

1/22

2548-70 PM32



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

MAR 13 1987

OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

Research Products Company  
P.O. Box 1460  
Salina, KS 67402-1460

SUBJECT: Aluminum and Magnesium Phosphide Registration Standard  
Your letters of February 23 and March 4, 1987  
EPA Reg. Nos. 2548-59

2548-62

2548-63

2548-67

2548-68

2548-69

2548-70

2548-73

2548-74

Gentlemen:

Your submission has been reviewed and found to be acceptable for the products listed above.

Enclosed for each product is stamped, approved labeling. Incorporate any comments noted on the labeling and submit five copies of finished printed labeling for our records.

Sincerely,

A handwritten signature in dark ink, appearing to read "Jeff Kempter".

Jeff Kempter  
Product Manager 32  
Registration Division (TS-767C)

Enclosures

2/22

ACCEPTED  
with COMMENTS  
to EPA Letter Dated:

MAR 16 1987

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

2548-70

DETIA ROTOX AP LABEL --- FRONT PANEL

RESTRICTED USE PESTICIDE  
DUE TO ACUTE INHALATION TOXICITY OF HIGHLY  
TOXIC HYDROGEN PHOSPHIDE (PHOSPHINE, PH<sub>3</sub>) 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.

Detia(R) ROTOX(R) AP

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 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 THE PELLETS OR THEIR DUST ARE SWALLOWED: Drink or administer

02400 one or two glasses of water and induce vomiting by touching back  
02500 of throat with finger, or if available, administer syrup of  
02550 ipecac. Do not give anything by mouth if victim is unconscious  
02600 or not alert.

02650 IF PELLETS OR THEIR DUST GET ON SKIN OR CLOTHING: Brush or  
02700 shake material off clothes and shoes in well ventilated area.  
02750 Allow clothes to aerate in a ventilated area prior to  
02800 laundering. Do not leave contaminated clothing in occupied  
02850 and/or confined areas such as automobiles, vans, motel rooms,  
02900 home, etc. Wash contaminated skin thoroughly with soap and  
02950 water.  
03000

03050 IF DUST FROM THE PELLETS GETS IN EYES: Flush with plenty of  
03100 water. Get medical attention.  
03150

03200 See side panels for additional precautionary statements.  
03250

03300 Manufactured by: Detia Freyberg, GMBH  
03350 P. O. Box 10  
03400 6947 Laudendach  
03450 F.R. of Germany  
03500

03550 Distributed by: Research Products Company  
03600 Div. of McShares, Inc.  
03650 P. O. Box 1460  
03700 Salina, KS 67402-1460  
03750  
03800

03850 EPA Establishment No. 33982WG01 Net Contents:  
03900 EPA Registration No. 2548-70 Net Contents:  
03950

04000  
04050  
04100  
04150  
04200

# LEFT PANEL

04250 HAZARDS TO HUMANS AND DOMESTIC ANIMALS  
04300

04350 KEEP OUT OF REACH OF CHILDREN  
04400 DANGER/POISON  
04450  
04500

04550 Aluminum phosphide in pellets or their dust can be fatal if  
04600 swallowed. Do not get in eyes, in nose, on skin or on clothing.  
04650 Do not eat, drink or smoke while handling aluminum phosphide  
04700 fumigants. When the container is opened Detia(R) ROTOX(R) AP  
04750 will begin to release hydrogen phosphide (phosphine) which is an  
04800 extremely toxic gas. Contact with water, acids and some other  
04850 liquids will accelerate this reaction. ~~If a garlic odor is~~  
04900 ~~detected, refer to section on respiratory protection or~~  
04950 ~~applicator/worker exposure for appropriate monitoring~~  
05000 ~~procedures.~~ Pure hydrogen phosphide gas is odorless; the odor  
05050 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 LOW CONCENTRATIONS ABOVE PERMISSIBLE LEVELS OVER A PERIOD OF DAYS OR WEEKS MAY CAUSE POISONING.

#### NOTE TO PHYSICIAN

Aluminum phosphide in 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 GUT, 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). Treatment is symptomatic.

