

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 accompany-
ing 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 in-
structions for the safe use of this pesticide.

APPLICATION PROCEDURES FOR

Detin®

ROTOX® AT

AND

Detin®

ROTOX® AP

ACCEPTED

2548-69

25 OCT 1988

UNDER THE FEDERAL INSECTICIDE
FUNGICIDE AND RODENTICIDE ACT
FOR ECONOMIC POISON REGISTER-
ED UNLESS NOTED OTHERWISE SUBJECT
TO ATTACHED COMMENTS.

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

EPA Establishment No. 33982WG01
EPA Registration No. 2548-69
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II. PRECAUTIONARY STATEMENTS

I. INTRODUCTION

A. HISTORY

The history of Delia[®] pesticides is long, dating back to the mid-1930's. In 1970 Delia[®] GAS EX-8 was introduced into the United States. The manufacturer, Delia Freyberg GmbH, West Germany was the early pioneer in the development of hydrogen phosphide as a fumigant gas.

B. PRODUCT DESCRIPTION

Both Delia[®] ROTOX[®] AP and Delia[®] ROTOX[®] A[®] 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 ~~about 1/2 in diameter and 1/5 in thick~~ spherical in shape (5/8 in diameter) and weigh 3.0 grams each. A pellet will produce about 0.2 gram 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.

Delia[®] ROTOX[®] ~~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.

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 insects, 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.

E. SAFETY RECOMMENDATIONS

1. Carefully read the labeling and follow instructions explicitly.
2. Never allow uninstructed persons to handle Delia[®].
3. Wear dry gloves made of cotton or other material when contact with tablets, pellets or their dust is likely.
4. Open fumigant containers in open air. Never open in a flammable atmosphere.
5. Do not allow Delia[®] to contact liquid water or to pile up.
6. Dispose of empty containers in a proper manner consistent with the label instructions.
7. Aerate contaminated clothing in well ventilated area prior to washing.
8. Keep containers tightly closed except when removing product.
9. Do not reuse aluminum phosphide containers for any purpose other than recycling or reconditioning.
10. 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.

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, Delia[®] ROTOX[®] 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. 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 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. Gut 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:

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

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

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.

Always open flasks of Delta[®] ROTOX[®] in open air. 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.

III. DIRECTIONS FOR USE

A. GENERAL

- It is a violation of federal law to use this product in a manner inconsistent with its labeling. Delta[®] ROTOX[®] AT and AP are Restricted Use Pesticides due to the acute inhalation toxicity of hydrogen phosphide (phosphine, PH₃) 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 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.
- Delta[®] 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

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- Do not fumigate with this product when burrow temperature is below 40°F (5°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

Delta[®] ROTOX[®] AT and AP may be used out of doors only for the control of the following burrowing rodents and insects: *Microtus*, *Spermophilus*, *Citellus*, and yellow legged marmots (*Callospermophilus*).

Do not use Delta[®] ROTOX[®] AT and AP for the control of burrowing rodents and insects in occupied buildings or structures. Do not use Delta[®] ROTOX[®] AT and AP for the control of burrowing rodents and insects in occupied buildings or structures in California.

