

## 1. Identification of Product and Company



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Emergency Tel. No.: 13 11 26 (Poisons Information Centre, Australia)

**Active Ingredient:** Aluminium Phosphide (metal Phosphide)  
**Trade name:** **Fumaphos Fumigation Tablet**  
**UN number:** 1397  
**CAS number:** 20859-73-8  
**Product use:** For the control of storage pests – use as described on the product label  
**Document created:** November, 2016  
**Document revised:** November, 2016

## 2. Hazards Identification

**Statement of Hazardous Nature:** This product is classified hazardous according to the criteria of Safe Work Australia and dangerous according to the Australian Dangerous Goods (ADG) code.

### GHS Classification:

Substance or mixture which in contact with water emits flammable gas – Category 1  
Acute toxicity – Category 2  
Hazardous to aquatic environment (acute) – Category 1

Pictograms:



Signal Word:

**DANGER**

Hazard Statements:

In contact with water releases flammable gases, which may ignite spontaneously  
Fatal if swallowed  
Fatal if inhaled  
Toxic in contact with skin  
Very toxic to aquatic life

Human Health Hazard Statements:

Contact with water liberates toxic gas  
Contact with acid liberates toxic gas

**Precautionary Statements:****Prevention:**

Keep away from any possible contact with water, because of violent reaction and possible flash fire  
Wear respiratory protection  
Keep out of reach of children  
Read label before use  
Do not eat, drink or smoke when using this product  
Wear suitable protective clothing and gloves  
Use only outdoors or in a well-ventilated area

**Response:**

In case of fire: Use DRY AGENT for extinction. DO NOT use water.  
IF SWALLOWED: Immediately call a POISON CENTER or doctor  
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing  
Brush off loose particles from skin  
IF ON SKIN: Wash with plenty of soap and water

**Storage:**

Store in a dry place. Store in a closed container  
Store locked up  
Store in a well-ventilated place. Keep cool.  
Store away from oxidising products

**Other Classifications:**

**SUSMP classification:** S7 "Not to be available except to authorised or licensed persons"  
**ADG classification:** Class 4.3, sub-risk 6.1 (ALUMINIUM PHOSPHIDE)

**Physical description:**

Grey-green granular powder. Presented in solid tablet form.

**Odour:** Strong characteristic odour, reminiscent of garlic, carbide or decaying fish.

**Major health hazards:**

Aluminium Phosphide is not absorbed through the skin. The main routes of exposure are through ingestion or inhalation. It is highly toxic via both these routes. The reported rodent oral LD50 is 11.5mg/kg for the active ingredient, 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 the observed toxicity. Very toxic if swallowed or inhaled.

**Potential Health Effects:**

See Section 11 for chronic exposure studies

Symptoms of mild to moderate acute Aluminium Phosphide toxicity include nausea, abdominal pain, and tightness in the 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 laboratory animals exposed to high concentrations of morphine. Mild exposure is reversible.

**Inhalation**

**Short-term exposure:** Significant inhalation exposure to Aluminium Phosphide is considered to be unlikely. However, there is a risk of inhalation of phosphine gas in normal use if no protective measures have been taken, and inhaled dust will liberate phosphine by reacting with body moisture. See symptoms above.

**Skin contact**

**Short-term exposure:** Available data indicated that this product may be irritating to the skin. Note however that the product will react with skin moisture, liberating phosphine gas, which is toxic if inhaled. See symptoms above.

**Eye contact**

**Short-term exposure:** Exposure via the eyes is considered to be unlikely. This product will react with eye moisture, liberating phosphine gas, which is toxic if inhaled. See symptoms above.

**Ingestion**

**Short-term exposure:** Significant oral exposure is considered possible due to the nature of the product as sold. Data shows that this product is very toxic. See symptoms above.

**Carcinogen Status**

**NOHSC:** No significant ingredient is classified as carcinogenic by NOHSC.

**NTP:** No significant ingredient is classified as carcinogenic by NTP.

**IARC:** No significant ingredient is classified as carcinogenic by IARC.

<b>3. Composition/information on ingredients</b>
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Ingredient	CAS number	Conc. (%)	TWA (mg/m3)	STEL (mg/m3)
Aluminium Phosphide	20859-73-8	57	not set	not set
Inerts	confidential	43	not set	not set
Phosphine gas	7803-51-2		0.42	1.4

Note: Phosphine gas exposures are equivalent to 0.3 and 1ppm for TWA and STEL respectively.  
This is a commercial product whose exact ratio of components may vary slightly.