#### RIGHT PANEL

#### DIRECTIONS FOR USE

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

The "Detia(R) ROTOX(R) AT and Detia(R) ROTOX(R) AP Instruction Booklet" is a part of labeling. Refer to it for application procedures and other information necessary to properly use Detia(R) ROTOX(R).

THIS PRODUCT IS ACCOMPANIED BY THE LABELING LISTED ABOVE. READ;

5/22

07800 AND UNDERSTAND THE ENTIRE LABELING. ALL PARTS OF THE LABELING  
07850 ARE EQUALLY IMPORTANT FOR SAFE AND EFFECTIVE USE OF THIS  
07900 PRODUCT. CALL RESEARCH PRODUCTS COMPANY OR EPA IF YOU HAVE ANY  
07950 QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABELING.

08000  
08050  
08100 STORAGE AND DISPOSAL

08150  
08200 STORAGE

08250  
08300 Flasks should be stored in a dry, well ventilated area, away  
08350 from heat and under lock and key. Post as a pesticide storage  
08400 area. Do not contaminate water, food or feed by storing  
08450 pesticides in the same areas used to store these commodities.

08500  
08550 Do not store in buildings where humans or domestic animals  
08600 reside. Refer to the "Detia(R) ROTOX(R) AT and Detia(R)  
08650 ROTOX(R) AP Instruction Booklet" for additional storage  
08700 instructions.

08750  
08800 DISPOSAL OF UNREACTED OR PARTIALLY REACTED PELLETS (From spills,  
08850 leaking flasks or other sources)

08900  
08950 Unreacted or partially reacted Detia(R) ROTOX(R) pellets are  
09000 acutely hazardous. Improper disposal of this product is a  
09050 violation of federal law.

09100  
09150 If this product cannot be disposed of by ordinary use or  
09200 according to labeling instructions, contact your state pesticide  
09250 or environmental control agency or the hazardous waste  
09300 representative at the nearest EPA regional office for guidance.  
09350 Do not contaminate water by disposal.

09400  
09450 Reacted pellets are not hazardous. For complete disposal, spill  
09500 and leak procedures refer to the booklet "Detia(R) ROTOX(R) AT  
09550 and Detia(R) ROTOX(R) AP Instruction Booklet."

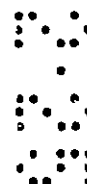
09600  
09650  
09700 DISPOSAL OF EMPTY FLASKS

09750  
09800 METHOD ONE: Triple rinse flasks and stoppers with water. Then  
09850 offer for recycling or reconditioning, or puncture and dispose  
09900 of them in a sanitary landfill or other approved site or by  
09950 other procedures approved by state and local authorities. . . .  
10000 Dispose of rinsate in a sanitary landfill or by other approved  
10050 procedures.

10100  
10150 METHOD TWO: Remove lids and place empty flasks outdoors or in  
10200 structure being fumigated until residue in flasks is reacted. . . .  
10250 Puncture and dispose of them in a sanitary landfill or other  
10300 approved site or by other procedures approved by state and local  
10400 authorities.  
10450

10500 GENERAL

10550  
10600 Consult federal, state and local disposal authorities for  
10650 approved procedures other than those given above. Approved  
10700 procedures vary for different types of generators.  
10750  
10800 \*If in doubt concerning whether the dust is reacted and/or  
10850 concerning proper disposal techniques contact Research Products  
10900 Company.



ACCEPTED  
with COMMENTS  
in EPA Letter Dated:

MAR 16 1987

Under the Federal Insecticide,  
Fungicide, and Rodenticide Act  
as amended, for the pesticide  
registered under EPA Reg. No.  
2548-70

00050 DETIA ROTOX AP (small label) -- FRONT PANEL

00100  
00150  
00200 RESTRICTED USE PESTICIDE  
00250 DUE TO ACUTE INHALATION TOXICITY OF HIGHLY  
00300 TOXIC HYDROGEN PHOSPHIDE (PHOSPHINE, PH<sub>3</sub>) GAS  
00350  
00400

