seed
coffee beans	sesame seed
corn	seed & pod vegetables
cottonseed	sorghum
dates	soybeans
filberts	sunflower seeds
flower seed	triticale
grass seed	vegetable seed
millet	walnuts
oats	wheat
peanuts	oilseeds <i>oilseeds</i>
pecans	

b. Processed Foods

The listed processed foods may be fumigated with Detia(R). Under no condition shall any processed food or bagged commodity come in contact with Detia(R) tablets, pellets or residual dust except that Detia(R) may be added directly to processed brewers rice, malt and corn grits for use in the manufacture of beer.

Processed candy and sugar
 Cereal flours and bakery mixes
 Cereal foods (including cookies, crackers, macaroni, noodles, pasta, pretzels, snack foods and spaghetti)
 Processed cereals *grains* (including milled fractions and packaged cereals)
 Cheese and cheese by-products

00542 Chocolate and chocolate products (assorted
 00544 chocolate, chocolate liquor, cocoa, cocoa powder,
 00545 dark chocolate coating and milk chocolate)
 00546 Processed coffee
 00547 Corn grits
 00548 Cured, dried and processed meat products and dried
 00549 fish
 00550 Dates
 00551 Dried eggs and egg yolk solids
 00552 Dried milk, dried powdered milk, nondairy creamers,
 00553 and nonfat dried milk
 00554 Dried or dehydrated fruits (apples, dates, figs,
 00555 peaches, pears, prunes, raisins and sultanas)
 00556 Figs
 00557 Malt
 00558 Peanuts
 00559 Processed herbs, spices, seasonings and condiments
 00560 Processed nuts (almonds, apricot kernels, Brazil
 00561 nuts, cashews, filberts, pecans, pistachio nuts and
 00562 walnuts)
 00563 Processed oats (including oatmeal)
 00564 Rice, ~~wild rice~~ brewers rice grits, enriched and polished
 00565 *leave in* → ~~wild rice~~
 00566 Soybean flour and milled fractions
 00567 Processed tea
 00568 Dried and dehydrated vegetables (beans, carrots,
 00569 lentils, peas, potato flour, potato products and
 00570 spinach)
 00571 Yeast (including primary yeast)
 00572
 00573 U c. Animal Feed and Feed Ingredients
 00574
 00575
 00576 U d. Nonfood Products
 00577
 00578
 00579 Animal hide
 00580 Clothing
 00581 Processed or unprocessed cotton, wool and
 00582 other natural fibers or cloth
 00583 Feathers
 00584 Furs
 00585 Human hair, rubberized hair, vulcanized hair, mohair
 00586 Leather products
 00587 Tobacco
 00588 Wood, cut trees, wood chips and wood and bamboo
 00589 products
 00590 Paper and paper products
 00591 Dried plants and flowers
 00592 Seeds (grass seed, ornamental herbaceous plant seed
 00593 and vegetable seed)
 00594 Straw or hay
 00595

D. DOSAGE GUIDE

Since hydrogen phosphide is a mobile gas and will penetrate

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to all parts of the storage structure, dosage must be based upon the total volume of the space being fumigated and not on the amount of bulk commodity it contains. For example, the same amount of Dettia(R) is required to treat a 30,000 bushel silo whether it is full or not. The following dosage ranges are allowed for bulk and space fumigations.

DOSAGE GUIDE

PRODUCT	PER 1000 CU. FT.	PER 1000 BU. STORAGE CAPACITY
PELLETS	100 - 725	125 - 905
TABLETS	20 - 145	25 - 180

NOTE: The maximum dosage allowed for dates, nuts and dried fruits is 40 tablets or 200 pellets per 1000 cubic feet.

These dosages should not be exceeded. It is important to realize that shortened exposure period cannot be compensated for with an increased dosage.

The wide dosage ranges listed above are designed to accommodate the variety of fumigation situations that might occur. The major factor in selecting dosage is the capability of the structure to hold hydrogen phosphide during the exposure period and thus obtain and sustain lethal concentrations throughout. It is more difficult to obtain penetration of gas throughout the structure in bulk stored commodities. An example of this is the treatment of grain stored in flat storage in which fumigant cannot be uniformly added to the grain but must be probed or surface applied.

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

RECOMMENDED DOSAGES FOR SEVERAL TYPES OF FUMIGATIONS

TYPE OF FUMIGATION	DOSAGE RANGE		UNIT OF VOLUME*
	PELLETS	TABLETS	
1. SPACE (INCLUDING PACKAGED COMMODITIES) A. MILLS, WAREHOUSES, ETC.	100-300	20-60	1000 CU. FT.

00455	B. BAGGED COMMODITIES	150-300	30-60	1000 CU. FT.
00457	C. DRIED FRUITS, NUTS	100-200	20-40	1000 CU. FT.
00458	AND DATES			
00459	D. STORED TOBACCO	100-200	20-40	1000 CU. FT.
00460				
00461	2. BULK STORED COMMODITIES			
00462	A. VERTICAL STORAGE	150-300	30-60	1000 CU. FT.
00463		200-375	40-75	1000 BUSHELS
00464	B. TANKS	200-350	40-70	1000 CU. FT.
00465		250-450	50-90	1000 BUSHELS
00466	C. FLAT STORAGE	250-725	50-145	1000 CU. FT.
00467	(LOOSE CONSTRUCTION)	325-900	65-180	1000 BUSHELS
00468	D. FARM BINS	350-725	70-145	1000 CU. FT.
00469		450-900	90-180	1000 BUSHELS
00470	E. RAIL CARS	150-350	30-70	1000 CU. FT.
00471		200-450	40-90	1000 BUSHELS
00472	F. BUNKERS, TARPED	150-350	30-70	1000 CU. FT.
00473	GROUND STORAGE	200-450	40-90	1000 BUSHELS
00474	G. BARGES	150-400	30-80	1000 CU. FT.
00475		200-375	40-75	1000 BUSHELS
00476	H. SHIPHOLDS	150-330	30-66	1000 CU. FT.
00477		200-413	40-83	1000 BUSHELS
00478				

*Volume or storage capacity of the area being treated.

The upper dosages listed are recommended in structures that are of loose construction.

