Common Name: ALUMINUM PHOSPHIDE

CAS Number: 20859-73-8
DOT Number: UN 1397
DOT Hazard Class: 4.3 (Dangerous When Wet)

HAZARD SUMMARY
* Aluminum Phosphide can affect you when breathed in.
* Contact can irritate the skin and eyes.
* Breathing Aluminum Phosphide can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
* Repeated exposure may damage the lungs, kidneys and liver.
* Aluminum Phosphide will react with WATER or MOISTURE to release highly toxic and flammable Phosphine gas.
* CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEET ON PHOSPHINE.
* Aluminum Phosphide is a HIGHLY FLAMMABLE and REACTIVE chemical and a DANGEROUS FIRE and EXPLOSION HAZARD.

IDENTIFICATION
Aluminum Phosphide is a dark gray or dark yellow crystalline (sand-like) solid. It is used as an insecticide or fumigant for grain and as an igniting agent in flares.

REASON FOR CITATION
* Aluminum Phosphide is on the Hazardous Substance List because it is cited by ACGIH, DOT, NIOSH, DEP, IRIS, NFPA and EPA.
* This chemical is on the Special Health Hazard Substance List because it is FLAMMABLE and REACTIVE.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED
The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

WORKPLACE EXPOSURE LIMITS
The following exposure limits are recommended for all soluble Aluminum Pyro powders (measured as Aluminum):

NIOSH: The recommended airborne exposure limit is 5 mg/m³ averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is 5 mg/m³ averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE
* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to Aluminum Phosphide and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Aluminum Phosphide to potentially exposed workers.
HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to Aluminum Phosphide:

* Contact can irritate the skin and eyes.
* Breathing Aluminum Phosphide can irritate the nose and throat causing coughing and wheezing.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to Aluminum Phosphide and can last for months or years:

Cancer Hazard
* According to the information presently available to the New Jersey Department of Health and Senior Services, Aluminum Phosphide has not been tested for its ability to cause cancer in animals.

Reproductive Hazard
* According to the information presently available to the New Jersey Department of Health and Senior Services, Aluminum Phosphide has not been tested for its ability to affect reproduction.

Other Long-Term Effects
* Aluminum Phosphide can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
* Repeated exposure may damage the lungs, kidneys and liver.

MEDICAL

Medical Testing
Before beginning employment and at regular times after that (at least annually), the following are recommended:

* Lung function tests.

If symptoms develop or overexposure is suspected, the following are recommended:

* Liver and kidney function tests.
* Chest x-ray.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures
* Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.
* Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by Aluminum Phosphide.

Conditions Made Worse By Exposure
* Persons exposed to Aluminum Phosphide should consult their doctor before taking Phosphorous supplements contained in certain vitamins.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

* Where possible, automatically transfer Aluminum Phosphide from drums or other storage containers to process containers.
* Before entering a confined space where Aluminum Phosphide may be present, check to make sure that an explosive concentration does not exist.

Good WORK PRACTICES can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by Aluminum Phosphide should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Aluminum Phosphide.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with Aluminum Phosphide, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted Aluminum Phosphide, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where Aluminum Phosphide is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
* Use a vacuum to reduce dust during clean-up.

**PERSONAL PROTECTIVE EQUIPMENT**

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

**Clothing**

* Avoid skin contact with Aluminum Phosphide. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* Safety equipment manufacturers recommend Lifeguard Responder ® as a protective material for Phosphine gas.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

**Eye Protection**

* Wear eye protection with side shields or goggles.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

**Respiratory Protection**

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* For field applications check with your supervisor and your safety equipment supplier regarding the appropriate respiratory equipment.
* NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect Aluminum Phosphide, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

**HANDLING AND STORAGE**

* Prior to working with Aluminum Phosphide you should be trained on its proper handling and storage.
* Aluminum Phosphide must be stored to avoid contact with STEAM; MOISTURE; WATER; and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) as flammable and toxic Phosphine gas is released.
* Aluminum Phosphide is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
* Store in tightly closed containers in a cool, well-ventilated area away from COMBUSTIBLES.
* Sources of ignition, such as smoking and open flames, are prohibited where Aluminum Phosphide is used, handled, or stored.
* Metal containers involving the transfer of Aluminum Phosphide should be grounded and bonded.
* Use only non-sparking tools and equipment, especially when opening and closing containers of Aluminum Phosphide.
* Wherever Aluminum Phosphide is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.
QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address:  http://www.state.nj.us/health/ehoh/odisweb/

Industrial Hygiene Information
Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation
If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations
Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources
The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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DEFINITIONS

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

**CFR** is the Code of Federal Regulations, which consists of the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

**IRIS** is the Integrated Risk Information System database of the federal EPA.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m³** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEL** is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.
Common Name: **ALUMINUM PHOSPHIDE**  
DOT Number: **UN 1397**  
DOT Hazard Class: **4.3 (Dangerous When Wet)**  
NAERG Code: **139**  
CAS Number: **20859-73-8**

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**Hazard Rating Key:** 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

**FIRE HAZARDS**

* **Aluminum Phosphide** is a FLAMMABLE and REACTIVE SOLID.
* Use dry sand, clay, dry ground limestone, or approved Class D extinguishers or allow release to burn if in a controlled area.  
* **DO NOT USE WATER OR FOAM.**  
* POISONOUS GASES ARE PRODUCED IN FIRE, including Phosphorus Oxides and Aluminum fumes.  
* CONTAINERS MAY EXPLODE IN FIRE.  
* Use water spray to keep fire-exposed containers cool. **DO NOT** get water inside containers.  
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

**SPILLS AND EMERGENCIES**

If **Aluminum Phosphide** is spilled, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.  
* Remove all ignition sources.  
* Cover spill with dry sand, clay, or ground limestone.  
* Use a clean shovel to place solid material in a clean, dry container and move it away from spill area.  
* **DO NOT USE WATER OR WET METHOD.**  
* Ventilate area after clean-up is complete.  
* Keep **Aluminum Phosphide** out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.  
* It may be necessary to contain and dispose of **Aluminum Phosphide** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

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**FOR LARGE SPILLS AND FIRES** immediately call your fire department. You can request emergency information from the following:

- **CHEMTREC:** (800) 424-9300  
- **NJDEP HOTLINE:** 1-877-WARN-DEP

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**HANDLING AND STORAGE**  (See page 3)

**FIRST AID**

*For POISON INFORMATION call 1-800-222-1222*

**Eye Contact**

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

**Skin Contact**

* Remove contaminated clothing. Wash contaminated skin with water.

**Breathing**

* Remove the person from exposure.  
* Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.  
* Transfer promptly to a medical facility.

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**PHYSICAL DATA**

**Water Solubility:** Reactive

**OTHER COMMONLY USED NAMES**

- **Chemical Name:** Aluminum Phosphide
- **Other Names:** Aluminum Monophosphide; Phostoxin; Celphos

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*Not intended to be copied and sold for commercial purposes.*

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES  
PO Box 368, Trenton, NJ 08625-0368  
(609) 984-2202

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