

1/22 2548-74 PM-32



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,

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

Enclosures

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.  
2548-74

DETIAPHOS ROTOX MF LABEL -- FRONT PANEL

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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.

Detiaphos(R) ROTOX(R) MF

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

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

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

03200 See side panels for additional precautionary statements.

03250  
03300  
03350 Manufactured by: Detia Freyberg, GMBH  
03400 P. O. Box 10  
03450 6947 Laudenschach  
03500 F.R. of Germany  
03550

03600  
03650 Distributed by: Research Products Company  
03700 Div. of McShores, Inc.  
03750 P. O. Box 1460  
03800 Salina, KS 67402-1460  
03850  
03900

03950 EPA Establishment No. 33982WG01 Net Contents:  
04000 EPA Registration No. 2548-74 Net Contents:

04100  
04150  
04200 LEFT PANEL

04250 HAZARDS TO HUMANS AND DOMESTIC ANIMALS

04300  
04350  
04400 KEEP OUT OF REACH OF CHILDREN  
04450 DANGER/POISON

04500 Magnesium phosphide in pellets or their dust can be fatal if  
04550 swallowed. Do not get in eyes, in nose, on skin or on clothing.  
04600 Do not eat, drink or smoke while handling magnesium phosphide  
04650 fumigants. When the container is opened Detiaphos(R) ROTOX(R)  
04700 MP will begin to release hydrogen phosphide (phosphine) which is  
04750 an extremely toxic gas. Contact with water, acids and some  
04800 other liquids will accelerate this reaction. If a garlic odor  
04850 is detected, refer to section on respiratory protection or  
04900 applicator/worke exposure for appropriate monitoring  
04950 procedures. Pure hydrogen phosphide gas is odorless; the odor  
05000 is due to a contaminant. Since an odor may not be detected  
05050

05100 under certain circumstances, the absence of a garlic odor does  
 05150 not mean that hydrogen phosphide gas is absent. Observe proper  
 05200 application, aeration, reentry and disposal procedures specified  
 05250 elsewhere in the labeling to prevent overexposure.

05300  
 05350 FREQUENT EXPOSURE TO LOW CONCENTRATIONS ABOVE PERMISSIBLE LEVELS  
 05400 OVER A PERIOD OF DAYS OR WEEKS MAY CAUSE POISONING.  
 05450

05500 NOTE TO PHYSICIAN

05550  
 05600 Magnesium phosphide in pellets or their dust reacts with  
 05650 moisture from the air, water, acids, and many other liquids to  
 05700 release hydrogen phosphide (phosphine) gas. Mild exposure by  
 05750 inhalation causes malaise (indefinite feeling of sickness),  
 05800 ringing of ears, fatigue, nausea and pressure in chest which are  
 05850 relieved by removal to fresh air. Moderate poisoning causes  
 05900 weakness, vomiting, epigastric pain (pain just above the  
 05950 stomach), chest pain, diarrhea and dyspnea (difficulty in  
 06000 breathing). Symptoms of severe poisoning may occur within a few  
 06050 hours or up to several days, resulting in pulmonary edema (fluid  
 06100 in lungs) and may lead to dizziness, cyanosis (blue or purple  
 06150 skin color), unconsciousness and death.

06200  
 06250 In sufficient quantity, hydrogen phosphide affects the liver,  
 06300 kidneys, lungs, nervous system and circulatory system.  
 06350 Inhalation can cause lung edema (fluid in lungs) and hyperemia  
 06400 (excess of blood in a body part), small perivascular brain  
 06450 hemorrhages and brain edema (fluid in brain). Ingestion can  
 06500 cause lung and brain symptoms, but damage to the viscera (body  
 06550 cavity organs) is more common. Hydrogen phosphide poisoning may  
 06600 result in (1) pulmonary edema, (2) liver elevated serum GOT, LDH  
 06650 and alkaline phosphatase, reduced prothrombin, hemorrhage and  
 06700 jaundice (yellow skin color) and (3) kidney hematuria (blood in  
 06750 urine) and anuria (abnormal or lack of urination). Pathology is  
 06800 characteristic of hypoxia (oxygen deficiency in body tissue).  
 06850 Treatment is symptomatic.  
 06900  
 06950

07000 RIGHT PANEL

07050 DIRECTIONS FOR USE

07100  
 07150  
 07200 It is a violation of federal law to use this product in a  
 07250 manner inconsistent with its labeling.