00450 For retail sale to and use only by certified applicators for  
00500 those uses covered by the applicator's certification or persons  
00550 trained in accordance with the attached product manual working  
06 00 under the direct supervision and in the physical presence of the  
06 50 certified applicator. Physical presence means on site or on the  
00700 premises. Read and follow the label and the Research Products  
00750 Company product manual which contains complete instructions for  
00800 the safe use of this pesticide.  
00850

00900  
00950 Detia(R) ROTOX(R) AP (small label)  
01000

01050  
01100 Active Ingredient: Aluminum Phosphide.....57%  
01150 Inert Ingredients:.....43%  
01200 TOTAL.....100%  
01250

01300 KEEP OUT OF REACH OF CHILDREN  
01350

01400 DANGER/PELIGRO-POISON  
01 50

01500 PRECAUCION AL USUARIO: Si usted no lee ingles, no use este  
01550 producto hasta que la etiqueta se le haya sido explicado  
01600 ampliamente.  
01650

# 01700 STATEMENT OF PRACTICAL TREATMENT

01800 Symptoms of overexposure to hydrogen phosphide are headache...  
01850 dizziness, nausea, difficult breathing, vomiting and diarrhea...  
01900 In all cases of overexposure get medical attention immediately...  
01950 Take victim to the doctor or emergency treatment facility...  
02000

02050 IF GAS OR DUST FROM PELLETS IS INHALED: Get exposed person...  
02100 fresh air. Keep warm and make sure person can breathe freely...  
02150 If breathing has stopped, give artificial respiration by...  
02200 mouth-to-mouth or other means of resuscitation. Do not give...  
02250 anything by mouth to an unconscious person...  
02350

02400 IF THE PELLETS OR THEIR DUST ARE SWALLOWED: Drink or administer

02450 one or two glasses of water and induce vomiting by touching back  
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02850 laundering. Do not leave contaminated clothing in occupied  
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02950 homes, etc. Wash contaminated skin thoroughly with soap and  
03000 water.

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03250 See side panels for additional precautionary statements.

03300  
03350  
03400 Manufactured by: Detia Freyberg, GMBH  
03450 P. O. Box 10  
03500 6947 Laudendach  
03550 F.R. of Germany

03600  
03650 Distributed by: Research Products Company  
03700 Div. of McShares, Inc.  
03750 P. O. Box 1460  
03800 Salina, KS 67402-1460

03850  
03900  
03950 EPA Establishment No. 33982WG01 Net Contents:  
04000 EPA Registration No. 2548-70 Net Contents:

04050  
04100  
04150  
04200 LEFT PANEL

04250  
04300 HAZARDS TO HUMANS AND DOMESTIC ANIMALS

04350  
04400 KEEP OUT OF REACH OF CHILDREN  
04450 DANGER/POISON

04500  
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04600 swallowed. Do not get in eyes, in nose, on skin or on clothing.  
04650 Do not eat, drink or smoke while handling aluminum phosphide.  
04700 fumigants. When the container is opened Detia(R) ROTOX(R) AP  
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04800 extremely toxic gas. Contact with water, acids and some other  
04850 liquids will accelerate this reaction. ~~If a garlic odor is~~  
04900 ~~detected, refer to section on respiratory protection or~~  
04950 ~~applicator/wearer exposure for appropriate monitoring~~  
05050 ~~procedures.~~ Pure hydrogen phosphide gas is odorless, the odor  
05100 is due to a contaminant. Since an odor may not be detected

05150 under certain circumstances, the absence of a garlic odor does  
 05200 not mean that hydrogen phosphide gas is absent. Observe proper  
 05250 application, aeration, reentry and disposal procedures specified  
 05300 elsewhere in the labeling to prevent overexposure.

05350  
 05400 FREQUENT EXPOSURE TO LOW CONCENTRATIONS ABOVE PERMISSIBLE LEVELS  
 05450 OVER A PERIOD OF DAYS OR WEEKS MAY CAUSE POISONING.  
 05500

05550 NOTE TO PHYSICIAN  
 05600

05650 Refer to "Detia(R) ROTOX(R) AT and Detia(R) ROTOX(R) AP  
 05700 Instruction Booklet" for this section.

# RIGHT PANEL

## DIRECTIONS FOR USE

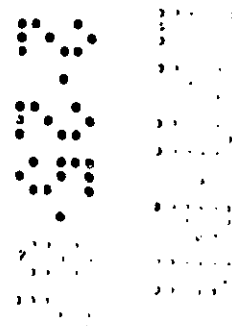
05950  
 06000 It is a violation of federal law to use this product in a  
 06050 manner inconsiste with its labeling.

