

MATERIAL SAFETY DATA SHEET

Aluphos 56% T.B

(Aluminum Phosphide 56%)

SECTION 1. IDENTIFICATION OF THE SUBSTANCE

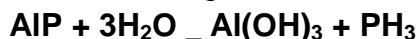
Trade name: Aluphos
Common Name: Aluminum Phosphide
Form: Tablets
Chemical Name: Aluminum phosphide
CAS No.: 20859-73-8
Formula: AIP
Mol. wt: 34.0
Structure: PH₃

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Substance	Conc.	Uses
Active ingredient		
aluminum phosphide	56%	Stored grain 3 Tablets / M ³
Inert ingredient	44%	
Total	100%	

SECTION 3. HAZARDS IDENTIFICATION

Waste, aluminum phosphide products consist mainly of aluminum hydroxide and inert ingredients in the formulation of the product. The aluminum hydroxide is generated via the following reaction:



Al(OH)₃ CAS No. 21645-51-2

AIP CAS No. 20859-73-8

PH₃ CAS No. 7803-51-2

The spent material will also contain from about 2 to 3 percent unreacted aluminum phosphide. However, this small amount of active ingredient is stabilized in the crystalline lattice of the waste. As a result, the waste has very

low oral and dermal toxicity, is not a significant fire hazard and is not a RCRA hazardous waste. Spent and partially spent dust are rather dense and ordinarily do not represent an inhalation hazard. Proper protective equipment

should be worn under conditions where significant risks of inhalation are present.

Toxicity:

Acute Oral Toxicity LD50 = 3000 mg/kg

Acute Dermal Toxicity LD50 > 5000 mg/kg

SECTION 4.FIRST AID MEASURES

Usually no emergency or first aid procedures are required due to the low toxicity of the spent dust. However, recommended procedures for dealing with overexposures from unreacted aluminum phosphide and phosphine are given below.

If the gas or dust from aluminum phosphide 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.

If aluminum phosphide pellets, tablets or powder are swallowed:

Drink or administer one or two glasses of water and induce vomiting by touching back of throat with finger, or if available, syrup of ipecac. Do not give anything by mouth if victim is unconscious or not alert.

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

Brush or shake material off clothes 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 dust from pellets or tablets gets in eyes:

Flush with plenty of water. Get medical attention.

SECTION 5.FIRE FIGHTING MEASURES

Flash Point: >800°C

Extinguishing Media: n/a, not flammable

Special Fire Fighting Procedures: n/a

Respiratory Protection:

None required. Use NIOSH/MSHA approved dust mask if spent dust becomes airborne.

Protective Clothing:

Wear gloves when handling aluminum phosphide or its spent dust

Unusual Fire and Explosion Hazards:

None, under ordinary circumstances. However, spent dust will liberate small amounts of phosphine when reacted with acids or bases. The phosphine, if it allowed to concentrate in a confined area, may be toxic and/or flammable.

SECTION 6.ACIDENTAL RELEASE MEASURES

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Corrosive solid.

Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

SECTION 7.HANDLING AND STORAGE

Precautions:

Keep container dry. Do not ingest. Do not breathe dust. Never add water to this product. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage:

Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F).

SECTION 8. EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations

generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Brown Tablet

Density : 1.15 g/cm³ (CIPAC F p.11 MT 3)

Storage stability: Accepted (CIPAC J p.128 MT46.3)

SECTION 10. STABILITY AND REACTIVITY

Reactivity:

Reacts even with atmospheric water vapour, producing deadly phosphine gas. Water must be avoided.

Conditions to Avoid:

This product should be kept in a cool place, preferably below 30°C. Keep containers tightly closed. Containers should be kept dry.

Incompatibilities:

Water and any product that contains water. Acids, oxidising agents.

Fire Decomposition:

Carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Nitrogen and its compounds, and under some circumstances, oxides of nitrogen. Occasionally hydrogen cyanide gas. Oxides of phosphorus and other phosphorus compounds. Water, aluminium compounds, phosphorus compounds. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of

judgment, and unconsciousness followed by coma and death.

Polymerisation: This product will not undergo polymerisation reactions.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Oral Toxicity $LD_{50} = 3000$ mg/kg

Acute Dermal Toxicity $LD_{50} > 5000$ mg/kg

Acute Toxicity:

Aluminium phosphide is not absorbed dermally; the main routes of exposure are through ingestion and inhalation. It is highly toxic via both these routes. The reported rodent oral LD_{50} is 11.5 mg/kg for the refined version, with that for the technical compound presumably lower. Aluminium phosphide ingested orally reacts with water and stomach acids to produce phosphine gas, which may account in a large part for observed toxicity.