07300  
 07350  
 07400 The "Detiaphos(R) ROTOX(R) MT and Detiaphos(R) ROTOX(R) MP  
 07450 Instruction Booklet" is a part of labeling. Refer to it for  
 07500 application procedures and other information necessary to  
 07550 properly use Detiaphos(R) ROTOX(R).  
 07600  
 07650

07700 THIS PRODUCT IS ACCOMPANIED BY THE LABELING LISTED ABOVE. READ

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 "Detiaphos(R) ROTOX(R) MT and  
 08650 Detiaphos(R) ROTOX(R) MP Instruction Booklet" for additional  
 08700 storage instructions.  
 08750

08800 DISPOSAL OF UNREACTED OR PARTIALLY REACTED PELLETS (From spills,  
 08850 leaking flasks or other sources)  
 08900

08950 Unreacted or partially reacted Detiaphos(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 "Detiaphos(R) ROTOX(R)  
 09550 MT and Detiaphos(R) ROTOX(R) MP 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.  
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10500 GENERAL

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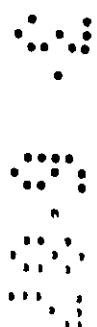
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Consult federal, state and local disposal authorities for approved procedures other than those given above. Approved procedures vary for different types of generators.

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



4/22

2-48-74 PM 3.2

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.

2548-74

DETIAPHOS ROTOX MP (small label) -- FRONT PANEL

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

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Detiaphos(R) ROTOX(R) MP

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

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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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03200  
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03300  
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 03400 P. O. Box 10  
 03450 6947 Laudenbach  
 03500 F.R. of Germany

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 04300 HAZARDS TO HUMANS AND DOMESTIC ANIMALS  
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 04800 an extremely toxic gas. Contact with water, acids and some  
 04850 other liquids will accelerate this reaction. If a reaction  
 04900 is detected, refer to section on ~~Emergency First Aid~~ *Emergency First Aid*  
 04950 ~~applicator/buffer exposure to appropriate monitoring~~ *applicator/buffer exposure to 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



05100 under certain circumstances, the absence of a garlic odor does  
 05150 not mean that hydrogen phosphide gas is absent. Observe proper  
 05200 application, aeration, reentry and disposal procedures specified  
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05450  
 05500 NOTE TO PHYSICIAN

05550  
 05600 Refer to "Detiaphos(R) ROTOX(R) MT and Detiaphos(R) ROTOX(R) MP  
 05650 Instruction Booklet" for this section.

05700  
 05750 RIGHT PANEL

05800  
 05850 DIRECTIONS FOR USE

05900  
 05950 It is a violation of federal law to use this product in a  
 06000 manner inconsistent with its labeling.

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06650  
 06700  
 ( 06750 STORAGE AND DISPOSAL

06800  
 06850 Refer to "Detiaphos(R) ROTOX(R) MT and Detiaphos(R) ROTOX(R) MP  
 06900 Instruction Booklet" for this section.



ACCEPTED  
with COMMENTS  
in EPA Letter Dated:

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Under the Federal Insecticide,  
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RESTRICTED USE  
PESTICIDE

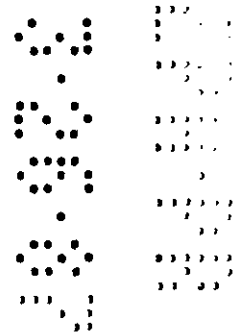
DUE TO ACUTE INHALATION TOXICITY OF HIGHLY  
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Research Products Company product manual which contains complete  
instructions for the safe use of this pesticide.