The TWA exposure value is the average airborne concentration of a particular substance when calculated over a normal 8-hour working day for a 5-day working week. The STEL (Short Term Exposure Limit) is an exposure value that should not be exceeded for more than 15 minutes and should not be repeated more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak" is used when the TWA limit should never be exceeded (due to the rapid action of the substance). Every g of formulated product yields a third of a g of phosphine gas.

## 4. First Aid Measures

### General Information

**If a patient has swallowed Aluminium Phosphide he/she may be emitting toxic phosphine gas. First aid and medical staff should take precautions against exposure to phosphine emitted by the patient. Contact the Poisons Information Centre on 13 11 26 (24hrs) if there is suspicion of poisoning, burning or irritation from this product. This SDS should be at hand when calling.**

**Inhalation:** Immediately call a POISON CENTER. Urgent hospital treatment will likely be required. Remove source of contamination or move victim to fresh air. DO NOT administer mouth-to-mouth resuscitation – use other forms of resuscitation. The preferred type is a balloon type resuscitator. DO NOT allow the victim to move about unnecessarily. Symptoms of pulmonary oedema can be delayed up to 48hrs after exposure.

**Skin contact:** First remove product with dry cloth and then wash gently and thoroughly with water (use non-abrasive soap if necessary) for 10 minutes or until the chemical is removed. If irritation persists, repeat flushing and obtain medical advice. If any unusual symptoms become evident, or if in doubt, contact Poisons Information Centre or a doctor. Change contaminated clothing.

**Eye contact:** Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the product has been removed, while holding the eyelid(s) open. Obtain medical advice immediately if irritation occurs or unusual symptoms become evident. Take special care if the exposed person is wearing contact lenses.

**Ingestion:** Rinse mouth thoroughly with water and immediately call a POISON CENTER. Urgent hospital treatment will like be required. DO NOT give mouth-to-mouth resuscitation as the person may be emitting toxic phosphine gas. First aid and medical staff should take precautions against exposure to phosphine emitted by a patient.

## 5. Fire Fighting Measures

**Fire and Explosion Hazards:** There is little risk of an explosion from this product if commercial quantities are involved in a fire. However, if water is used as an extinguishing agent, an explosion will be likely. Fire decomposition products from this product may be toxic if inhaled. Take appropriate protective measures.

**Medium:** Carbon dioxide, dry chemical or lastly, dry sand is recommended. Water MUST NOT be allowed to come into contact with the product since this is likely to result in a dangerous reaction. Ensure that no spillage enters drains or water courses.

**Fire Fighting:** When fighting fires involving significant quantities of the product, wear a fully encapsulated splash suit complete with self-contained breathing apparatus.

<b>Flash Point:</b>	Not detectable
<b>Upper Flammability Limit:</b>	No data
<b>Lower Flammability Limit:</b>	No data
<b>Flammability:</b>	Phosphine concentration above 3% can cause auto-ignition
<b>Flammability Class:</b>	No data

## 6. Accidental Release Measures

In the event of a major spill, prevent spillage from entering drains or water courses. Evacuate the spill area and deny entry to unnecessary and unprotected personnel. Immediately call the Fire Brigade. Wear full protective, chemically resistant clothing including gauntlets and self-contained breathing apparatus. See Section 8 regarding Australian Standards relating to personal protective equipment. Suitable materials for protective clothing include rubber and PVC. Eye/face protective equipment should comprise, as a minimum, protective glasses and, preferably, goggles.

In the event of a minor spill, the above precautions should still be implemented, but respiratory protection may be reduced to a full-face respirator fitted with a type "B" gas cartridge (usually this is designated by a grey band).

Because of the toxicity of this product, special personal care should be taken in any clean-up operation. Sweep up and shovel or collect recoverable product into labelled containers and dispose of promptly. Under no circumstances should any drum, which contains Aluminium Phosphide, be sealed since flammable concentrations of Phosphine are likely to develop, which could lead to a spontaneous ignition and subsequent explosion. If large quantities need to be disposed of, consider wet deactivation as outlined in Section 13 below. To dispose of small quantities (no more than about 5kg Aluminium Phosphide), spread the product on the ground in an open and remote area to be degraded by atmospheric moisture. Do not heap product. If any material enters drains, evacuate the area and advise emergency services. Ensure legality of disposal by consulting regulations prior to disposal. Thoroughly launder protective clothing before storage or re-use. Advise any laundry services of the nature of contamination when sending contaminated clothing to be laundered.

## 7. Handling and Storage

**Handling:** Keep exposure to this product to a minimum, and minimize the quantities kept in work areas. Ensure that measures outlined in Section 8 of this SDS, relating to protective measures, are followed.