E. SEALING

There are many factors affecting a fumigation but most are minor compared to sealing. Proper sealing is necessary to insure effective control of insects and to protect man and other forms of life in adjoining enclosed areas from hydrogen phosphide during the fumigation. Proper sealing must include the closure of all openings except tiny holes or narrow cracks that are very difficult to seal. Maximum results however can be achieved if even these are sealed. Polyethylene sheeting and masking or duct tape are adequate sealing materials. Contact Research Products Company for additional information.

F. EXPOSURE GUIDELINES

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

00705	TEMPERATURE TO WHICH	PELLETS	TABLETS
00706	FUMIGANT AND/OR		
00707 U	INSECTS ARE EXPOSED	-----	-----
00709			

00710	Below 40° F	Do Not Fumigate	Do Not Fumigate
00712	40° F - 53° F	8 days(192 hrs.)	10 days(240 hrs.)
00713	54° F - 59° F	4 days (96 hrs.)	5 days (120 hrs.)
00714	60° F - 68° F	3 days(72 hrs.)	4 days(96 hrs.)
00715	Above 69° F	2 days(48 hrs.)	3 days(72 hrs.)

The length of the fumigation must be great enough so as to provide for adequate control of the insect pests which infest the commodity being treated. It is necessary to lengthen the fumigation at lower temperatures since insects are more difficult to kill under these conditions. In this regard, the temperature to which the insects are exposed is the critical factor.

There is little to be gained by extending the exposure period if the structure to be fumigated has not been carefully sealed. Careful sealing is required to ensure that adequate gas levels are retained. Proper application procedures must be followed to provide satisfactory distribution of hydrogen phosphide gas particularly in the fumigation of bulk commodity contained in large storages.

When pellets or tablets are not uniformly added to a bulk commodity mass (i.e., surface application or shallow probing) exposure times must be substantially lengthened to allow penetration of gas throughout the commodity. As a "rule of thumb" a minimum of 1 day should be added to the exposure time listed on page for each 10 feet the gas must penetrate downward. It is preferable to add 2 days for each 10 feet. Some structures can only be treated when completely tarped.

In addition the fumigation period should be long enough that the production of hydrogen phosphide has essentially ceased. This will minimize worker exposure during further storage and/or processing of the treated bulk commodity as well as reduce hazards in the disposal of spent aluminum phosphide products remaining after space fumigations. Temperature and humidity to which Detia(R) Pellets and Tablets are exposed are important to this determination since both lower temperatures and/or dry air retard gas release.

Consequently, exposure periods recommended in the table are minimum periods and may not be adequate to control all stored product pests under all conditions. This is particularly true at lower temperatures (below 60 degrees F). Nor will they always provide for the cessation of the production of hydrogen phosphide when pellets or tablets are exposed to inadequate moisture levels. Grain at 70 degrees F and 12 percent moisture provides more than adequate conditions for fumigation.

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00764 If the temperature to which the insects are exposed is
00765 warmer than the temperature to which the pellets or tablets
00766 are exposed (i.e. may occur in a winter space fumigation),
00767 it may be possible to obtain an effective insect kill before
00768 the fumigant is totally spent. In this event it is
00769 permissible to conclude a space fumigation as soon as an
00770 effective kill has been achieved, however in this event the
00771 pellets or tablets must be deactivated prior to disposal.
00772 See deactivation instructions on page of this manual.
00773
00774 Whenever possible, exposure periods should exceed minimum
00775 periods listed above. Remember, the key to effective
00776 results lies with correct dosage, long exposure periods,
00777 proper application procedures and well sealed enclosures.
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00780 R G. APPLICATION PROCEDURES

00782 1. GENERAL STATEMENT

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

2. APPLICATION PROCEDURES FOR DIRECT ADDITION OF PELLETS OR TABLETS TO BULK COMMODITIES.

a. Commodities: Listed raw agricultural commodities, seeds, wood chips, animal feed and feed ingredients; and processed brewers rice, malt and corn grits used in the manufacture of beer.

b. Storage Structures: Bins, tanks, silos, granaries, flat storage, bunkers, bulk rail cars, etc.

c. Procedures For Vertical Storage: (concrete upright bins and other silo type bins that can be quickly transferred)

(1) For best results all cracks and openings with the exception of fill openings should be closed or sealed prior to fumigating the bin. To this end, vents near the bin top connecting adjacent bins should be sealed prior to the fumigation. If the bin is entered to seal these openings after the fumigant has been added, proper respiratory protection must be worn.

(2) Determine minimum exposure time based on commodity temperature and moisture. At commodity moistures of below 11.5%, exposure periods should be extended to obtain complete reaction of the fumigant.

(3) Calculate the number of pellets or tablets needed and the rate at which they must be added based upon the rate at which the bin will be filled.

(4) Pellets or tablets may be applied by hand or by an automatic dispenser on the headhouse/gallery belt or into the fill opening. An automatic dispenser may also be used to add fumigant into the upleg of the elevator. Add fumigant in as continuous a manner as possible to the commodity stream.

(5) Seal the bin deck openings after the application is complete.

(6) Vertical bins can also be fumigated by deep

probing.

- (7) Bins requiring more than 24 hours to fill should not be fumigated by direct addition as the bin is filled. These bins must be fumigated by probing, surface application, or other appropriate methods.
- (8) Post "DANGER" placards on all entrances and on the discharge gate.
- (9) Bins needn't be aerated until they are transferred. Workers must not be over exposed during this transfer.

d. Procedures For Elai Storage: (rectangular shaped bins, tanks, farm style bins and other horizontal bins)

- (1) Check the storage for tightness.
- (2) To the extent practical seal any vents, cracks or other sources of leaks.
- (3) Determine application procedure to be used. This can include shallow probing, deep probing, uniform addition as the bin is filled, or surface application.

Bins requiring more than 24 hours to fill should not be fumigated by addition as the bin is filled since large quantities of gaseous fumigant may escape before the bin is finally sealed.

Probes should be inserted at horizontal intervals along the length and width of the bin. The number of pellets or tablets per probe is determined by dividing the total number of pellets or tablets by the total number of probings. Pellets or tablets will be dropped into the probes at intervals as the probe is withdrawn. Releasing all the fumigant into the probe at once may retard the production of hydrogen phosphide and might cause an ignition of gas trapped in the clump of pellets or tablets.

Surface application can be used if the bin can be made sufficiently gas tight to contain the fumigant long enough for it to penetrate throughout. In this instance it is advisable to place 1/4 of the dosage in the floor level aeration ducts. This fumigant must not contact liquid phase water.