Detiaphos(R) ROTOX(R) MT  
and  
Detiaphos(R) ROTOX(R) MP

INSTRUCTION BOOKLET

EPA Registration No. 2548-73  
EPA Registration No. 2548-74  
EPA Establishment No. 33982WG01



11/22

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02800 L. Spill and Leak Procedures.....

02900 P

## I. INTRODUCTION

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## A. HISTORY

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## B. PRODUCT DESCRIPTION

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## C. PRODUCT PACKAGING

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## D. WHAT IS HYDROGEN PHOSPHIDE?

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The history of Detia(R) metal phosphide pesticides is long, dating back to the mid-1930's. In 1970 Detia(R) GAG EX-B was introduced into the United States. Detiaphos(R), which has recently been introduced into the U.S.A., contains magnesium phosphide as the active ingredient. The manufacturer, Detia Freyberg GMBH, West Germany was the early pioneer in the development of hydrogen phosphide as a fumigant gas.

Both Detiaphos(R) ROTOX(R) MF and Detiaphos(R) ROTOX(R) MT are a mixture of magnesium phosphide (34% by weight), ammonium carbamate and other inerts which are 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 0.1 grams hydrogen phosphide, the tablet about 0.5 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.

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



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

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.

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

05600 vapor pressure. Thus the penetrating capability of hydrogen  
 05650 phosphide is great. The combination of high molecular  
 05700 activity, vapor pressure and toxicity at low dosages  
 05750 accounts for its wide acceptance as a fumigant.

05800  
 05850 E. SAFETY RECOMMENDATIONS

- 05900 1. Carefully read the labeling and follow instructions  
 05950 explicitly.  
 06000 2. Never allow uninstructed persons to handle  
 06050 Detiaphos(R).  
 06100 3. Wear dry gloves made of cotton or other material when  
 06150 contact with tablets, pellets or their dust is likely.  
 06200 4. Open fumigant containers in open air. Never open in a  
 06250 flammable atmosphere.  
 06300 5. Do not allow Detia(R) to contact liquid water or to  
 06350 pile up.  
 ( 6400 6. Dispose of empty containers in a proper manner  
 J6450 consistent with the label instructions.  
 06500 7. Aerate contaminated clothing in well ventilated area  
 06550 prior to washing.  
 06600 8. Keep containers tightly closed except when removing  
 06650 product.  
 06700 9. Do not re-use magnesium phosphide containers for any  
 06750 purpose other than recycling or reconditioning.  
 06800 10. OSHA recommends that the exposure screening of  
 06850 employees be conducted to detect impaired pulmonary  
 06900 function. OSHA recommends that any employees developing  
 06950 the above condition be referred for medical attention.  
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 07050  
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II. PRECAUTIONARY STATEMENTS

( 7200 A. HAZARDS TO HUMANS AND DOMESTIC ANIMALS

07300 Keep Out of Reach of Children  
 07350 DANGER-POISON

07400  
 07450 Magnesium phosphide in pellets, tablets or their dust can be  
 07500 fatal if swallowed. Do not get in eyes, in nose, on skin or  
 07550 on clothing. Do not eat, drink or smoke while handling  
 07600 magnesium phosphide fumigants. When the container is opened  
 07650 Detiaphos(R) ROTOX(R) will begin to release hydrogen  
 07700 phosphide (phosphine) which is an extremely toxic gas.  
 07750 Contact with water, acids and some other liquids will  
 07800 accelerate this reaction.

07850  
 07900 Observe proper application and disposal procedures  
 07950 specified elsewhere in the labeling to prevent  
 08000 overexposure.

08050  
 08100 FREQUENT EXPOSURE TO CONCENTRATIONS ABOVE PERMISSIBLE LEVELS  
 08150 OVER A PERIOD OF DAYS OR WEEKS MAY CAUSE POISONING.  
 08200

08250 B. STATEMENT OF PRACTICAL TREATMENT

08350 Symptoms of overexposure to hydrogen phosphide are headache,  
08400 dizziness, nausea, difficult breathing, vomiting and  
08450 diarrhea. In all cases of overexposure get medical  
08500 attention immediately. Take victim to a doctor or emergency  
08550 treatment facility.