06100  
 06150 The "Detia(R) ROTOX(R) AT and Detia(R) ROTOX(R) AP Instruction  
 06200 Booklet" is a part of labeling. Refer to it for application  
 06250 procedures and other information necessary to properly use  
 06300 Detia(R) ROTOX(R).  
 06400

06450  
 06500 THIS PRODUCT IS ACCOMPANIED BY THE LABELING LISTED ABOVE. READ  
 06550 AND UNDERSTAND THE ENTIRE LABELING. ALL PARTS OF THE LABELING  
 06600 ARE EQUALLY IMPORTANT FOR SAFE AND EFFECTIVE USE OF THIS  
 06650 PRODUCT. CALL RESEARCH PRODUCTS COMPANY OR EPA IF YOU HAVE ANY  
 06700 QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABELING.  
 06750

## STORAGE AND DISPOSAL

06800  
 06850  
 06900 Refer to "Detia(R) ROTOX(R) AT and Detia(R) ROTOX(R) AP  
 07000 Instruction Booklet" for this section.



ACCEPTED  
with COMMENTS  
in EPA Letter Dated:

MAR 16 1987

Under the Federal Insecticide,  
Fungicide, and Rodenticide Act  
as amended, for the pesticide  
registered under EPA Reg. No.  
2548-69 and 2548-70

RESTRICTED USE  
PESTICIDE

DUE TO ACUTE INHALATION TOXICITY OF HIGHLY  
TOXIC HYDROGEN PHOSPHIDE (PHOSPHINE, PH<sub>3</sub>) 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.

Detia(R) ROTOX(R) AT  
and  
Detia(R) ROTOX(R) AP

INSTRUCTION BOOKLET

EPA Registration No. 2548-69  
EPA Registration No. 2548-70  
EPA Establishment No. 33982WG01

Research Products Company  
Div. of McShares, Inc.  
P. O. Box 1460  
Salina, KS 67402-1460



11/22

01050 F

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# 1. 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. 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) ROTOX(R) AP and Detia(R) ROTOX(R) AT 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.

Detia(R) ROTOX(R) so contains ammonium carbamate which liberates ammonia and carbon dioxide as follows:



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

## C. PRODUCT PACKAGING

The tablets are packaged 500 and 100 to a flask. The pellets are packaged 1660 and 500 to a flask.

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

## D. WHAT IS HYDROGEN PHOSPHIDE?

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

05950  
06000 E. SAFETY RECOMMENDATIONS

- 06050 1. Carefully read the labeling and follow instructions  
06100 explicitly.  
06150 2. Never allow uninstructed persons to handle Detia(R).  
06200 3. Wear dry gloves made of cotton or other material when  
06250 contact with tablets, pellets or their dust is likely.  
06300 4. Open fumigant containers in open air. Never open in a  
06350 flammable atmosphere.  
06400 5. Do not allow Detia(R) to contact liquid water or to  
06450 pile up.  
06500 6. Dispose of empty containers in a proper manner  
06550 consistent with the label instructions.  
06600 7. Aerate contaminated clothing in well ventilated area  
06650 prior to washing.  
06700 8. Keep containers tightly closed except when removing  
06750 product.  
06800 9. Do not reuse aluminum phosphide containers for any  
06850 purpose other than recycling or reconditioning.  
06900 10. OSHA recommends that the exposure screening of  
06950 employees be conducted to detect impaired pulmonary  
07000 function. OSHA recommends that any employees developing  
07050 the above condition be referred for medical attention.  
07100  
07150  
07200