Phosphine generated in the gastrointestinal tract is readily absorbed in to the bloodstream, and it is readily absorbed through the lung epithelium. The rodent 4-hour inhalation LC_{50} for phosphine gas (the product of phosphide reaction with water) is widely reported as 15 mg/m³ (15 µg/L, or approximately 10.7 ppm). Recent study indicates that the rodent 4-hour inhalation LC_{50} may exceed 15 mg/m³. Symptoms of mild to moderate acute Aluminium phosphide

toxicity include nausea, abdominal pain, tightness in chest, excitement, restlessness, agitation and chills. Symptoms of more severe toxicity include, diarrhoea, cyanosis, difficulty breathing, pulmonary oedema, respiratory failure, tachycardia (rapid pulse) and hypotension (low blood pressure), dizziness and/or death. Convulsions have been reported in lab animals exposed to high concentrations of phosphine. Mild exposure is reversible.

Chronic Toxicity:

There is no evidence available that shows cumulative or chronic toxicity symptoms.

Reproductive Effects:

The available evidence for reproductive effects in animals suggest that reproductive effects are not likely in humans under normal conditions.

Teratogenic Effects:

The available evidence for teratogenic effects in animals suggests that such effects are not likely in humans under normal conditions.

Mutagenic Effects:

No evidence was available regarding the ability of Aluminium phosphide or phosphine to cause mutations or increase the mutation rate.

Carcinogenic Effects:

No data are currently available; it is possible that some testing on the oncogenicity may be initiated in the near future.

Organ Toxicity:

Acute toxicity resulting from Aluminium phosphide exposure is apparent most immediately in the heart and lungs; it may also affect the central nervous system, liver and kidneys. Fate in Humans & Animals: Aluminium phosphide rapidly reacts with water to form highly toxic phosphine gas. It has been reported that Aluminium phosphide may be absorbed directly into the bloodstream, although this is probably a very minor route of entry. That phosphine which is not expired through the lungs may be metabolized to phosphates, hypophosphite and phosphite .

SECTION 12. ECOLOGICAL INFORMATION

Effects on Birds:

The precise oral or inhalation median lethal doses for Aluminium phosphide or phosphine in birds are not known. It is reported that exposure of turkeys and hens to 211 and 224 mg/m³ for 74 and 59 minutes respectively resulted in laboured breathing, swelling of organs, tonic-clonic convulsions and death.

Effects on Aquatic Species:

The reported acute LC₅₀ is 4.1 µg/L in rainbow trout, indicating very high toxicity. No data were available regarding the specific toxicity of Aluminium phosphide or of phosphine to other fish or aquatic species (e.g. LC₅₀ or EC₅₀ values), but due to the mechanism of action it is likely that it will be very highly toxic to them as well.

Effects on Other Animals (Non target species): No data were available.

ENVIRONMENTAL FATE:

Breakdown of Chemical in Soil and Groundwater:

Aluminium phosphide will break down spontaneously in the presence of water to form a gaseous product, and so it is non-persistent and non-mobile in the soil environment, and poses no risk to groundwater.

Breakdown of Chemical in Surface Water:

It is highly unlikely that Aluminium phosphide or phosphine will be found in surface waters.

Breakdown of Chemical in Vegetation: No data were available.

SECTION 13. DISPOSAL INSTRUCTION

When being disposed of, spilled or partially reacted aluminum phosphide fumigants are 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 residual dust from incompletely exposed products may require special care.

Triple rinse flasks and stoppers with water or dry deactivate them by exposure to open air for 24 hours or longer. 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 above recommendations. Disposal procedures should be reviewed with appropriate authorities to ensure compliance with local regulations.

SECTION 14. TRANSPORT INFORMATION

UN Number : 3048

Proper shipping name : Aluminium Phosphide Pesticide

Subsidiary Risk : 6.1

SECTION 15. REGULATORY INFORMATION

Risk Phrases: R23, R28, R32, R15/29, R36/37/38.

Toxic by inhalation. Very toxic if swallowed. Contact with acids liberates very toxic gas. Contact with water liberates toxic, highly flammable gas. Irritating to eyes, respiratory system and skin.

Safety Phrases: S14, S20, S22, S38, S24/25, S36/37/39. Keep away from water or any product containing water.

When using, do not eat or drink. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin and eyes. Wear suitable protective clothing, gloves and eye/face protection.



National Fire Protection Association (NFPA) Chemical Hazard Ratings:

Flammability Hazard: 1

Health Hazard: 0

Reactivity Hazard: 1

Special Hazard: **None**

SECTION 16. OTHER INFORMATION

The data given here is based on current knowledge and experience. The purpose of this safety data sheet is to describe the products in terms of their safety requirements.