

# SAFETY DATA SHEET

Date Accessed: 04/18/2024

Date Revised: 01/15/2022

## SECTION 1. IDENTIFICATION

**Product Name:** Aluminum Phosphide Sputtering Target

**Product Number:** All applicable American Elements product codes, e.g. AL-P-02-ST , AL-P-025-ST , AL-P-03-ST , AL-P-035-ST , AL-P-04-ST , AL-P-05-ST

**CAS #:** 20859-73-8

**Relevant identified uses of the substance:** Scientific research and development

**Supplier details:**

American Elements  
10884 Weyburn Ave.  
Los Angeles, CA 90024  
Tel: +1 310-208-0551  
Fax: +1 310-208-0351

**Emergency telephone number:**

+1 800-424-9300

## SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Aluminum phosphide - reacts with water to produce phosphine gas (PH<sub>3</sub>)

Dangerous when wet

Fatal if swallowed or inhaled

When sealed aluminum foil pouches are opened contact with the moisture in the air will cause phosphine gas to be released

Phosphine is spontaneously flammable in air.



**DANGER!**

Appearance Greenish, Yellow. Physical State Solid. Odor Garlic like. Pure phosphine gas is odorless but a garlic odor might be detected due to a contaminant. Since odor may not be detected under certain circumstances, the absence of a garlic odor does not mean that phosphine gas is absent

**Potential Health Effects**

- Inhalation
- Ingestion
- Skin contact

#### Acute Effects

Phosphine gas is odorless. Accidental ingestion of aluminum phosphide or inhalation of phosphine gas have been reported to produce CNS depression, pulmonary edema, respiratory distress syndrome, cardiac dysrhythmias, seizures, liver injury and renal failure.

Eyes:

Irritating to eyes.

Skin:

Irritating to skin

Inhalation:

Fatal if inhaled - Do not breathe mist/vapors.

Ingestion:

Fatal if swallowed - Do not eat, drink, or smoke while handling this product.

---

### SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name

Aluminum phosphide

CAS-No

20859-73-8

Weight %

77.5

OSHA PEL

N/A

---

### SECTION 4. FIRST AID MEASURES

Skin Contact Brush or shake off material. Wash contaminated skin with soapy water in a well ventilated area

Call poison control center or doctor for treatment advice.

Eye Contact

Hold eye open and rinse slowly and gently with water for 15 - 20 minutes.

Remove contact lenses, if present, after 5 minutes, then continue rinsing eye.

Inhalation If breathing is irregular or stopped, administer artificial respiration

May cause allergic respiratory reaction

Call a physician or poison control center immediately

---

### SECTION 5. FIREFIGHTING MEASURES

Aluminum phosphide - is not flammable. However, it reacts readily with water to produce hydrogen phosphide (phosphine, PH<sub>3</sub>) gas which may ignite spontaneously in air concentrations above the LEL of 1.8% v/v.

Extinguishing Media Carbon dioxide (CO<sub>2</sub>) Dry powder Dry chemical Sand

Autoignition Temperature Not available

Fire/Explosion Hazard Alphas = Hydrogen phosphide (Phosphine)/air mixtures at concentrations above the lower flammable limit 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 personal injury.

Never allow the build-up of hydrogen phosphide to exceed explosive concentrations. Containers of metal phosphides should be opened in open air and never in a flammable atmosphere. Do not confine spent or partially spent dust from metal phosphide fumigants as slow release of the hydrogen

phosphide from these materials may result in formation of an explosive atmosphere. Spontaneous ignition may occur if large quantities of aluminum phosphide are piled in contact with liquid water. Fires containing hydrogen phosphide or metal phosphides will produce phosphoric acid by the following reaction:  $2\text{PH}_3 + 4\text{O}_2 = \text{H}_2\text{O} + \text{P}_2\text{O}_5 = 2\text{H}_3\text{PO}_4$

---

## **SECTION 6. ACCIDENTAL RELEASE MEASURES**

### **Personal Precautions**

Remove all sources of ignition. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Use personal protective equipment. An accidental spill/release of material may produce high levels of gas. A NIOSH/MSHA approved full face gas mask with phosphine cartridge or SCBA must be employed during wet deactivation of partially spent material. Wear protective gloves and clothing.

### **Environmental Precautions**

Do not flush into surface water or sanitary sewer system. Should not be released into the environment.

### **Methods for Clean-up**

Do not use water at any time during clean-up. Wear gloves when handling aluminum phosphide. Damaged aluminum foil pouches should be transferred to a sound dry metal container and immediately seal and properly label as aluminum phosphide. Follow all label instructions for disposal of residual material and/or empty containers.

---

## **SECTION 7. HANDLING AND STORAGE**

### **Handling**

Use of this product is **STRICTLY PROHIBITED** on single and multifamily residential properties and nursing homes, schools (except athletic fields) daycare facilities and hospitals. Keep out of reach of children. Do not eat, drink or smoke when using this product. Remove all sources of ignition. Wear personal protective equipment. It is recommended that aluminum foil pouch be opened in air or near a fan, which exhausts outside immediately. Never open in a flammable atmosphere as the product may, although rare, flash. When opening, point pouch away from the face and body. These precautions will reduce the applications potential for exposure to hydrogen phosphide (phosphine) gas. Do not expose product to atmospheric moisture any longer than is necessary.