- (4) Determine dosage and exposure time. The dosage will depend in large part on a combination of the tightness of the seal, the application procedure and the grain depth. The poorer the seal and the farther the gas must penetrate to

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reach throughout the bin the higher the required dosage will be. For good results add the length of time required for the gas to penetrate throughout the bin to the exposure time given on page of this manual. To the extent possible, lengthen the exposure period. As a "rule of thumb" a minimum of 1 day should be added to the exposure time listed on page for each 10 feet the gas must penetrate downward. It is preferable to add 2 days for each 10 feet.

Exposure periods listed on page of this manual should also be lengthened at commodity moistures below 11.5% to obtain complete reaction of the fumigant.

- (5) Arrange enough applicators and other workers to complete the job quickly enough to avoid excessive exposure to hydrogen phosphide gas. The production of gas during application can be significantly retarded by venting flasks outdoors, conducting fumigations when temperatures in the bin are lowest, and other work practices. It is often advisable to wear approved respiratory protection from start to finish. Monitoring with a suitable detection device is required to assure that the 0.3 ppm 8 hour TWA is not exceeded. See "Industrial Hygiene Monitoring" section on page of this manual.
 - (6) It is often advisable as an additional sealing measure to cover the commodity with plastic tarps.
 - (7) Seal all remaining exits.
 - (8) Post "DANGER" placards on and lock all entrances.
 - (9) The bin needn't be aerated unless reentry is required. Consult safety procedures listed elsewhere in labeling.
- e. Procedures for Bunkers and Other Outdoor-Tarped Commodities:
- (1) See steps "3" and "4" in section "d" above.
 - (2) When tarps are being spread over ground storage they should be glued, clamped or otherwise sealed together. Sand or water snakes can be used for a ground seal.
 - (3) Application may be made through slits in the

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00949 tarp or the tarp can be spread over the
 00950 commodity after application. Seal slits after
 00951 application.
 00952

00953 (4) Post "DANGER" placards.

00954 (5) This is an outdoor application so safety
 00955 monitoring and respiratory equipment are not
 00956 required.
 00957
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00959 U f. Procedures for Rail Cars, Containers, Trucks, and
 00962 U other Transport Vehicles:

00963 Rail cars, containers, trucks, and other transport
 00964 vehicles loaded with bulk commodities to which
 00965 Deltia(R) Tablets or Pellets may be added are treated
 00966 in essentially the same way as any other storage
 00967 facility. Deltia (R) may be added as the vehicle is
 00968 being filled, the dose may be scattered over the
 00969 surface after loading has been completed or the
 00970 tablets or pellets may be probed below the surface.
 00971 Carefully seal any vents, cracks or other leaks
 00972 particularly if the fumigation is to be carried out
 00973 intransit. Remember, rail cars and containers
 00974 shipped piggyback by rail may be fumigated
 00975 intransit, but it is not legal to move trucks,
 00976 trailers, etc., over public roads or highways until
 00977 they are aerated. See section "III.J" on page
 00978 of this manual for recommendations on placarding,
 00979 commodity aeration and training of persons
 00980 authorized to remove placarding.
 00981

00982 Notify the consignee if the commodity is to be shipped
 00983 under fumigation. If the consignee is unfamiliar with
 00984 proper handling of fumigated rail cars, it is recommended
 00985 that they be provided with the necessary information.
 00986
 00987

00988 U g. Procedures for Farm Storage:

00990 (1) General

00991 Since on farm storage is almost always flat storage,
 00992 refer to "Procedures for Flat Storage" on page of
 00993 this manual. The instructions which follow provide
 00994 additional guidance.
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00997 (2) Sealing

00998 Leakage is the single most important cause of
 00999 failure in the treatment of farm bins. Since
 01000 these bins are usually small by comparison they
 01001 have a higher leakage area in proportion to
 01002 their capacity. Most wooden granaries are so
 01003 porous that they cannot be successfully
 01004 fumigated unless they are completely covered
 01005

with plastic sheeting or similar tarp. Steel bins are also usually of very loose construction and therefore require much attention to sealing. All vents and aeration ducts must be tightly sealed using 4 mil polyethylene sheeting or its equivalent. The plastic must be sealed directly to the metal with tape or other adhesive. It is not sufficient to "cinch up" the plastic as with a belt. The surface of the grain should be covered with plastic sheeting after Detia(R) has been applied. Tarping of the grain surface will greatly reduce leakage. Other sealing techniques are recommended i.e. closure of all large cracks with caulking, foam insulation or other sealant. Sealing these cracks will greatly reduce the required dosage. Two mil or thicker plastic can be used for tarping the grain surface, however the plastic used on the outside of the bin should be at least 4 mils. When an entire structure is tarped the plastic must be at least 6 mils thick to prevent excessive tearing during the fumigation.

(3) Dosage

Unless all the large cracks are sealed as described above the dosage recommended should be 90-180 tablets or 450-900 pellets per 1000 bu. capacity of the space under the plastic tarp.

(4) Additional Application Instructions

Probing tablets or pellets into the grain mass is the recommended method of application. Probe insertions should be scattered evenly over the surface. A rigid PVC pipe, about 5 to 7 feet long and 1 1/4 inch diameter can be used. In this event, use about 20-50 tablets or 100-250 pellets per probe. The fumigant is gradually released into the probe as it is withdrawn from the grain. Releasing all the fumigant into the probe at once may retard the production of hydrogen phosphide and might cause an ignition of gas trapped in the clump of pellets or tablets. Place no more than 1/4 of the total dose in floor level aeration ducts. Be sure the inside of the aeration duct is dry before adding the pellets or tablets. Addition of Detia(R) to water in an aeration duct can cause a fire. Seal the aeration fan as described above.

(5) Additional Precautions

Do not fumigate bins that will be entered by humans or animals prior to aeration. Do not fumigate areas which house equipment containing copper or other metals which will be corroded by hydrogen phosphide. This includes electrical and electronic equipment.

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Place "DANGER" placards on entrances to the bin and near the ladder. See section on "PLACARDING OF FUMIGATED AREAS" on page of this manual.

If monitoring equipment is not available, an approved canister respirator must be worn for indoor application. If an approved respirator is not available, application must be done from outside of the site to be fumigated. Also refer to all other precautions given in this manual.

