

# MATERIAL SAFETY DATA SHEET: ALUMINUM PHOSPHIDE

	<u>US EPA REG. NO.</u>	<u>CANADA REG. NO.</u>
<b>FUMTOXIN® TABLETS</b>	72959-1	19227
<b>FUMITOXIN® PELLETS</b>	72959-2	19226
<b>FUMITOXIN® BAGS</b>	72959-3	

## SECTION I – PRODUCT INFORMATION

**Distributor:**

D & D Holdings, Inc.  
PO BOX 116(153 Triangle Drive)  
Weyers Cave, VA 24486 USA  
Phone: (540) 234-9281/1-800-330-2525  
Fax: (540) 234-8225  
Email: [degesch@degeschamerica.com](mailto:degesch@degeschamerica.com)  
Internet: [www.degeschamerica.com](http://www.degeschamerica.com)

**Manufacturer:**

People's Republic of China

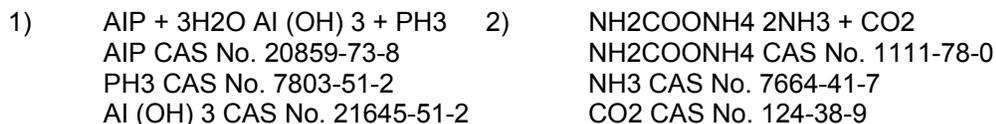
**EMERGENCY TELEPHONE NOS.:**

Medical Emergencies Prosar (Human and Animal): 1-800-308-4856  
All Other Chemical Emergencies (DOT): Chemtrec (800) 424-9300 – International: 202-483-7616  
All Other Information: D & D Holdings: (540) 234-9281/1-800-330-2525  
Date of Revision: January 2009 — Form MSDS/phosphine

## SECTION II – HAZARDOUS INGREDIENTS INFORMATION

**Identity:**

Aluminum Phosphide (AIP) – react with water to produce phosphine, hydrogen phosphide. PH<sub>3</sub> as shown in Equation 1 is formulated with 55% aluminum phosphide and also contains ammonium carbamate (AC) and inert ingredients. Ammonium carbamate releases ammonia and carbon dioxide as shown in Equation 2.

**NFPA Chemical Hazard Ratings:**

Flammability Hazard 4  
Health Hazard 4  
Reactivity Hazard 2  
Special Hazard W

**SARA Physical and Health Hazards:**

Fire  
Reactivity  
Immediate (Acute)

**Inhalation Exposure Limits:**

Component	OSHA PEL		ACGIH TLV		NIOSH
	TWA	TWA	STEL	IDLH	
	(ppm)	(ppm)	(ppm)	(ppm)	
Hydrogen Phosphide*	0.3	0.3	1.0	50	
Ammonia	50	25	35	300	
Carbon Dioxide	5,000	5,000	30,000	40,000	

## SECTION III – PHYSICAL CHARACTERISTICS

**Boiling Point:**

AIP > 1000°C  
PH<sub>3</sub> -87.7°C

**Vapor Pressure:**

AIP 0mm Hg  
PH<sub>3</sub> 40mm Hg @ -129.4°C  
AC 100mm Hg @ 26.7°C

**Specific Gravity of Vapors (Air=1):**

AIP N/A  
PH<sub>3</sub> 1.17

**Solubility in Water:**

AIP Insoluble, reacts  
PH<sub>3</sub> 26cc in 100 ml water at 17°C  
AC Very soluble, reacts

**Appearance and Odor:**

Aluminum phosphide has a greenish-gray color and the hydrogen phosphide (phosphine, PH<sub>3</sub>) gas produced by these chemicals has an odor described as similar to garlic, carbide or decaying fish.

**Specific Gravity:**

AIP 2.85

**Melting Point:**

AIP > 1000°C

PH<sub>3</sub> -133.5°C

<b>SECTION IV – FIRE AND EXPLOSION HAZARD DATA</b>
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**Flash Point:**

Aluminum phosphide, itself is not flammable. However, it will react readily with water to produce hydrogen phosphide (phosphine, PH<sub>3</sub>) gas which may ignite spontaneously in air at concentrations above its LEL of 1.8% v/v. UEL of hydrogen phosphide is not known.

**Extinguishing Media:**

Suffocate flames with sand, carbon dioxide or dry extinguishing chemicals.

**Special Fire Fighting Procedures:**

Do not use water on metal phosphide fires.

**Respiratory Protection:**

Wear NIOSH/MSHA approved SCBA or equivalent respiratory protection.

**Protective Clothing:**

Wear gloves when handling Aluminum Phosphide tablets, pellets or dust.

**Unusual Fire and Explosion Hazards:**

Hydrogen phosphide-air mixtures at concentrations above the lower flammable limit of 1.8% v/v, PH<sub>3</sub> may ignite spontaneously. Ignition of high concentrations of hydrogen phosphide can produce a very energetic reaction. Explosions can occur under these conditions and may cause severe personal injury. **Never allow the buildup of hydrogen phosphide to exceed explosive concentrations.** Open containers of metal phosphides in open air only and never in a flammable atmosphere. Do not confine spent or partially spent dust from metal phosphide fumigants as the slow release of hydrogen phosphide from these materials may result in the formation of an explosive atmosphere. Spontaneous ignition may occur if large quantities of aluminum phosphide are piled in contact with liquid water. This is particularly true if quantities of this material are placed in moist or spoiled grain which can provide partial confinement of the hydrogen phosphide gas liberated by hydrolysis.