08600

08650 U 1. If gas or dust from tablets or pellets is inhaled: Get  
08750 exposed person to fresh air. Keep warm and make sure  
08800 person can breathe freely. If breathing has stopped,  
08850 give artificial respiration by mouth-to-mouth or other  
08900 means of resuscitation. Do not give anything by mouth  
08950 to an unconscious person.

09000

09050 U 2. If the pellets, tablets or their dust are swallowed:  
09150 Drink or administer one or two glasses of water and induce  
09200 vomiting by touching back of throat with finger, or if  
09250 available, administer syrup of ipecac. Do not give  
09300 anything by mouth if victim is unconscious or not alert.

09350

09400 U 3. If pellets, tablets or their dust gets on skin or  
09500 clothing: Brush or shake material off clothes and shoes in  
09600 well ventilated area. Allow clothes to aerate in a ventilated  
09650 area prior to laundering. Do not leave contaminated  
09700 clothing in occupied and/or confined area such as  
09750 automobiles, vans, motel rooms, homes, etc. Wash  
09800 contaminated skin thoroughly with soap and water.

09850

09900 U 4. If dust from the pellets or tablets gets in eyes:  
10000 Flush with plenty of water. Get medical attention.

10050

10100

C. NOTE TO PHYSICIAN

10150 Magnesium phosphide tablets, pellets or their dust reacts  
10200 with moisture from the air, water, acids and many other  
10250 liquids to release hydrogen phosphide (phosphine) gas. Mild  
10300 exposure by inhalation causes malaise (indefinite feeling of  
10350 sickness), ringing of ears, fatigue, nausea and pressure in  
10400 chest which are relieved by removal to fresh air. Moderate  
10450 poisoning causes weakness, vomiting, epigastric pain (pain  
10500 just above the stomach), chest pain, diarrhea and dyspnea  
10550 (difficulty in breathing). Symptoms of severe poisoning may  
10600 occur within a few hours or up to several days, resulting in  
10650 pulmonary edema (fluid in lungs) and may lead to dizziness,  
10700 cyanosis (blue or purple skin color), unconsciousness and  
10750 death.

10800

10850 In sufficient quantity hydrogen phosphide affects the liver,  
10900 kidneys, lungs, nervous system, and circulatory system.

10950

11000 Inhalation can cause lung edema (fluid in lungs) and  
11050 hyperemia (excess of blood in a body part), small  
11100 perivascular brain hemorrhages and brain edema (fluid in  
11150 brain). Ingestion can cause lung and brain symptoms but  
damage to the viscera (body cavity organs) is more common.

11200 Hydrogen phosphide poisoning may result in (1) pulmonary  
 11300 edema, (2) liver elevated serum GGT, LDH and alkaline  
 11350 phosphatase, reduced prothrombin, hemorrhage and jaundice  
 11400 (yellow skin color) and (3) kidney hematuria (blood in  
 11450 urine) and anuria (abnormal or lack of urination).  
 11500 Pathology is characteristic of hypoxia (oxygen deficiency in  
 11550 body tissue). Frequent exposure over a period of days or  
 11600 weeks may cause poisoning. Treatment is symptomatic.  
 11650

11700 The following measures are suggested for use by the  
 11750 physician in accordance with his own judgment:  
 11800

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

Magnesium phosphide in tablets, pellets or partially spent

13900 dust will release hydrogen phosphide gas if exposed to  
 13950 moisture from the air or if it comes into contact with  
 14000 water, acids or many other liquids. Piling of tablets,  
 14050 pellets or dust from their fragmentation may cause a  
 14100 temperature increase and confine the release of gas so that  
 14150 ignition could occur.

14200  
 14250 Always open flasks of Detiaphos(R) ROTOX(R) in open air.  
 14300 Never open in a flammable atmosphere because on rare  
 14350 occasions they may flash. When opening, point the container  
 14400 away from the face and body and slowly loosen the cap.  
 14450 These precautions will also reduce the applicator's exposure  
 14500 to hydrogen phosphide gas.