(6) Post Aeration Treatment

It is good practice to spray the grain surface with an approved insecticide protectant to retard reinfestation and to fog the space above the grain to kill existing adult flying insects.

3. APPLICATION PROCEDURES FOR SPACE FUMIGATIONS.

a. Procedures for Mills, Warehouses, Food Processing Plants, Chambers, Trucks, Trailers, Containers and other Static Sealable Enclosures

- (1) Determine the dosage of tablets or pellets to be applied based upon the following parameters for space fumigation:

The volume of the structure
The air and/or commodity temperature
The general tightness of the structure to be fumigated.

- (2) Determine exposure period based on the "Exposure Guide" on page of this manual.

- (3) Seal all openings except for the door being used to enter and leave. Pay particular attention to openings to connecting or adjacent structures.

- (4) Place trays or sheets of Kraft paper or foil, up to 12 sq. ft. (1.1 sq. M) in area, on the floor throughout the structure to hold Detia(R) Tablets or Pellets.

- (5) Spread Detia(R) on the sheets at a density no greater than 30 tablets per sq. ft. or 75 pellets per sq. ft. This corresponds to slightly more than one half flask of tablets or one half flask of pellets per 3'x4' sheet. Check to see that they have not piled up and that they are spread out evenly to minimize contact between the individual tablets or pellets.

- 01117 (6) Pellets and tablets may also be applied in moisture
01118 permeable envelopes to fumigate commodities. When
01119 fumigating in this way the envelopes must be fastened
01120 to a substantial support. Place no more than 10
01121 pellets nor more than 2 tablets into one envelope.
01122 Detia(R) Pellets and Tablets shall not be placed in or
01123 attached to, commodity packages intended for
01124 retailers.
01125
01126 (7) When fumigating multiple story buildings, each
01127 floor is considered a separate enclosure. Application
01128 should begin with the top floor and end with the ground
01129 floor.
01130
01131 (8) Seal all remaining exits.
01132
01133 (9) Placard and lock all entrances.
01134
01135 (10) Aerate the structure upon completion of the exposure
01136 period. Standard aeration time and practices should be
01137 developed using a low level detection device.
01138 Practices will vary widely at different sites, but will
01139 usually include opening windows, doors, and vents and
01140 activating any ventilation equipment. Reentry of an
01141 unaerated structure must be done in pairs wearing
01142 appropriate respiratory equipment.
01143
01144 (11) Dispose of remaining dust from tablets or pellets.
01145 SEE "STORAGE AND DISPOSAL" on page of this
01146 manual. Avoid breathing the dust.
01147
01148 U b. Procedures for Space Fumigations Under Tarps:
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01151 (1) General
01152 Follow the pertinent instructions given immediately
01153 above in part "a".
01154
01155 Use of plastic sheeting or tarpaulins to provide a
01156 fumigation enclosure is one of the easiest and least
01157 expensive means for providing relatively gas tight
01158 enclosures which are very well suited for fumigation.
01159 Plastic tarps are penetrated only very slowly by
01160 hydrogen phosphide gas, and tight coverings are readily
01161 formed from the sheets. The volume of these enclosures
01162 may vary widely.
01163
01164 (2) Sealing
01165 An enclosure suitable for fumigation may be formed by
01166 covering packaged commodities with plastic sheeting.
01167 The sheets may be taped, glued, or clamped together to
01168 provide a sufficient width of material to ensure that
01169 adequate sealing is obtained. If the flooring upon
01170 which the commodity rests is of wood or other porous
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material, it should be repositioned onto plastic sheeting prior to covering for fumigation. The plastic covering of the pile may be sealed to the floor using tape, glue, sand or water snakes, by shoveling soil or sand onto the ends of the plastic covering or by other suitable procedures. The plastic covering should be reinforced by tape or other means around any sharp corners or edges in the stack so as to reduce the risk of tearing. Thinner sheeting, about 2 mils, is suitable for most indoor tarp fumigations. However, 4 mil plastic or thicker is more suitable for outdoor applications where wind or other mechanical stresses are likely to be encountered.

(3) Additional Application Instructions

Tablets or pellets may be applied under the edge of the tarp or through slits. The pellets or tablets should be protected from condensation or other source of water. The slits in the covering should be carefully taped to prevent loss of gas once the dose has been applied. Pellets or tablets must be placed in a single layer. Care should be taken to prevent the plastic tarp from covering the pellets or tablets in such a way as to prevent contact with moist air or to confine the gas. Refer to other sections for dosage and exposure times.

(4) Additional Precautions

See appropriate precautions if the fumigation is conducted indoors as opposed to outdoors. Indoor fumigation precautions are handled as any other situation where the application is made from outside the area being fumigated (i.e. the adding of pellets or tablets to a dispenser for uniform addition to grain). Workers may occupy adjacent indoor areas but they must be protected from overexposure to hydrogen phosphide by adequate sealing, ventilation or as a last resort, respiratory equipment.

Do not walk on stacks during the fumigation.

Place "DANGER" placards at conspicuous points on the enclosure.

Follow precautions listed elsewhere in labeling.

(5) Aeration

Precautions must be taken to assure that exposure to hydrogen phosphide in excess of allowed limits does not occur both during the fumigation and aeration.

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4. APPLICATION PROCEDURES FOR INTRANSIT FUMIGATION OF SHIP
HOLDS

a. General Information:

- (1) Shipboard fumigation is also regulated by the U.S. Coast Guard Regulations 46 CFR 147A.
- (2) This product is toxic to fish. Keep out of lakes, streams and other aquatic environments. Do not contaminate water by cleaning equipment or disposal of wastes.

b. Pre-Voyage Fumigation Procedures and Precautions:

- (1) Refer to and comply with the regulations and procedures found in U.S. Coast Guard Regulation, 46 CFR 147A.
- (2) Prior to fumigating a vessel for intransit cargo fumigation, the master of the vessel or his representative, and the fumigator must determine whether the vessel is suitably designed and configured so as to allow for safe occupancy by the ship's crew throughout the duration of the fumigation/voyage.
- If it is determined that the design and configuration of the vessel does not allow for safe occupancy by the ship's crew throughout the duration of the fumigation/voyage, then the vessel will not be fumigated unless all crew members are removed from the vessel. The crew members will not be allowed to re-occupy the vessel until the vessel has been properly aerated and a determination has been made by the master of the vessel and the fumigator that the vessel is safe for occupancy.
- (3) The person responsible for the fumigation must notify the master of the vessel, or his representative of the requirements relating to personal protection equipment*, low range 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.
- (4) Seal all openings to the cargo hold or tank using suitable, water proof, gas tight materials. Lock and/or otherwise secure all openings, manways, etc.