Fires containing hydrogen phosphide or metal phosphides will produce phosphoric acid by the following reaction:



<b>SECTION V – REACTIVITY DATA</b>
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**Stability:**

Aluminum phosphide is stable to most chemical reactions, except for hydrolysis. It will react with moist air, liquid water, acids and some other liquids to produce toxic and flammable hydrogen phosphide gas. Hydrogen phosphide may react vigorously with oxygen and other oxidizing agents.

**Incompatibility:**

Avoid contact with water and oxidizing agents.

**Corrosion:**

Hydrogen phosphide gas may react with certain metals and cause corrosion, especially at higher temperatures and relative humidities. Metals such as copper, brass and other copper alloys, and precious metals such as gold and silver are susceptible to corrosion by phosphine. Small electric motors, smoke detectors, brass sprinkler heads, batteries and battery chargers, fork lifts, temperature monitoring systems, switching gears, communication devices, computers, calculators and other electrical equipment may be damaged by this gas. Hydrogen phosphide will also react with certain metallic salts and, therefore, sensitive items such as photographic film, some inorganic pigments, etc., should not be exposed.

**Hazardous Polymerization:**

Will not occur.

<b>SECTION VI – HEALTH HAZARD INFORMATION</b>
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**Routes of Entry:**

The dermal toxicity of aluminum phosphide is very low. The LD<sub>50</sub> via the dermal route is greater than 5,000 mg per kilogram for a 1-hour exposure. Primary routes of exposure are inhalation and ingestion.

**Acute and Chronic Health Hazards:**

Aluminum Phosphide is a highly acute toxic substance. The LC<sub>50</sub> for hydrogen phosphide gas is about 180 ppm for a 1-hour inhalation exposure. The acute oral toxicity of the Aluminum Phosphide formulations was found to be 11.5 mg/kg of body weight. Aluminum phosphide and phosphine are not known to cause chronic poisoning.

**Carcinogenicity:**

Aluminum Phosphide and phosphine are not carcinogenic and are not listed as such by NTP, IARC or OSHA.

**Signs and Symptoms of Exposure:**

Aluminum phosphide tablets, pellets and dust react with moisture from the air, acids and many other liquids to release hydrogen phosphide (phosphine, PH<sub>3</sub>) gas. Mild exposure by inhalation causes malaise (indefinite feeling of sickness), ringing in the ears, fatigue, nausea and pressure in the chest which is relieved by removal to fresh air. Moderate poisoning causes weakness, vomiting, pain just above the stomach, chest pain, diarrhea and dyspnea (difficulty in breathing). Symptoms of severe poisoning may occur within a few hours to several days resulting in pulmonary edema (fluid in lungs) and may lead to dizziness, cyanosis (blue or purple skin color), unconsciousness, and death.

**Emergency and First Aid Procedures:**

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

**If inhaled:** - Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth if possible. Keep warm and make sure person can breathe freely. Call a poison control center or doctor for further treatment advice.

**If swallowed:** - Call a poison control center or doctor immediately for treatment advice. Have person drink 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 to an unconscious person.

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

**If in eyes:** - Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for further treatment advice.

**For Assistance Contact:**

PESTCON SYSTEMS, INC  
1808 Firestone Parkway  
Wilson, NC 27893  
Telephone: 252-237-7923/800-548-2778  
Fax: 252-243-1832/252-237-3259  
Internet Address: [www.pestcon.com](http://www.pestcon.com)  
Email: [info@pestcon.com](mailto:info@pestcon.com)

OR

DEGESCH AMERICA, INC.  
PO Box 116 (153 Triangle Dr.)  
Weyers Cave, VA 24486  
540-234-9281/800-330-2525  
540-234-2525  
[www.degeschamerica.com](http://www.degeschamerica.com)  
[degesch@degeschamerica.com](mailto:degesch@degeschamerica.com)

Medical Emergencies (Human and Animal) call Prozar: 1-800-308-4856

All other Chemical Emergencies (DOT): Chemtrec (800) 424-9300-International: (202) 483-7616

**SECTION VII – PRECAUTIONS FOR SAFE HANDLING****Spill Cleanup Procedures:**

If possible, dispose of spilled Aluminum Phosphide by use according to label instructions. Freshly spilled material which has not been contaminated by water or foreign matter may be replaced into original containers. Punctured flasks or containers may be temporarily repaired using aluminum tape. If the age of the spill is unknown or if the product has been contaminated with soil, debris, water, etc. gather up the spillage in small open buckets having a capacity no larger than about 1 gallon. Do not add more than about 1 to 1.5 kg (2 to 3 lbs.) to a bucket. If on-site wet deactivation is not feasible, transport the uncovered buckets in open vehicles to a suitable area. Wear gloves when handling Aluminum Phosphide tablets and pellets. Respiratory protection may be required during cleanup of spilled material. If the concentration of hydrogen phosphide is unknown, NIOSH/MSHA approved SCBA or its equivalent must be worn.