**Storage:** This product is a Scheduled Poison. Observe all relevant regulations regarding sale, transport and storage of this class of poison. Store the product under lock and key in a secure, cool, dry, well-ventilated separate room, building or covered area. Check containers periodically for leaks. Containers should be kept closed to minimize contamination. If storing more than 500kg of dangerous goods of packaging group 1, a license may be required for the premises or notify your Dangerous Goods authority. The Dangerous Goods authority should be contacted should there be any doubt about storage obligations. Check label for further storage instructions.

Phosphine is a powerful reducing agent therefore DO NOT store with oxidising agents. Do not store in the same area as water, food or feeds. Do not store in buildings where humans or domestic animals reside. Keep away from sources of ignition and protect from exposure to fire and heat. Separate from incompatible materials as outlined in Section 10.

## 8. Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:

<b>Respiratory equipment:</b>	AS/NZS1715
<b>Protective gloves:</b>	AS2161
<b>Industrial clothing:</b>	AS2919
<b>Industrial eye protection:</b>	AS1336 and AS/NZS1337
<b>Occupational Protective footwear:</b>	AS/NZS2210

<b>Exposure Limits</b>	<b>TWA (mg/m<sup>3</sup>)</b>	<b>STEL (mg/m<sup>3</sup>)</b>
Phosphine	0.42 (0.3ppm)	1.4 (1ppm)

No exposure limits set by NOHSC for Aluminium Phosphide or other ingredients in the formulation

**Ventilation:** Handle product in an open space or preferably in a well-ventilated area. Ensure compliance with applicable exposure limits.

**Skin Protection:** When opening the container or using the product, wear elbow length PVC gloves.

**Respirator:** Under all normal usage conditions, use respiratory equipment suited to phosphine gas. A full-face mask fitted with a combined dust and gas filter, type "B2P3" cartridge (usually denoted by a grey band) is recommended. A half-face mask, similarly fitted may be used in situations not conflicting label instructions. In the event of an accident, or a spill, use of self-contained breathing apparatus should be considered if large quantities of the product (or phosphine gas) are involved. Safety deluge showers (or running water at a minimum) and eyewash facilities should be provided near to where the product is used.

**Eye protection:** If the respiratory equipment recommended above is used, no further eye protection is required.

## 9. Physical and Chemical Properties

<b>Appearance:</b>	Grey-green granular powder presented in the form of a tablet.
<b>Odour:</b>	Strong characteristic odour similar to garlic, carbide or decaying fish.
<b>Melting Point:</b>	1,000 degrees C
<b>Specific gravity:</b>	2.85
<b>Molecular weight:</b>	57.95
<b>Oxidizing properties:</b>	Strong reducing agent
<b>Solubility:</b>	Reacts with water yielding phosphine gas

## 10. Stability and Reactivity

**Reactivity:** Will react with water (incl. atmospheric water vapour) liberating toxic, flammable Phosphine gas.

**Conditions to avoid:** Do not store in buildings inhabited by humans or domestic animals. Keep away from water or other liquids. Do not pile up large quantities of the product during fumigation or disposal.

**Incompatibles:** Water and water-based fluids, acids, oxidizing agents.

Phosphine gas may react with certain metals and cause corrosion, especially at elevated temperature and humidity. 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 phosphine gas. Phosphine will also react with certain metallic salts and therefore sensitive items such as photographic film, some inorganic pigments, etc., should not be exposed to the gas.

**Fire decomposition:** Small quantities of carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Oxides of phosphorous and other phosphorous compounds. Water, Aluminium compounds. Nitrogen and nitrogen compounds such as ammonia and nitrogen oxides.

**Polymerisation:** This product will not undergo polymerisation processes.

## 11. Toxicological information

**Toxicity:** A profile for Aluminium Phosphide is available at <http://extoxnet.orst.edu/pips/alumphos.htm>

**Acute Toxicity:** Aluminium Phosphide is not absorbed through the skin. The main routes of exposure are through ingestion or inhalation. It is highly toxic via both these routes. The reported rodent oral LD50 is 11.5mg/kg for the active ingredient, 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 the observed toxicity. Very toxic if swallowed or inhaled.

Phosphine generated in the gastrointestinal tract is readily absorbed into the bloodstream. It is also readily absorbed through the lung epithelium. The rodent 4-hour inhalation LC50 for phosphine gas is widely reported as 15mg/m<sup>3</sup> (15µg/L, or approximately 10.7ppm). Recent studies indicate that the rodent 4-hour LC50 may exceed 15mg/m<sup>3</sup>. Symptoms of mild to moderate acute Aluminium Phosphide toxicity include nausea, abdominal pain, and tightness in the 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. 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 is available regarding the ability of Aluminium Phosphide or phosphine to cause mutations or increase mutation rate.