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used to enter the hold. Post appropriate "DANGER" placards on same.

(5) On tankers the over-space pressure relief system of each tank must be sealed by (1) the closing of appropriate valves and (2) sealing the openings into the over-space with gas tight materials.

(6) Contact appropriate authorities.

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

(8) During the fumigation or until a manned vessel leaves port or the cargo is aerated, the person in charge of the fumigation shall insure that a qualified person using gas or vapor detection equipment test spaces adjacent to the fumigated cargo area 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.

(9) Review with the Master, or his representative, the voyage precautions and procedures.

*Personal protection equipment means a respirator or gas mask fitted with a canister designed for phosphine gas which is approved by NIOSH/MSHA. A gas mask and canister is approved for use up to 15 ppm. Above 15 ppm or at unknown concentrations a SCBA or its equivalent must be used.

c. Procedures for Bulk Dry Cargo Vessels and Tankers:

(1) Apply either the tablets or pellets by scattering them uniformly onto the commodity surface utilizing as much of the total surface area as possible, or insert them uniformly into the commodity mass by hand or with probes to any depth desired.

(2) Close and secure hatch covers, tank tops, butterworths, etc. immediately following application.

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d. Voyage Precautions and Procedures:

- (1) At regular intervals monitor spaces adjacent to areas containing fumigated cargo and all regularly occupied areas for fumigant leakage using appropriate gas detection equipment.

Special attention should be given to living quarters, kitchens, storerooms, mess halls, keel ducts, day rooms, the bridge, engine room and any other enclosed spaces occupied or frequented by crew members during a voyage.

- (2) If hydrogen phosphide is detected, evacuate the space or area, locate and seal off the source of the leak wearing appropriate respiratory protection equipment. Ventilate the area before allowing occupants to return.

- (3) Do not enter fumigated holds or tanks.

- (4) Do not open, ventilate or aerate the fumigated holds during the voyage.

e. Precautions and Procedures During Discharge:

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

f. Personal Protective Equipment and Monitoring:

- (1) Fully loaded holds on dry bulk carriers are considered an outdoor fumigation.

- (2) Tanker holds which must be entered to fumigate and partially loaded holds on dry bulk carriers are fumigated from within the area being treated.

- (3) See sections "I" and "M" on pages of this manual for requirements.

- (4) If hydrogen phosphide is detected a minimum of two qualified persons on ship should wear the gas mask and canister described above while aerating the area and locating and sealing the leak.

5. APPLICATION PROCEDURES FOR INTRANSIT FUMIGATION OF CONTAINERS ON SHIPS

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- a. When fumigating bulk commodities to which direct addition of pellets or tablets is not allowed or packaged commodities, refer to section "3.a" on page of this manual. Do not place tablets loosely on trays or sheets of paper or foil since movement of the container may disrupt the correct placement of pellets or tablets. Instead they must be applied in moisture permeable envelopes as described in section "3.a.(6)".
- b. When fumigating a commodity by direct addition of pellets or tablets, refer to Section "2.f." on page of this manual.
- c. Intransit fumigation of containers on ships is regulated by Coast Guard Regulation 46 CFR 147A and the applicator or shipper must obtain and comply with U.S. Coast Guard Special permit No. 52-75. Contact the Coast Guard or Research Products Company for additional information.
- d. Comply with general precautions given in labeling.

6. APPLICATION PROCEDURES FOR FUMIGATION OF BARGES

- a. General
Since barge fumigation is a type of flat storage fumigation as well as having similarities in common with a ship, refer to the sections "Procedures for Flat Storage" on page and "APPLICATION PROCEDURES FOR INTRANSIT FUMIGATION OF SHIP HOLDS" on page .

Barge fumigation is regulated by the U. S. Coast Guard Regulations 46 CFR 147A as modified by U. S. Coast Guard Special Permit 2-75. The shipper or fumigator must possess this permit prior to fumigating. To obtain this permit contact

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

- b. Sealing
Special care must be taken in determining whether a barge is suitable for fumigation. Excessive leakage may occur through poorly sealed hold covers.

7. APPLICATION PROCEDURES FOR FUMIGATION OF RODENT AND MOLE BURROWS

- a. List of Burrowing Pests
Dettia(R) Tablets and Pellets may be used out of doors only for the control of the following burrowing rodents and moles: marmot sp. - woodchucks and yellow-belly marmots

(rockchucks), prairie dogs (except Utah prairie dog), Norway and roof rats, mice, ground squirrels, moles (except in Indiana), voles, gophers and chipmunks (except in California).

b. Application Instructions

Add from 1 to 4 Dettia(R) Tablets or 5 to 20 Dettia(R) Pellets to each burrow opening. Seal tightly by shoveling soil over the entrance. Place the pellets or tablets far enough down the burrow that the soil used to plug the burrow doesn't cover the pellets or tablets, slowing down their action. Where possible, subsurface tunnels or runways should be treated every 5 to 10 feet with a dose of 2 to 4 tablets or 10 to 20 pellets. Use lower rates in smaller burrows, in tight soils, under moist soil conditions and higher rates in larger burrows, in porous soils and/or when soil moisture is low. In extremely dry or porous soil, it is sometimes not possible to obtain satisfactory results. This is particularly true in instances where the burrow systems are extensive such as moles or gophers. It is always better not to fumigate during extended periods of dry weather. Treat reopened burrows and fresh runways a second time 1 to 3 days after the initial treatment.