14550  
 14600 Pure hydrogen phosphide gas is practically insoluble in  
 14650 water and oils, and is stable at normal fumigation  
 14700 temperatures. However, it may react with certain metals and  
 14750 cause corrosion, especially at higher temperatures and  
 14800 relative humidities. Metals such as copper, brass and other  
 14850 copper alloys, and precious metals such as gold and silver  
 14900 are susceptible to corrosion by hydrogen phosphide.  
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### III. DIRECTIONS FOR USE

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#### A. GENERAL

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1. It is a violation of federal law to use this product in a manner inconsistent with its labeling. Detiaphos(R) ROTOX(R) MT and MP 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 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. Detiaphos(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 with this product when burrow



temperature is below 40 degrees F (5 degrees C).

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16600  
16650 B. PROTECTIVE CLOTHING

16750 Wear dry gloves made of cotton or other material when  
16800 contact with tablets, pellets, or their dust is likely.  
16850 Wash hands after use.  
16900

16950 C. RESPIRATORY PROTECTION

17000 Respiratory protection need not be available for outdoor  
17050 applications.  
17100

17150 D. HYDROGEN PHOSPHIDE EXPOSURE LIMITS

17200 Exposure to hydrogen phosphide must not exceed the 8 hour  
17250 TWA of 0.3 ppm.  
17300

17350 E. INDUSTRIAL HYGIENE MONITORING

17400 Monitoring is not required outdoors.  
17450

17500 F. LIST OF BURROWING PESTS

17550 Dettiaphos(R) ROTOX(R) be used out of doors only for the  
17600 control of the following burrowing rodents and moles: marmot  
17650 sp. - woodchucks and yellow-belly marmots (rockchucks),  
17700 prairie dogs (except Utah prairie dog), Norway and roof  
17750 rats, mice, ground squirrels, moles (except in Indiana),  
17800 voles, gophers and chipmunks (except in California).  
17850

17900 G. APPLICATION INSTRUCTIONS

17950 Add from 2 to 8 Dettiaphos(R) ROTOX(R) MT tablets or 10 to 40  
18000 Dettiaphos(R) ROTOX(R) MP pellets to each burrow opening.  
18050 Seal tightly by shoveling soil over the entrance. Place the  
18100 pellets or tablets far enough down the burrow that the soil  
18150 used to plug the burrow doesn't cover the pellets or  
18200 tablets, slowing down their action. Where possible  
18250 subsurface tunnels or runways should be treated every 5 to  
18300 10 feet with a dose of 4 to 8 tablets or 20 to 40 pellets.  
18350 Use lower rates in smaller burrows, in tight soils, under  
18400 moist soil conditions and higher rates in larger burrows, in  
18450 porous soils and/or when soil moisture is low. In extremely  
18500 dry or porous soil, it is sometimes not possible to obtain  
18550 satisfactory results. This is particularly true in  
18600 instances where the burrow systems are extensive such as  
18650 moles or gophers. It is always better not to fumigate  
18700 during extended periods of dry weather. Treat reopened  
18750 burrows and fresh runways a second time 1 to 3 days after  
18800 the initial treatment.  
18850

18900 Dettiaphos(R) may be used out of doors only, for control of  
18950 burrowing pests. Do not use within 15 feet (5 meters) of  
19000 inhabited structures. Do not apply to burrows which may  
19050 open under or into occupied buildings.  
19100

19150 H. ENVIRONMENTAL HAZARDS

19200 This product is highly toxic to wildlife. Non-target

19250 organisms exposed to hydrogen phosphide gas in burrows will  
 19300 be killed. Do not apply directly to water or wetlands  
 19350 (swamps, bogs, marshes, and potholes). Do not contaminate  
 19400 water by cleaning of equipment or disposal of wastes.  
 19500

19550 I. ENDANGERED SPECIES RESTRICTIONS

19600 The use of Dethiaphos(R) in a manner that may kill or  
 19650 otherwise harm an endangered or threatened species or  
 19700 adversely modify their habitat is a violation of federal  
 19750 law. The use of this product is controlled to prevent death  
 19800 or harm to endangered or threatened species that occur in  
 19850 the following counties or elsewhere in their range. Use of  
 19900 this product in the areas listed below is prohibited without  
 19950 first contacting and obtaining permission from the  
 20000 Endangered Species Specialist at the nearest regional  
 20050 offices of the U. S. Fish and Wildlife Service (FWS).  
 20100