07250 II. PRECAUTIONARY STATEMENTS  
07300

07350 A. HAZARDS TO HUMANS AND DOMESTIC ANIMALS

07400 Keep Out of Reach of Children  
07450 DANGER-POISON  
07500

07550 Aluminum phosphide in pellets, tablets or their dust can be  
07600 fatal if swallowed. Do not get in eyes, in nose, on skin or  
07650 on clothing. Do not eat, drink or smoke while handling  
07700 aluminum phosphide fumigants. When the container is opened  
07750 Detia(R) ROTOX(R) will begin to release hydrogen phosphide  
07800 (phosphine) which is an extremely toxic gas. Contact with  
07850 water, acids and some other liquids will accelerate this  
07900 reaction. *Pure hydrogen phosphide gas is odorless; the odor is due to a contaminant.*  
07950 *Since an odor may not be detected under certain circumstances, the absence of a*  
08000 *garlic odor does not mean that hydrogen phosphide is absent.*  
08050 Observe proper application and disposal procedures  
08100 specified elsewhere in the labeling to prevent  
08150 overexposure.

08200 FREQUENT EXPOSURE TO CONCENTRATIONS ABOVE PERMISSIBLE LEVELS  
08250 OVER A PERIOD OF DAYS OR WEEKS MAY CAUSE POISONING.  
08300

08350 B. STATEMENT OF PRACTICAL TREATMENT

08400 Symptoms of overexposure to hydrogen phosphide are headache,  
08450 dizziness, nausea, difficult breathing, vomiting and  
08500 diarrhea. In all cases of overexposure get medical  
08550 attention immediately. Take victim to a doctor or emergency

08450 treatment facility.  
 08700  
 08800 U 1. If gas or dust from tablets or pellets is inhaled: Get  
 08850 exposed person to fresh air. Keep warm and make sure  
 08900 person can breathe freely. If breathing has stopped,  
 08950 give artificial respiration by mouth-to-mouth or other  
 09000 means of resuscitation. Do not give anything by mouth  
 09050 to an unconscious person.  
 09100  
 09200 U 2. If the pellets, tablets or their dust are swallowed:  
 09250 Drink or administer one or two glasses of water and induce  
 09300 vomiting by touching back of throat with finger, or if  
 09350 available, administer syrup of ipecac. Do not give  
 09400 anything by mouth if victim is unconscious or not alert.  
 09450  
 09500 U 3. If pellets, tablets or their dust gets on skin or  
 09600 U clothing: Brush or shake material off clothes and shoes in  
 09700 well ventilated area. Allow clothes to aerate in a ventilated  
 09750 area prior to laundering. Do not leave contaminated  
 09800 clothing in occupied and/or confined area such as  
 09850 automobiles, vans, motel rooms, homes, etc. Wash  
 09900 contaminated skin thoroughly with soap and water.  
 09950  
 10000 U 4. If dust from the pellets or tablets gets in eyes:  
 10100 Flush with plenty of water. Get medical attention.  
 10150  
 10200 C. NOTE TO PHYSICIAN  
 10250 Aluminum phosphide tablets, pellets or their dust reacts  
 10300 with moisture from the air, water, acids and many other  
 10350 liquids to release hydrogen phosphide (phosphine) gas. Mild  
 10400 exposure by inhalation causes malaise (indefinite feeling of  
 10450 sickness), ringing of ears, fatigue, nausea and pressure in  
 10500 chest which are relieved by removal to fresh air. Moderate  
 10550 poisoning causes weakness, vomiting, epigastric pain (pain  
 10600 just above the stomach), chest pain, diarrhea and dyspnea  
 10650 (difficulty in breathing). Symptoms of severe poisoning may  
 10700 occur within a few hours or up to several days, resulting in  
 10750 pulmonary edema (fluid in lungs) and may lead to dizziness,  
 10800 cyanosis (blue or purple skin color), unconsciousness and  
 10850 death.  
 10900  
 10950 In sufficient quantity hydrogen phosphide affects the liver,  
 11000 kidneys, lungs, nervous system, and circulatory system.  
 11050 Inhalation can cause lung edema (fluid in lungs) and  
 11100 hyperemia (excess of blood in a body part), small  
 11150 perivascular brain hemorrhages and brain edema (fluid in  
 11200 brain). Ingestion can cause lung and brain symptoms but  
 11250 damage to the viscera (body cavity organs) is more common.  
 11300 Hydrogen phosphide poisoning may result in (1) pulmonary  
 11350 edema, (2) liver elevated serum GOT, LDH and alkaline  
 11400 phosphatase, reduced prothrombin, hemorrhage and jaundice  
 11450 (yellow skin color) and (3) kidney hematuria (blood in  
 11500 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. Filling of tablets, pellets or dust from their fragmentation may cause a temperature increase and confine the release of gas so that

16/22

14300 ignition could occur.