Dettia(R) may be used out of doors only, for control of burrowing pests. Do not use within 15 feet (5 meters) of inhabited structures. Do not apply to burrows which may open under or into occupied buildings.

c. Environmental Hazards

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

d. Endangered Species Restrictions

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

Areas Inhabited by Endangered or Threatened Species
(1) Black-footed ferret - State of Arizona, Colorado,

- 01504 Kansas, Montana, Nebraska, New Mexico, North Dakota,
01507 Oklahoma, South Dakota, Texas, Utah and Wyoming.
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01509 (2) Blunt-nosed leopard lizard - Counties of Kern,
01510 Kings, Fresno, Madera, Merced, and Tulare in the state
01511 of California.
01512
01513 (3) Desert tortoise - Washington County in the state of
01514 Utah.
01515
01516 (4) Eastern indigo snake - States of Florida and
01517 Georgia.
01518
01519 (5) San Joaquin kit fox - Counties of Kern, Kings,
01520 Fresno, Merced, Monterey, San Benito, San Luis Obispo,
01521 Santa Barbara, Tulare and Ventura in the state of
01522 California.
01523
01524

01525 U e. Special Local Restrictions
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- 01527
01528 (1) NORTH CAROLINA
01529 Detia(R) Tablets and Pellets may only be used
01530 for control of rats and mice in the state of
01531 North Carolina. Use against other pests is not
01532 permitted.
01533
01534 (2) OKLAHOMA
01535 A special permit for black-tailed prairie dog control
01536 by poisoning is required in Oklahoma. Contact the
01537 Oklahoma State Department of Wildlife Conservation to
01538 obtain this permit.
01539
01540 (3) WISCONSIN
01541 A state permit is required for use of pesticides in
01542 Wisconsin to control small mammals, except rats or
01543 mice. Please contact your local Department of Natural
01544 Resources office for information.
01545
01546 (4) INDIANA
01547 Use of Detia(R) Tablets or Pellets for mole
01548 control is not legal in the state of Indiana.
01549
01550 (5) MISSOURI
01551 A state permit is required for use of pesticides in
01552 Missouri to control small mammals, except rats and
01553 mice. Please contact the Missouri Department of
01554 Conservation office for information.
01555
01556 (6) KANSAS
01557 A special permit for black-tailed prairie dog control
01558 by poisoning is required in Kansas. Contact the Kansas
01559 Fish and Game Commission to obtain this permit.
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(7) CALIFORNIA

Use of Detia(R) Tablets and Pellets for chipmunk control is not legal in the state of California.

8. APPLICATION PROCEDURES FOR FUMIGATION OF BEEHIVES, SUPERS AND OTHER BEEKEEPING EQUIPMENT

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

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

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01582 Q H. PROTECTIVE CLOTHING

01583 Wear dry gloves made of cotton or other material when
01584 contact with tablets, pellets, or their dust is likely.
01585 Wash hands after use.
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01587 I. RESPIRATORY PROTECTION

01588 1. WHEN RESPIRATORY PROTECTION MUST BE WORN

01589
01590 NIOSH/MSHA approved respiratory protection must be worn
01591 during exposure to concentrations in excess of permitted
01592 limits or when concentrations are unknown.
01593

01594 2. PERMISSIBLE GAS CONCENTRATION RANGES FOR RESPIRATORY
01595 PROTECTION DEVICES
01596

01597 A NIOSH/MSHA approved, full face gas mask - hydrogen
01598 phosphide canister combination may be used at levels up
01599 to 15 ppm or to escape from levels up to 1500 ppm.
01600 Above this level or in situations where the hydrogen
01601 phosphide concentration is unknown, a NIOSH/MSHA
01602 approved, self-contained breathing apparatus (SCBA) or
01603 its equivalent must be used. The NIOSH/OSHA Pocket
01604 Guide, 8-85, DHEW/NIOSH 78-210, lists these and other
01605 types of approved respirators and the concentration
01606 limits of which they may be used.
01607

01608 3. REQUIREMENTS FOR AVAILABILITY OF RESPIRATORY PROTECTION

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01610 Respiratory protection must be available at the site of
01611 application in case it is needed when applying Deltia(R)
01612 from within the structure being fumigated. An approved
01613 full face gas mask - phosphine canister combination or
01614 self-contained breathing apparatus (SCBA) or its
01615 equivalent must be available at the site of application.
01616 If SCBA or its equivalent is not available at the
01617 application site, it must be available locally, for
01618 example, at a fire station or rescue squad.
01619

01620 Respiratory protection need not be available for
01621 applications from outside the area to be fumigated such
01622 as addition of tablets or pellets to automatic
01623 dispensing devices, etc., if exposures above the
01624 permitted exposure limit will not be encountered.
01625

01626 Respiratory protection need not be available for outdoor
01627 applications.
01628

01629 If monitoring equipment is not available on a farm and
01630 application cannot be done from outside the structure,
01631 an approved canister respirator must be worn during
01632 application from within the enclosed indoor area.
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01635 J. PLACARDING OF FUMIGATED AREAS

The applicator must placard or post all entrances to the fumigated area with signs bearing:

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 phosphine gas). If incompletely aerated commodity is transferred to a new site, the new site must also be placarded and workers must not be exposed to more than 0.3 ppm phosphine."
4. The date and time fumigation begins and is completed.
5. Name of fumigant used.
6. Name, address, 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 in order to keep unauthorized persons away. For railroad hopper cars, placarding must be placed securely on both sides of the car near the ladders and next to the top hatch into which the fumigant is introduced.

Do not remove a placard until the treated ^{commodity} ~~area~~ is aerated down to 0.3 ppm or less. To determine whether aeration is complete, each fumigated site or vehicle must be monitored and shown to contain 0.3 ppm or less hydrogen phosphide gas in the air space around and, when feasible, in the mass of the commodity.

Transfer of incompletely aerated commodity to a new site is permissible, however the new storage must be placarded if it contains more than 0.3 ppm hydrogen phosphide.

Workers who handle incompletely aerated commodity must be informed and appropriate measures must be taken (i.e., ventilation or respiratory protection) to prevent exposures from exceeding the exposure limits for hydrogen phosphide.

It is recommended that the person responsible for removing the placards be familiar with the physical, chemical and toxicological properties of hydrogen phosphide. They should also be knowledgeable in how to take gas readings, exposure limits, symptoms and first aid treatment for hydrogen phosphide poisoning.