Small amounts of spillage, from about 4 to 8 kg (9 to 18 lbs.) may be spread out over the ground in an open area to be deactivated by atmospheric moisture. Alternatively, spilled Aluminum Phosphide may be deactivated by the wet method as described in the following:

**Wet Deactivation of Spilled Aluminum Phosphide:**

1. Deactivating solution is prepared by adding the appropriate amount of low sudsing detergent to water in a drum or other suitable container. A 2% solution or 4 cups of detergent in 30 gallons is suggested. The container should be filled with deactivating solution to within a few inches of the top.
2. The material is added slowly to the deactivating solution and stirred so as to thoroughly wet all of the product. This should be carried out in open air and respiratory protection may be required. At no time should the deactivation drum be covered.
3. No more than about 45 to 50 lbs. of Aluminum Phosphide should be added to 15 gallons of water-detergent mixture.
4. Allow the mixture to stand, with occasional stirring, for about 36 hours. The resultant slurry of dust will then be safe for disposal.
5. Dispose of the slurry of deactivated material, with or without preliminary decanting, at a sanitary landfill or other suitable site approved by local authorities. Where permissible, this slurry may be poured into a storm sewer or out onto the ground.

### **Disposal of Spent Aluminum Phosphide:**

When being disposed of, spilled or partially reacted Aluminum Phosphide is considered hazardous wastes under existing Federal Regulations. If properly exposed, the grayish-white residual dust after a fumigation will not be a hazardous waste and normally contains only a very small amount of unreacted aluminum phosphide. This waste will be safe for disposal. However, the spent residual dust from incompletely exposed Aluminum Phosphide may require special care.

Triple rinse tablet and pellet flasks and stoppers with water. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities. Rinsate may be disposed of in a storm sewer, sanitary landfill or by other approved procedures. Or, it is permissible to remove lids and expose empty flasks to atmospheric conditions until the residue in the flasks is reacted. Then puncture and dispose of in a sanitary landfill or other approved site, or by other procedures approved by state and local authorities.

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

1. Confinement of partially spent residual materials, as in a closed container, or collection and storage of large quantities of dust may result in a fire or explosion hazard. Small amounts of hydrogen phosphide may be given off from unreacted aluminum phosphide, and confinement of the gas may result in a flash.
2. In open areas, small amounts of spent residual dust may be disposed of on site by burial or by spreading over the land surface away from inhabited buildings.
3. Residual dust from Aluminum Phosphide may also be collected and disposed of at a sanitary landfill, or other approved sites or by other procedures approved by Federal, State or Local authorities.
4. From 3 to 5 kg (7 to 10 lbs.) of spent dust from 2 to 3 flasks of Aluminum Phosphide may be collected for disposal in a 1-gallon bucket. Larger amounts, up to about one-half case, may be collected in burlap, cotton or other types of porous cloth bags for transportation in an open vehicle to the disposal site. Do not collect dust from more than 7 flasks of tablets, 10 flasks of pellets (about 11 kg or 25 lbs.) in a single bag. Do not pile cloth bags together. Do not use this method for partially spent or "green" dust. **Caution:** Do not collect dust in large drums, dumpsters, plastic bags or other containers where confinement may occur.

### **Precautions to be taken in Handling and Storage:**

Store Aluminum Phosphide products in a locked, well-ventilated area away from heat. Post as a pesticide storage area. Do not store in buildings inhabited by humans or domestic animals.

### **Other Precautions:**

1. Do not allow water or other liquids to contact Aluminum Phosphide tablets, pellets or their dust.
2. Do not pile up large quantities of Aluminum Phosphide during fumigation or disposal.
3. Once exposed, do not confine Aluminum Phosphide or allow hydrogen phosphide concentrations to exceed the LEL.
4. Open containers of Aluminum Phosphide only in open air. Do not open in a flammable atmosphere. Hydrogen phosphide in the head space of containers may flash upon exposure to atmospheric oxygen.
5. Aluminum Phosphide Tablets and Pellets are restricted use pesticides due to acute inhalation toxicity or highly toxic phosphine gas. For retail sale and use only by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification.
6. See EPA accepted labeling for additional precautions and directions for use.

## **SECTION VIII – CONTROL MEASURES**

### **Respiratory Protection:**

NIOSH/MSHA approved full-mask with approved canister for phosphine (hydrogen phosphide, PH<sub>3</sub>) may be worn at concentrations up to 15 ppm. At levels above this or when the hydrogen phosphide concentration is unknown, NIOSH/MSHA approved SCBA or equivalent must be worn.

### **Protective Clothing:**

Wear gloves when handling aluminum phosphide tablets, pellets or dust.

### **Eye Protection:**

None required.

### **Ventilation:**

Local ventilation is generally adequate to reduce hydrogen phosphide levels in fumigated areas to below the TLV/TWA. Exhaust fans may be used to speed the aeration of silos, warehouses, shipholds, containers, etc.

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