### **Storage**

Store in cool/well-ventilated place. Keep away from heat and sources of ignition.

Do not transport or store above 38 C/100 F. Do not store in buildings where humans or domestic animals reside.

---

## **SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

### **Exposure Guidelines**

### **Engineering Controls**

Investigate engineering techniques to reduce exposures. Local mechanical exhaust ventilation is preferred. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems. Use equipment/monitors for the detection of phosphine gas.

### **Personal Protective Equipment**

Where there is potential for eye contact have eye flushing equipment available. Eye contact should be avoided through the use of chemical safety glasses, goggles, or a faceshield selected in regard to exposure potential.

#### Skin Protection

Wear protective gloves/clothing.

#### Respiratory Protection

A NIOSH/MESA approved full face mask with approved canister for phosphine may be employed for concentrations up to 15 ppm. At concentrations above that level, or when concentration is unknown, NIOSH/MESA approved SCBA or equivalent must be worn.

---

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance Greenish Yellow

Odor

Garlic like Pure phosphine gas is odorless but a garlic odor might be detected due to a contaminant. Since odor may not be detected under certain circumstances, the absence of a garlic odor does not mean that phosphine gas is absent.

Physical State: Solid

pH: 8.13

VOC Content: Not available

---

## SECTION 10. STABILITY AND REACTIVITY

Stability This product is stable to most chemical reactions except for hydrolysis. A component of this product, aluminum phosphide, reacts with moisture from the air, water, acids and many other liquids to produce toxic and flammable hydrogen phosphine gas. Pure hydrogen phosphide (phosphine) gas is practically insoluble in water, fats and oils and is stable at normal fumigation temperatures.

---

## SECTION 11. TOXICOLOGICAL INFORMATION

Component Information

Aluminum phosphide -

Acute oral LD50 = 11.5 mg/kg

Acute dermal LD50 = >5,000 mg/kg (1 hr exposure)

Sensitization = Not a sensitizer Hydrogen phosphide (phosphine) gas -

Inhalation = LC50 190 ppm (1 hour)

Carcinogenicity

Aluminum phosphide:

Chronic effects = Not expected to produce target organ effects

Mutagenicity = No data

Carcinogenicity = Not classified as a carcinogen by IARC, OSHA, or NTP

Reproductive and Developmental Effects = Not expected to produce reproductive or developmental effects. Hydrogen phosphide (phosphine) gas -

Chronic effects = In a 2-year study, rats were exposed to 48-90 g/m<sup>3</sup> of feed and no overt systemic toxicity was noted.

Mutagenicity = Increased frequency of cells with structural chromosomal aberrations noted in an invitro cytogenetic assay with Chinese hamster ovary cells.

Carcinogenicity = Not classified as a carcinogen by IARC, OSHA or NTP

Reproductive and developmental effects = Not expected to product reproductive or developmental effects

---

## SECTION 12. ECOLOGICAL INFORMATION

### Ecotoxicity

Highly toxic to wildlife. Non-target organisms exposed to phosphine gas in burrows will be killed.

---

## SECTION 13. DISPOSAL CONSIDERATIONS

### Waste Disposal Method

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide or rinsate is a violation of Federal law. If the wastes cannot be disposed of by use or according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance. Follow label for proper disposal instructions.

---

## SECTION 14. TRANSPORT INFORMATION

### DOT

Proper Shipping Name: Aluminum phosphide

Hazard Class 4.3

Subsidiary Class: 6.1

UN-No: UN 1397

Packing Group: PGI

---

## SECTION 15. REGULATORY INFORMATION

### SARA 311/312 Hazardous Categorization

Aluminum phosphide

20859-73-8 ( 77.5 )

100 lb

X

Chronic Health Hazard No

Component CERCLA EHS RQs

Aluminum phosphide

Aluminum phosphide

20859-73-8 ( 77.5 )

100 lb

Acute Health Hazard Yes

Present

RCRA

Component RCRA - D Series Wastes RCRA - P Series Wastes RCRA - U Series Wastes

Fire Hazard Yes

Aluminum phosphide

20859-73-8 ( 77.5 )

P006

SARA 313

Y

Sudden Release of Pressure Hazard

Pesticide Information

No

X  
Component FIFRA - Restricted Use FIFRA - Pesticide  
Product Other  
Ingredients  
FIFRA - Listing of  
Pesticide Chemicals  
California Pesticides -  
Restricted Materials  
Reactive Hazard Yes

---

## **SECTION 16. OTHER INFORMATION**

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. American Elements shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. COPYRIGHT 1997-2022 AMERICAN ELEMENTS. LICENSED GRANTED TO MAKE UNLIMITED PAPER COPIES FOR INTERNAL USE ONLY.