K. GAS DETECTION EQUIPMENT

There are several reliable devices marketed. One type is the hand pump when used in conjunction with the appropriate detector tube. They are portable, simple devices and do not require intensive training or elaborate supporting equipment to operate. Furthermore, they are

01690 inexpensively adaptable to remote monitoring procedures and
01691 will measure concentrations of hydrogen phosphide in air in
01692 trace amounts on up. Use instructions are enclosed with
01693 each purchase. Consult your local supplier of such
01694 equipment or contact Research Products Company for more
01695 information.
01696

01697 L. AERATION OF FUMIGATED COMMODITIES

01698 1. FOODS AND FEEDS

01699 Tolerances for hydrogen phosphide residues have been
01700 established at 0.1 ppm for animal feeds and 0.01 ppm for
01701 finished foods. To guarantee compliance with these
01702 tolerances, it is necessary to aerate these commodities
01703 for 48 hours prior to offering them to the end
01704 consumer.
01705

(01706 2. TOBACCO

01707 Tobacco must be aerated for at least three days (72
01708 hours) when fumigated in hogsheads and for at least two
01709 days (48 hours) when fumigated in other containers.
01710 When plastic liners are used, longer aeration periods
01711 will probably be required to aerate the commodity down
01712 to 0.3 ppm.
01713

01714 3. As an alternative to these aeration periods, each
01715 container of a treated commodity may be analyzed for
01716 residues using accepted analytical methods. If residues
01717 are less than tolerance levels, the commodity may be
01718 shipped to the consumer regardless of the above holding
01719 periods.
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01721 M. APPLICATOR AND WORKER EXPOSURE

(01722 1. HYDROGEN PHOSPHIDE EXPOSURE LIMITS

01723 Exposure to hydrogen phosphide must not exceed the 8
01724 hour TWA of 0.3 ppm for applicators and workers during
01725 application. Application is defined as the time period
01726 covering the opening of the first container, applying
01727 the appropriate dosage of fumigant and closing up the
01728 site to be fumigated. All persons in the treated site
01729 and in adjacent indoor areas are covered by this
01730 exposure standard.
01731

01732 After application is completed worker or applicator
01733 exposure must not exceed 0.3 ppm maximum concentration.
01734 Such exposures may occur because of leakage into
01735 enclosed areas from fumigation sites, during reentry or
01736 during transfer of unaerated commodity.
01737

01738 2. APPLICATION OF FUMIGANT

01739 Depending upon temperature and humidity, Detia(R)
01740 Tablets and Pellets release hydrogen phosphide gas
01741 slowly upon exposure to moisture from the air. This
01742 release is often slow enough to permit applicators to

01743 deposit fumigant in the desired areas and then vacate
01744 the premises without significant exposure to the gas.
01745 If the fumigator's exposure exceeds the 8 hour TWA of
01746 0.3 ppm, approved respiratory protection must be worn.
01747 Gas concentration measurements for safety purposes must
01748 be made using low level detector tubes or other suitable
01749 low level detection equipment. See the "Industrial
01750 Hygiene Monitoring" section below. Information on
01751 hydrogen phosphide (phosphine, PH₃) detector tubes may
01752 be obtained from Research Products Company.
01753

01754 It is often practical to wear approved respiratory
01755 protection from start to finish. This is particularly
01756 true when performing large space fumigations or when
01757 fumigating bulk stored commodities in flat storage
01758 buildings.
(01759

3. LEAKAGE FROM FUMIGATED SITES

01760 Hydrogen phosphide is highly mobile and given enough
01761 time may penetrate seemingly gas tight materials such as
01762 concrete and cinder block. Therefore, adjacent,
01763 enclosed areas likely to be occupied should be examined
01764 to ensure that significant leakage has not occurred.
01765 Sealing of the fumigated site and/or air flow in the
01766 occupied areas should be used to reduce exposure.
01767
01768

4. AERATION AND REENTRY

01769 If the area is to be entered after fumigation, it must
01770 be aerated until the level of hydrogen phosphide gas is
01771 0.3 ppm or below. The area or site must be monitored to
01772 ensure that liberation of gas from the treated commodity
01773 does not result in the development of unacceptable
01774 levels of hydrogen phosphide. Do not allow reentry into
(01775 treated areas by any person before this time unless
01776 protected by an approved respirator.
01777
01778

5. HANDLING UNAERATED COMMODITIES

01779 Transfer and processing of a treated commodity prior to
01780 complete aeration is permissible, however workers must
01781 not be exposed to hydrogen phosphide in excess of the
01782 permitted exposure limits.
01783
01784

6. INDUSTRIAL HYGIENE MONITORING

01785 It is recommended that hydrogen phosphide exposure be
01786 documented in an operation log or manual for each site
01787 and operation where exposure may occur. The purpose of
01788 this monitoring is to prevent excessive exposure and to
01789 determine when and where respiratory protection is
01790 required. This monitoring is mandatory although once
01791 exposures have been adequately characterized, subsequent
01792 monitoring is not routinely required. However, spot
01793 checks should be made occasionally, especially if
01794 conditions significantly change. Gas concentration
01795

or an unexpected gas odor is detected

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measurements should be taken in the worker's breathing zone. Monitoring is not required outdoors.

7. ENGINEERING CONTROLS AND WORK PRACTICES

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

N. STORAGE AND DISPOSAL

1. STORAGE

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

Detia(R) Tablets and Pellets are supplied in gas tight resealable, aluminum flasks. Do not expose the product inside flasks to atmospheric moisture any longer than is necessary. Seal tightly before returning opened flasks to storage. The shelf life of Detia(R) is virtually unlimited if the containers are tightly sealed.

Flasks should not be stored at sub-zero temperatures because this will increase the possibility of an ignition (flash) when opened.

2. DISPOSAL OF UNREACTED OR PARTIALLY REACTED TABLETS OR PELLETS

(From spills, leaking flasks or other sources)
Unreacted or partially reacted Detia(R) Pellets or Detia(R) Tablets are acutely hazardous. Improper disposal of these products is a violation of federal law. If these products cannot be disposed of by ordinary use or according to the instructions that follow, contact your state pesticide or environmental control agency or the hazardous waste representative at the nearest EPA regional office for guidance. Do not contaminate water by disposal.

Some local and state waste disposal regulations may vary from the following recommendations. Disposal procedures should be reviewed with appropriate authorities to ensure compliance with local regulations.

FOR SPECIFIC INSTRUCTIONS SEE "SPILL AND LEAK PROCEDURES" ON PAGE OF THIS MANUAL.

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3. DISPOSAL OF PELLET OR TABLET DUST FOLLOWING A SPACE FUMIGATION

a. General

If properly exposed, the residual dust remaining after a fumigation with Detia(R) will be a grayish white, spent, nonhazardous waste and will contain only a small amount of unreacted aluminum phosphide. However, residual dust from incompletely exposed pellets or tablets (See "EXPOSURE GUIDE" on page of this manual.) will require special care. Confinement of partially spent residual dust, as in a closed container, or collection and storage of large quantities of this dust may result in a fire hazard. Small amounts of hydrogen phosphide may be given off from the unreacted aluminum phosphide, and confinement of the gas may result in a flash.