14350  
14400 Always open flasks of Detia(R) ROTOX in open air. Never  
14450 open in a flammable atmosphere because on rare occasions  
14500 they may flash. When opening, point the container away from  
14550 the face and body and slowly loosen the cap. These  
14600 precautions will also reduce the applicator's exposure to  
14650 hydrogen phosphide gas.

14700  
14750 Pure hydrogen phosphide gas is practically insoluble in  
14800 water and oils, and is stable at normal fumigation  
14850 temperatures. However, it may react with certain metals and  
14900 cause corrosion, especially at higher temperatures and  
14950 relative humidities. Metals such as copper, brass and other  
15000 copper alloys, and precious metals such as gold and silver  
15050 are susceptible to corrosion by hydrogen phosphide.  
15100

### 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) ROTOX(R) AT and AP are Restricted Use Pesticides due to the acute inhalation toxicity of hydrogen phosphide (phosphine, PH<sub>3</sub>) 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 attached~~ <sup>this</sup> 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  
Div. of McShares, Inc.  
P. O. Box 1460  
Salina, Kansas 67402-1460  
913-825-2181

3. Do not fumigate commodities with this product when burrow temperature is below 40 degrees F (5 degrees C).

#### B. PROTECTIVE CLOTHING

Wear dry gloves made of cotton or other material when

contact with tablets, pellets, or their dust is likely.  
Wash hands after use.

#### C. RESPIRATORY PROTECTION

Respiratory protection need not be available for outdoor applications.

#### D. HYDROGEN PHOSPHIDE EXPOSURE LIMITS

Exposure to hydrogen phosphide must not exceed the 8 hour TWA of 0.3 ppm.

#### E. INDUSTRIAL HYGIENE MONITORING

Monitoring is not required outdoors.

#### F. LIST OF BURROWING PESTS

Detia(R) ROTOX 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).

#### G. APPLICATION INSTRUCTIONS

Add from 1 to 4 Detia(R) ROTOX(R) AT tablets or 5 to 20 Detia(R) ROTOX(R) AP 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.

Detia(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.

#### H. 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.

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# I. 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, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah and Wyoming.
- (2) Blunt-nosed leopard lizard - Counties of Kern, Kings, Fresno, Madera, Merced, and Tulare in the state of California.
- (3) Desert tortoise - Washington County in the state of Utah.
- (4) Eastern indigo snake - States of Florida and Georgia.
- (5) San Joaquin kit fox - Counties of Kern, Kings, Fresno, Merced, Monterey, San Benito, San Luis Obispo, Santa Barbara, Tulare and Ventura in the state of California.

# J. SPECIAL LOCAL RESTRICTIONS

- (1) NORTH CAROLINA  
Dettia(R) ROTOX(R) may only be used for control of rats and mice in the state of North Carolina. Use against other pests is not permitted.
- (2) OKLAHOMA  
A special permit for black-tailed prairie dog control by poisoning is required in Oklahoma. Contact the Oklahoma State Department of Wildlife Conservation to obtain this permit.
- (3) WISCONSIN  
Wisconsin to control small mammals, except rats or mice. Please contact your local Department of Natural Resources office for information.
- (4) INDIANA  
Use of Dettia(R) ROTOX(R) for mole control is not legal.

in the state of Indiana.

(5) MISSOURI

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

(6) KANSAS

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

(7) CALIFORNIA

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

K. 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) ROTOX(R) is 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.

2. DISPOSAL OF UNREACTED OR PARTIALLY REACTED TABLETS OR PELLETS

(From spills, leaking flasks or other sources) Unreacted or partially reacted Detia(R) ROTOX(R) AP or Detia(R) ROTOX(R) AT 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.