**Carcinogenic:** No evidence available that Aluminium Phosphide or phosphine have any carcinogenic effects.

**Organ toxicity:** Acute toxicity resulting from Aluminium Phosphide exposure is apparent almost immediately in the heart and lungs. It may also affect the central nervous system, liver and kidneys.

## 12. Ecological & Environmental Information

**Effects on birds:** The precise oral or inhalation median lethal doses for aluminum Phosphide or phosphine in birds are not known. It is reported that exposure of turkeys and hens to 211 and 224 mg/meters cubed for 74 and 59 minutes respectively resulted in labored breathing, swelling of organs, tonic-clonic convulsions and death. Due to the mechanism of action it is likely that it could similarly affect other bird species at similar levels of exposure. Fortunately, such exposure is not very likely, as phosphine is rapidly dissipated in open air.

**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 aluminum 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. Such exposure is unlikely; aluminum Phosphide will rapidly react to form phosphine gas, which is somewhat soluble in water, but will mainly bubble up into the air.

**Effects on other animals (non-target species):** No data available.

**Breakdown of chemical in Soil and Groundwater:** Aluminum Phosphide will breakdown 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. The Phosphine gas will also break down to form phosphates.

**Breakdown of chemical in Surface Water:** It is highly unlikely that aluminum Phosphide or phosphine will be found in surface waters.

**Breakdown of chemical in Vegetation:** No data available.

## 13. Disposal Considerations

**Wet deactivation:** If available, prepare a 2% solution of low-foam detergent solution (as this will better wet the hydrophobic surface of the Aluminium Phosphide particles); otherwise use available water. A large container should be filled with this solution (or water) to within a few centimetres of the top rim of the container. The Aluminium Phosphide should then be added slowly to the solution and stirred so as to thoroughly wet the Aluminium Phosphide. This should be done in the open air, and respiratory protection should be worn if necessary. No more than one part Aluminium Phosphide should be added to 3 parts of solution. Allow the mixture to stand, with occasional stirring, for about 48 hours. The resultant slurry will then be safe for disposal. Dispose of the deactivated material, with or without preliminary decanting, at a landfill or other suitable site approved by local authorities.

An alternative method is to place the product into a suitable empty vessel, and to, then, add water from a suitable distance (this may be achieved with a hose). Again, allow to stand for a few days and dispose as indicated above.

**Disposal:** The product label will give general advice regarding disposal of small quantities, as well as on disposal of empty containers. Alternatively contact ChemClear on 1800 008 182

(<http://www.chemclear.com.au>) for help with the collection of rural chemicals. Contact DrumMuster (<http://www.drummuster.com.au>) for help with the disposal of empty drums.



**14. Transport Information**

<b>ADG Code:</b>	1397, Aluminium Phosphide
<b>Hazchem Code:</b>	4WE
<b>Special provisions:</b>	None specified.
<b>Dangerous Goods Class:</b>	Class 4.3, substances which in contact with water emit flammable gases
<b>Sub-risk:</b>	Class 6.1, Toxic Substances
<b>Packaging Group:</b>	1
<b>Packaging Instruction:</b>	P403 (4.1.4 ADG Code 7.4)

Refer to Australian Dangerous Goods Code for incompatibility classifications and segregation requirements.

**15. Regulatory Information**

<b>Australian Registration:</b>	52019 (AgChem), 52020 (AgChem)
<b>AICS:</b>	All of the significant ingredients in this formulation are to be found in the public AICS database.
<b>SUSMP:</b>	Schedule 7 poison "Not to be available except to authorised or licensed persons" (SUSMP No. 15)

**16. Acronyms**

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail
AICS	Australian Inventory of Chemical Substances
CAS Number	Chemical Abstracts Number
Hazchem Number	Emergency action code of numbers and letters that provide information to emergency services, especially fire fighter
NOHSC	National Occupational Health and Safety Commission
NOS	Not otherwise specified
NTP	National Toxicology Program
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
UN Number	United Nations Number

**17. Other Information**

Please read all labels carefully before using this product.

THIS SDS SUMMARISES OUR BEST KNOWLEDGE OF THE HEALTH AND SAFETY HAZARD INFORMATION OF THE PRODUCT AND HOW TO SAFELY HANDLE AND USE THE PRODUCT IN THE WORKPLACE. USERS OF THIS PRODUCT SHOULD READ THIS SDS BEFORE USE, AND CONSIDER THE INFORMATION IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE, INCLUDING USING THE PRODUCT IN CONJUNCTION WITH OTHER PRODUCTS.

END OF SDS