Unless it can be determined with certainty that this dust is spent it must be held for several days beyond the required exposure time prior to disposal or the wet method (see below) of deactivation must be used. If the dust retains any of its greenish color the wet method is recommended.

All caps
or
underlined

b. Dry Method

In open areas, small amounts (up to 5 flasks) of residual dust may be disposed of on site by burial or by spreading over the land surface away from inhabited buildings. Up to 3 flasks of this residual dust (4 to 7 lbs.) may be collected in a one gallon bucket for holding or disposal. Larger amounts of residual dust may be collected in a porous cloth bag (burlap, cotton, etc.) for holding and/or transportation to a suitable disposal site. Do not put more than one half case (8 flasks of tablets or 10 flasks of pellets) of residual dust in each bag. Always transport these bags in an open vehicle. Do not pile bags. CAUTION: Do not use this method for dust that still retains some of its original greenish color. Never confine, dispose of or store residual dust in closed containers such as dumpsters, drums or plastic bags.

Spent residual dust from Detia(R) may be collected and disposed of at a sanitary landfill, approved pesticide incinerator or other approved sites or by other procedures approved by federal, state and local authorities.

Do not dispose of dust in a toilet.

c. Wet Method

Fill an appropriate sized metal container 2/3 full with water. For each gallon of water add 1/4 cup of low sudsing detergent or surfactant. Use no less than 10 gallons of water/detergent solution for each case of spent material. Slowly pour the dust into the container as the water is stirred. Wear appropriate respiratory protection. DO NOT COVER THE CONTAINER AT ANY TIME. This must be done outdoors or in front of an adequate fan that exhausts immediately outside.

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

4. DISPOSAL OF EMPTY FLASKS

- a. Method One: Triple rinse flasks and stoppers with water. Then offer for recycling or reconditioning, or puncture and dispose of them in a sanitary landfill or other approved site or by other procedures approved by state and local authorities. Dispose of rinsate in a sanitary landfill or by other approved procedures. Small quantities can be poured out on the ground.
- b. Method Two: Remove lids and place empty flasks outdoors or in structure being fumigated until residue in flasks is reacted. Puncture and dispose of them in a sanitary landfill or other approved site or by other procedures approved by state and local authorities.

D. SPILL AND LEAK PROCEDURES

1. GENERAL

for punctured flasks
A spill other than incidental to application or normal handling, can produce high levels of gas and, therefore attending personnel must wear a SCBA or its equivalent when the concentrations of hydrogen phosphide gas is unknown. If the concentration is known, other NIOSH/MSHA approved respiratory protection can be worn. Wear dry cotton or other gloves when handling spilled material.

2. DAMAGE TO FIBERBOARD CASE

Check aluminum flasks. If they are damaged handle as described below. If they are undamaged return them to cardboard cartons or other suitable packaging which

01961 complies with DOT regulations.

01962
01963 3. LEAKING FLASK PROCEDURES

01964 If aluminum flasks have been punctured or damaged
01965 causing a leak, the product may be immediately used, the
01966 container may be temporarily repaired with aluminum tape
01967 or the Detia(R) may be transferred from the damaged
01968 flask to a sound metal container which should be sealed
01969 and properly labeled as aluminum phosphide. Transport
01970 the damaged containers to an area suitable for pesticide
01971 storage for inspection. Further instructions and
01972 recommendations may be obtained, if required, from
01973 Research Products Company.

01974 Handle empty damaged containers as described under
01975 "DISPOSAL OF EMPTY FLASKS" above.
01976

(977
01978 4. SPILL PROCEDURES

01979 Do not flush spillage down drain with water. DO NOT
01980 use water at anytime to clean up a spill. Water in
01981 contact with unreacted tablets or pellets will rapidly
01982 accelerate the production of hydrogen phosphide gas and
01983 could cause spontaneous ignition of the gas. If the
01984 spill is only a few minutes old and is not contaminated
01985 by other materials, collect the spillage and place it
01986 back into the original flask or other sound metal
01987 container and tighten the cap. If possible, use
01988 immediately. CAUTION: AN IGNITION MAY OCCUR WHEN THESE
01989 CONTAINERS ARE REOPENED.

01970 If the spilled material is contaminated or has begun to
01991 visibly decompose, gather it up and place it into open
01992 top, perforated gallon cans and process it immediately.
(993

01994 Do not add more than about one flask (2 to 3 lbs.) of
01995 spilled material to the bucket. If on-site
01996 deactivation is not feasible, these open containers
01997 should be transported in open vehicles to a suitable
01998 area away from occupied buildings. Wet or dry
01999 deactivation may then be carried out as described in the
02000 section immediately below.
02001

02002
02004 U 5. DEACTIVATION AND DISPOSAL OF UNREACTED OR PARTIALLY REACTED
02005 TABLETS OR PELLETS

02006 U a. Wet Method

02008 Transport material by hand or in open vehicles to
02009 open air away from occupied structures. Fill a drum
02010 2/3 full with water.

02011 Add 1/4 cup of low sudsing detergent or surfactant
02012 in each gallon of water. Each flask of tablets or
02013 pellets should be mixed with no less than 1 gallon
02014 of water/detergent solution. Slowly pour the
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material into the water as it is stirred. Stir occasionally thereafter for at least 36 hours. Wear appropriate respiratory protection. DO NOT COVER THE CONTAINER. IF THE CONTAINER IS COVERED THE HYDROGEN PHOSPHIDE BEING GENERATED WILL BE CONFINED AND WILL DECOMPOSE EXPLOSIVELY. The wet method of deactivation is the method of choice for quantities in excess of 5 flasks (10 to 15 pounds). It is safe to dispose of this slurry.

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

b. Dry Method

As an alternative to the wet method, when permissible small amounts (up to 5 flasks) of partially reacted or unreacted material may be spread out in an open, secure area away from occupied buildings to be deactivated by atmospheric moisture.

NOTE: Never place pellets, tablets, their dust or the dust/water slurry in a confined container such as a closed drum or plastic bags. Any hydrogen phosphide generated will be confined and may decompose explosively.