G. APPLICATION INSTRUCTIONS

Add from 1 to 4 Delta[®] ROTOX[®] AT tablets or 1 to 20 Delta[®] ROTOX[®] AP pellets to each burrow opening. Seal entry by shoving moist dirt into the entrance to the levels of tablets later dug down the burrow that the pellets dug to plug the burrow closed below the pellets. Tablets should be placed down the burrow, not on the surface. When pellets are used, surface barrier or runways should be treated only. If the hole is with a diameter of 1 to 4 inches or less, 1 to 2 tablets (or 10 to 20 pellets) will do the job. If the hole is 4 to 8 inches in diameter, 2 to 4 tablets (or 20 to 40 pellets) will do the job. If the hole is 8 to 12 inches in diameter, 4 to 8 tablets (or 40 to 80 pellets) will do the job. If the hole is 12 to 16 inches in diameter, 8 to 16 tablets (or 80 to 160 pellets) will do the job. If the hole is 16 to 20 inches in diameter, 16 to 20 tablets (or 160 to 200 pellets) will do the job. If the hole is 20 to 24 inches in diameter, 20 to 24 tablets (or 200 to 240 pellets) will do the job. If the hole is 24 to 28 inches in diameter, 24 to 28 tablets (or 240 to 280 pellets) will do the job. If the hole is 28 to 32 inches in diameter, 28 to 32 tablets (or 280 to 320 pellets) will do the job. If the hole is 32 to 36 inches in diameter, 32 to 36 tablets (or 320 to 360 pellets) will do the job. If the hole is 36 to 40 inches in diameter, 36 to 40 tablets (or 360 to 400 pellets) will do the job. If the hole is 40 to 44 inches in diameter, 40 to 44 tablets (or 400 to 440 pellets) will do the job. If the hole is 44 to 48 inches in diameter, 44 to 48 tablets (or 440 to 480 pellets) will do the job. If the hole is 48 to 52 inches in diameter, 48 to 52 tablets (or 480 to 520 pellets) will do the job. If the hole is 52 to 56 inches in diameter, 52 to 56 tablets (or 520 to 560 pellets) will do the job. If the hole is 56 to 60 inches in diameter, 56 to 60 tablets (or 560 to 600 pellets) will do the job. If the hole is 60 to 64 inches in diameter, 60 to 64 tablets (or 600 to 640 pellets) will do the job. If the hole is 64 to 68 inches in diameter, 64 to 68 tablets (or 640 to 680 pellets) will do the job. If the hole is 68 to 72 inches in diameter, 68 to 72 tablets (or 680 to 720 pellets) will do the job. If the hole is 72 to 76 inches in diameter, 72 to 76 tablets (or 720 to 760 pellets) will do the job. If the hole is 76 to 80 inches in diameter, 76 to 80 tablets (or 760 to 800 pellets) will do the job. If the hole is 80 to 84 inches in diameter, 80 to 84 tablets (or 800 to 840 pellets) will do the job. If the hole is 84 to 88 inches in diameter, 84 to 88 tablets (or 840 to 880 pellets) will do the job. If the hole is 88 to 92 inches in diameter, 88 to 92 tablets (or 880 to 920 pellets) will do the job. If the hole is 92 to 96 inches in diameter, 92 to 96 tablets (or 920 to 960 pellets) will do the job. If the hole is 96 to 100 inches in diameter, 96 to 100 tablets (or 960 to 1000 pellets) will do the job.

Delta[®] 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 ponds). Do not contaminate water by cleaning of equipment or disposal of wastes.

I. ENDANGERED SPECIES RESTRICTIONS

The use of Delta[®] 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 - States of Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah and Wyoming.
- (2) Bunt-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, Santa Cruz, and Ventura in the state of California.

J. SPECIAL LOCAL RESTRICTIONS

(1) NORTH CAROLINA

Delta[®] ROTOX[®] 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

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

(4) INDIANA

Use of Delta[®] ROTOX[®] 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 Delta[®] 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.

Delta[®] ROTOX[®] 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 Delta[®] 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 Delta[®] ROTOX[®] AP or Delta[®] ROTOX[®] 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.

FOR SPECIFIC INSTRUCTIONS SEE SPILL AND LEAK PROCEDURES BELOW

3. 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 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 EMBROIDERED CASE

Check all empty flasks. If they are damaged handle as described below. They are to be promptly returned to the container or other suitable packaging which complies with DOT regulations.

3. LEAK/SPILL PROCEDURES

If empty 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 Delta[®] may be transferred from the damaged flask to a sound metal container which should be sealed and properly labeled as aluminum phosphide. Transport the damaged containers to an area suitable for pesticide 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 react, decompose, gather it up and place into open top perforated or clean cans and process 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

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 in to 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 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.