- 25100 FOR SPECIFIC INSTRUCTIONS SEE "SPILL AND LEAK  
25150 PROCEDURES" ON PAGE OF THIS MANUAL.  
25200
- 25250 3. DISPOSAL OF EMPTY FLASKS  
25400 U a. Method\_One: Triple rinse flasks and stoppers  
25450 with water. Then offer for recycling or reconditioning,  
25500 or puncture and dispose of them in a sanitary landfill  
25550 or other approved site or by other procedures  
25600 approved by state and local authorities. Dispose of  
25650 rinsate in a sanitary landfill or by other approved  
25700 procedures.  
25750
- 25800 U b. Method\_Two: Remove lids and place empty flasks outdoors  
25900 until residue in flasks is reacted. Puncture and  
25950 dispose of them in a sanitary landfill or other  
26000 approved site or by other procedures approved by  
26050 state and local authorities.  
26100
- 26150 L. SPILL AND LEAK PROCEDURES  
26200 1. GENERAL  
26250 A spill other than incidental to application or normal  
26300 handling, can produce high levels of gas and, therefore  
26350 attending personnel must wear a SCBA or its equivalent  
26400 when the concentrations of hydrogen phosphide gas is  
26450 unknown. If the concentration is known, other  
26500 NIOSH/MSHA approved respiratory protection can be worn.  
26550 Wear dry cotton or other gloves when handling spilled  
26600 material.  
26650
- 26700 2. DAMAGE TO FIBERBOARD CASE  
26750 Check aluminum flasks. If they are damaged handle as  
26800 described below. If they are undamaged return them to  
26850 cardboard cartons or other suitable packaging which  
26900 complies with DOT regulations.  
26950
- 27000 3. LEAKING FLASK PROCEDURES  
27050 If aluminum flasks have been punctured or damaged  
27100 causing a leak, the product may be immediately used, the  
27150 container may be temporarily repaired with aluminum tape  
27200 or the Detia(R) may be transferred from the damaged  
27250 flask to a sound metal container which should be sealed  
27300 and properly labeled as aluminum phosphide. Transport  
27350 the damaged containers to an area suitable for pesticide  
27400 storage for inspection. Further instructions and  
27450 recommendations may be obtained, if required, from  
27500 Research Products Company.  
27550
- 27600 Handle empty damaged containers as described under  
27650 "DISPOSAL OF EMPTY FLASKS" above.  
27700
- 27750 4. SPILL PROCEDURES  
27800 Do not flush spillage down drain with water. DO NOT  
27850 use water at anytime to clean up a spill. Water in

contact with unreacted tablets or pellets will rapidly accelerate the production of hydrogen phosphide gas and could cause spontaneous ignition of the gas. If the spill is only a few minutes old and is not contaminated by other materials, collect the spillage and place it back into the original flask or other sound metal container and tighten the cap. If possible, use immediately. CAUTION: AN IGNITION MAY OCCUR WHEN THESE CONTAINERS ARE REOPENED.

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

Do not add more than about one flask (2 to 3 lbs.) of spilled material to the bucket. If on-site deactivation is not feasible, these open containers should be transported in open vehicles to a suitable area away from occupied buildings. Wet or dry deactivation ~~may~~ <sup>must</sup> then be carried out as described in the section immediately below. ✓

# 5. DEACTIVATION AND DISPOSAL OF UNREACTED OR PARTIALLY REACTED TABLETS OR PELLETS

## a. Wet Method

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

Add 1/4 cup of low sudsing detergent or surfactant in each gallon of water. Each flask of tablets or pellets should be mixed with no less than 1 gallon of water/detergent solution. Slowly pour the material into the water as it is stirred. Stir occasionally thereafter for at least 36 hours. Appropriate respiratory protection must be worn. 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

30750 partially reacted or unreacted material may be  
 30800 spread out in an open, secure area away from  
 30850 occupied buildings to be deactivated by atmospheric  
 30950 moisture.

31000  
 31050 NOTE: Never place pellets, tablets, their dust or  
 31100 the dust/water slurry in a confined container such  
 31150 as a closed drum or plastic bags. Any hydrogen  
 31200 phosphide generated will be confined and may  
 31250 decompose explosively.

TC

