

# MATERIAL SAFETY DATA SHEET: ALUMINUM PHOSPHIDE

U.S. EPA Reg. No.

Canada Reg. No.

FUMITOXIN® TABLETS  
FUMITOXIN® PELLETS

72959-1  
72959-2

19227  
19226

**PROPER DOT SHIPPING NAME: ALUMINUM PHOSPHIDE, 4.3 (6.1) UN1397 PG I DANGEROUS WHEN WET, POISON LABELS APPLY**

## SECTION I - PRODUCT INFORMATION

### Manufacturer:

D & D Holdings  
153 Triangle Dr.  
P. O. Box 116  
Weyers Cave, VA 24486 USA

Telephone: (540) 234-9281 / 1-800-330-2525  
Telefax: (540) 234-8225 / 1-800-548-2778  
Internet Address: www.degeschamerica.com  
E-mail: degesch@degeschamerica.com

### EMERGENCY TELEPHONE NOS.:

Emergency – Call PROSAR: 1-800-308-4856 for human or animal emergencies  
Call Chemtrec: 1-800- 424-9300 for all other chemical emergencies  
Emergency and Information - DEGESCH America, Inc. (540) 234-9281 / 1-800-330-2525  
Pestcon Systems, Inc. (252) 237-7923 / 1-800-548-2778

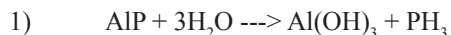
Fumitoxin tablets and pellets are available as 0.6g pellets and 3.0g tablets.

Date of Revision: March 2011

## SECTION II - HAZARDOUS INGREDIENTS INFORMATION

### Identity:

Fumitoxin and Aluminum Phosphide (AIP) - react with water to produce phosphine (hydrogen phosphide, PH<sub>3</sub>) as shown in Equation 1. Fumitoxin 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.



AIP CAS No. 20859-73-8  
PH<sub>3</sub> CAS No. 7803-51-2  
Al(OH)<sub>3</sub> CAS No. 21645-51-2

NH<sub>2</sub>COONH<sub>4</sub> CAS No. 1111-78-0  
NH<sub>3</sub> CAS No. 7664-41-7  
CO<sub>2</sub> CAS No. 124-38-9

### 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 (ppm)	TWA (ppm)	STEL (ppm)	IDLH (ppm)
Phosphine (Hydrogen Phosphide, PH <sub>3</sub> )	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

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

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

### Vapor Pressure:

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

### 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:**

Fumitoxin and aluminum phosphide have a greenish-gray color and the phosphine (hydrogen phosphide, 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

**SECTION IV - FIRE AND EXPLOSION HAZARD DATA****Flash Point:**

Aluminum phosphide and Fumitoxin are not themselves flammable. However, they react readily with water to produce phosphine (hydrogen phosphide, PH<sub>3</sub>) gas which may ignite spontaneously in air at concentrations above its LEL of 1.8% v/v (18,000 ppm). UEL of phosphine (hydrogen phosphide, PH<sub>3</sub>) 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 Fumitoxin tablets, pellets or dust.

**Unusual Fire and Explosion Hazards:**

Phosphine (hydrogen phosphide, PH<sub>3</sub>) -air mixtures at concentrations above the lower flammable limit of 1.8% v/v (18,000 ppm). Phosphine (hydrogen phosphide, PH<sub>3</sub>) may ignite spontaneously. Ignition of high concentrations of phosphine (hydrogen phosphide, PH<sub>3</sub>) can produce a very energetic reaction. Explosions can occur under these conditions and may cause severe personal injury. Never allow the buildup of phosphine (hydrogen phosphide, PH<sub>3</sub>) 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 phosphine (hydrogen phosphide, PH<sub>3</sub>) from these materials may result in the formation of an explosive atmosphere. Spontaneous ignition may occur if large quantities of aluminum phosphide or magnesium phosphide are piled in contact with liquid water. This is particularly true if quantities of these materials are placed in an environment (i.e., moist or spoiled grain) which can provide partial confinement of the phosphine (hydrogen phosphide, PH<sub>3</sub>) gas liberated by hydrolysis.

Fires containing phosphine (hydrogen phosphide, PH<sub>3</sub>) or metal phosphides will produce phosphoric acid by the following reaction:

**SECTION V - REACTIVITY DATA****Stability:**

Fumitoxin and aluminum phosphide are stable to most chemical reactions, except for hydrolysis. They will react with moist air, liquid water, acids and some other liquids to produce toxic and flammable phosphine (hydrogen phosphide, PH<sub>3</sub>) gas. Phosphine (hydrogen phosphide, PH<sub>3</sub>) may react vigorously with oxygen and other oxidizing agents.

**Incompatibility:**

Avoid contact with water and oxidizing agents.

**Corrosion:**

Phosphine (hydrogen phosphide, PH<sub>3</sub>) 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. Phosphine (hydrogen phosphide, PH<sub>3</sub>) 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.