20150 Areas Inhabited by Endangered or Threatened Species

- 20200 (1) Black-footed ferret - States of Arizona, Colorado,  
 20250 Kansas, Montana, Nebraska, New Mexico, North Dakota,  
 20300 Oklahoma, South Dakota, Texas, Utah and Wyoming.  
 20350
- 20400 (2) Blunt-nosed leopard lizard - Counties of Kern,  
 20450 Kings, Fresno, Madera, Merced, and Tulare in the State  
 20500 of California.  
 20550
- 20600 (3) Desert tortoise - Washington county in the state of  
 20650 Utah.  
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- 20750 (4) Eastern indigo snake - States of Florida and  
 20800 Georgia.  
 20850
- 20900 (5) San Joaquin kit fox - Counties of Kern, Kings,  
 20950 Fresno, Merced, Monterey, San Benito, San Luis Obispo,  
 21000 Santa Barbara, Tulare and Ventura in the state of  
 21050 California.  
 21100

21150 J. SPECIAL LOCAL RESTRICTIONS

- 21200 (1) NORTH CAROLINA  
 21250 Dethiaphos(R) ROTOX(R) may only be used for control of  
 21300 rats and mice in the state of North Carolina. Use  
 21350 against other pests is not permitted.  
 21400  
 21450
- 21500 (2) OKLAHOMA  
 21550 A special permit for black-tailed prairie dog control  
 21600 by poisoning is required in Oklahoma. Contact the  
 21650 Oklahoma State Department of Wildlife Conservation to  
 21700 obtain this permit.  
 21750
- 21800 (3) WISCONSIN  
 21850 Wisconsin to control small mammals, except rats or  
 21900 mice. Please contact your local Department of Natural

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(3) WISCONSIN

A state permit is required for use of pesticides in Wisconsin to control small mammals, except rats or mice. Please contact your local Department of Natural Resources office for information.

(4) INDIANA

Use of Detiaphos(R) ROTOX(R) 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 Detiaphos(R) ROTOX(R) 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.

Detiaphos(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 Detiaphos(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 Detiaphos(R) ROTOX(R) MF or Detiaphos(R) ROTOX(R) MT 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

24900 control agency or the hazardous waste representative at  
25000 the nearest EPA regional office for guidance. Do not  
25050 contaminate water by disposal.

25100  
25150 Some local and state waste disposal regulations may vary  
25200 from the following recommendations. Disposal procedures  
25250 should be reviewed with appropriate authorities to  
25300 ensure compliance with local regulations.

25350 FOR SPECIFIC INSTRUCTIONS SEE "SPILL AND LEAK  
25400 PROCEDURES" ON PAGE OF THIS MANUAL.

3. DISPOSAL OF EMPTY FLASKS

a. Method\_Qns: 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  
rinstate in a sanitary landfill or by other approved  
procedures. Small quantities can be poured out on  
the ground.

b. Method\_Lws: Remove lids and place empty flasks outdoors  
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.

L. SPILL AND LEAK PROCEDURES

1. GENERAL

A spill other than incidental to application or normal  
handling or punctured flasks 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  
complies with DOT regulations.

3. LEAKING FLASK PROCEDURES

If aluminum flasks have been punctured or damaged  
causing a leak, the product may be immediately used, the  
container may be temporarily repaired with aluminum tape  
or the Detiaphos(R) may be transferred from the damaged  
flask to a sound metal container which should be sealed  
and properly labeled as magnesium phosphide. Transport  
the damaged containers to an area suitable for pesticide

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storage for inspection. Further instructions and recommendations may be obtained, if required, from Research Products Company.

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

4. SPILL PROCEDURES

Do not flush spillage down drain with water. DO NOT 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 must 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 6 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.

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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.