**SECTION VI - HEALTH HAZARD INFORMATION****Routes of Entry:**

The dermal toxicity of aluminum phosphide is very low. The LD50 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:**

Fumitoxin and aluminum phosphide are highly acute toxic substances. The LC50 for phosphine (hydrogen phosphide, PH<sub>3</sub>) gas is about 180 ppm for a one-hour inhalation exposure. The acute oral toxicity of the Fumitoxin formulations was found to be 11.5 mg/kg of body weight. Aluminum phosphide and phosphine (hydrogen phosphide, PH<sub>3</sub>) are not known to cause chronic poisoning.

**Carcinogenicity:**

Aluminum phosphide and phosphine (hydrogen phosphide, PH<sub>3</sub>) 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 overexposure 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.

#### **If the gas or dust from aluminum phosphide is inhaled:**

Get exposed 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. Contact a poison control center or doctor for treatment advice.

#### **If aluminum phosphide pellets, tablets or powder are swallowed:**

Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not give anything by mouth to an unconscious person. Do not induce vomiting unless told to by a poison control center or doctor.

#### **If powder or granules of aluminum phosphide get on skin or clothing:**

Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

#### **If dust from pellets or tablets gets 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 treatment advice.

**HOTLINE NUMBER:** Have the product container, label or applicator's manual with you when calling a poison control center, doctor, or when going for treatment. **CONTACT 1-800-308-4856 FOR ASSISTANCE WITH HUMAN OR ANIMAL MEDICAL EMERGENCIES.** You may also contact Degesch America, Inc. (540) 234-9281 / 1-800-330-2525 or Pestcon Systems, Inc. (252) 237-7923 / 1-800-548-2778 OR CHEMTREC-1-800-424-9300 for all other chemical emergencies.

## **SECTION VII - PRECAUTIONS FOR SAFE HANDLING**

### **Spill Cleanup Procedures:**

If possible, dispose of spilled Fumitoxin 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 1.5kg (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 Fumitoxin tablets and pellets.

Respiratory protection may be required during cleanup of spilled material. If the concentration of phosphine (hydrogen phosphide, PH<sub>3</sub>) 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 Fumitoxin may be deactivated by the wet method as described in the following:

### **Wet Deactivation of Spilled Fumitoxin:**

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 Fumitoxin should be added to 15 gallons of water-detergent mixture. Add weights or otherwise ensure that Fumitoxin stays submerged until deactivation is completed.
4. Allow the mixture to stand, with occasional stirring, for about 36 hours. The resultant slurry of dust or packaged product 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.

### **For Assistance:**

Contact -

D & D Holdings  
Telephone: (540) 234-9281 / (800) 330-2525  
Fax: (540) 234-8225  
Internet address: [www.degeschamerica.com](http://www.degeschamerica.com)  
E-Mail: [degesch@degeschamerica.com](mailto:degesch@degeschamerica.com)

or

Human or Animal Emergencies – PROSAR: 1-800-308-4856  
All other chemical emergencies – CHEMTREC: 1-800-424-9300

**Disposal of Spent Fumitoxin:**

When being disposed of, spilled or partially reacted Fumitoxin 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 Fumitoxin 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 or spent packaged products may be disposed of on site by burial or by spreading over the land surface away from inhabited buildings.
3. Residual dust from Fumitoxin 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 Fumitoxin 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 Fumitoxin products in a locked, dry, 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 Fumitoxin tablets, pellets or their dust.
2. Do not pile up large quantities of Fumitoxin during fumigation or disposal.
3. Once exposed, do not confine Fumitoxin or allow phosphine (hydrogen phosphide,  $\text{PH}_3$ ) concentrations to exceed the LEL.
4. Open containers of Fumitoxin only in open air. Do not open in a flammable atmosphere. Phosphine (hydrogen phosphide,  $\text{PH}_3$ ) in the head space of containers may flash upon exposure to atmospheric oxygen.
5. Fumitoxin tablets and pellets are restricted use pesticides due to acute inhalation toxicity of highly toxic phosphine (hydrogen phosphide,  $\text{PH}_3$ ) gas. For retail sale to 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 approved labeling for additional precautions and directions for use.

**SECTION VIII - CONTROL MEASURES****Respiratory Protection:**

NIOSH/MSHA approved full-face mask with approved canister for phosphine (hydrogen phosphide,  $\text{PH}_3$ ) may be worn at concentrations up to 15 ppm. At levels above this or when the phosphine (hydrogen phosphide,  $\text{PH}_3$ ) concentration is unknown, NIOSH/MSHA approved SCBA or equivalent must be worn.

**Protective Clothing:**

Wear gloves when contact with aluminum phosphide tablets, pellets or dust is likely to occur.

**Eye Protection:**

None required.

**Ventilation:**

Local ventilation is generally adequate to reduce phosphine (hydrogen phosphide,  $\text{PH}_3$ ) 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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