



Section 1 - Identification of Chemical Product and Company

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Substance: Metal phosphide.
Trade Name: Farmoz Pestex Fumigation Tablets
Product Use: Pesticide for the control of storage pests and rabbits.
Creation Date: July, 2002
Revision Date: June, 2008

Section 2 - Hazards Identification

Statement of Hazardous Nature

This product is classified as: Hazardous according to the criteria of ASCC Australia.
Dangerous according to the Australian Dangerous Goods (ADG) Code.

Risk Phrases: R23, R28, R15/29. Toxic by inhalation. Very toxic if swallowed. Contact with water liberates toxic, highly flammable gas.

Safety Phrases: S14, S20, S38. Keep away from water and water based materials. When using, do not eat or drink. In case of insufficient ventilation, wear suitable respiratory equipment.

SUSDP Classification: S7

ADG Classification: Class 4.3, Sub risk 6.1 (ALUMINIUM PHOSPHIDE)

UN Number: 1397

Emergency Overview

Physical Description & colour: White tablets or pellets.

Odour: Produces colourless phosphine gas which has a carbide-like odour.

Major Health Hazards: Aluminum 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 LD₅₀ is 11.5 mg/kg for the refined version, with that for the technical compound presumably lower. Aluminum phosphide ingested orally reacts with water and stomach acids to produce phosphine gas, which may account in a large part for observed toxicity.

Potential Health Effects

See section 11 for Chronic exposure studies.

Inhalation

Short term exposure: Available data shows that this product is toxic, but symptoms are not available. In addition, this product may be irritating, but is unlikely to cause anything more than mild transient discomfort.

Skin Contact:

Short term exposure: Available data indicates that this product is not harmful. It should present no hazards in normal use. In addition, this product may be irritating, but is unlikely to cause anything more than mild transient discomfort.

Eye Contact:

Short term exposure: Available data shows that this product is not harmful. In addition, this product may be irritating to eyes, but is unlikely to cause anything more than mild transient discomfort.

Ingestion:

Short term exposure: This product is very toxic if swallowed. See symptoms above.

Carcinogen Status:

ASCC: No significant ingredient is classified as carcinogenic by ASCC.

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

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

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Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc, %	TWA (mg/m ³)	STEL (mg/m ³)
Aluminium phosphide	20859-73-8	56	not set	not set
Other non hazardous ingredients	secret	to 100	not set	not set

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non hazardous ingredients are also possible.

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 for 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, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:

You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 1126 from anywhere in Australia and is available at all times. Have this MSDS with you when you call.

Inhalation: If inhalation occurs, contact a Poisons Information Centre. Urgent hospital treatment is likely to be needed. Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary oedema can be delayed up to 48 hours after exposure.

Skin Contact: Irritation is unlikely. However, if irritation does occur, flush with lukewarm, gently flowing water for 5 minutes or until chemical is removed.

Eye Contact: No effects expected. If irritation does occur, flush contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the product is removed.

Ingestion: If swallowed, rinse mouth thoroughly with water and contact a Poisons Information Centre. Urgent hospital treatment is likely to be needed. Give activated charcoal if instructed.

Section 5 – Fire Fighting Measures

Fire and Explosion Hazards: There is no risk of an explosion from this product under normal circumstances if it is involved in a fire. This product will probably cause the fire to intensify as contents ignite.

Fire decomposition products from this product may be toxic if inhaled. Take appropriate protective measures.

Extinguishing Media: Dry Agent. Water MUST NOT be allowed to come into contact with the product since a dangerously reaction is likely to take place. Try to contain spills, minimise spillage entering drains or water courses.

Extinguishing Media: Preferred extinguishing media are carbon dioxide, dry chemical, dry sand.

WATER MUST NOT BE ALLOWED TO COME INTO CONTACT WITH THE PRODUCT SINCE A DANGEROUS REACTION WILL TAKE PLACE.

Fire Fighting: If a significant quantity of this product is involved in a fire, call the fire brigade. There is a danger of a violent reaction or explosion if significant quantities of this product are involved in a fire. Recommended personal protective equipment is liquid-tight chemical protective clothing and breathing apparatus.

Flash point: Does not burn.

Upper Flammability Limit: Does not burn.

Lower Flammability Limit: Does not burn.

Autoignition temperature: Not applicable - does not burn.

Flammability Class: Does not burn.

Section 6 – Accidental Release Measures

Accidental release: 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 face mask, face shield, gauntlets and self contained breathing apparatus. See above under Personal Protection regarding Australian Standards relating to personal protective equipment. Suitable materials for protective clothing include cotton, rubber, PVC. Stop leak if safe to do so, and contain spill. Avoid using sawdust or other combustible material. Because of the toxicity of this product, special personal care should be taken in any cleanup operation. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage, and dispose of promptly. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. Full details regarding disposal of used containers, spillage and unused material may be found on the label. If there is any conflict between this MSDS and the label, instructions on the label prevail. Ensure legality of disposal by consulting regulations prior to

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disposal. Thoroughly launder protective clothing before storage or re-use. Advise laundry of nature of contamination when sending contaminated clothing to laundry.

Section 7 – Handling and Storage

Handling: Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this MSDS for details of personal protective measures, and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.

Storage: This product is a Scheduled Poison. Observe all relevant regulations regarding sale, transport and storage of this class of poison. Store in a cool, well ventilated area. Check containers periodically for leaks. Containers should be kept closed in order to minimise contamination, especially from water. Make sure that the product does not come into contact with water, or substances listed under "Materials to avoid" in Section 10. Check packaging - there may be further storage instructions on the label.

Section 8 Exposure Controls and Personal Protection

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

Respiratory equipment: **AS/NZS 1715**, Protective Gloves: **AS 2161**, Industrial Clothing: **AS2919**, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

Exposure Limits	TWA (mg/m ³)	STEL (mg/m ³)
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Phosphine gas is liberated from this product by moisture (even moist air) and has a TWA of 0.42 mg/m³.

Ventilation: This product should only be used in a well ventilated area. If natural ventilation is inadequate, use of a fan is suggested.

Eye Protection: Eye protection such as protective glasses or goggles is recommended when this product is being used.

Skin Protection: You should avoid contact even with mild skin irritants. Therefore you should wear suitable impervious elbow-length gloves and facial protection when handling this product. See below for suitable material types.

Protective Material Types: We suggest that protective clothing be made from the following materials: cotton, rubber, PVC.

Respirator: If there is a significant chance that dusts are likely to build up in the area where this product is being used, we recommend that you use a suitable Dust Mask. Use a P3 mask, designed for use against all particulates including highly toxic materials. Otherwise, not normally necessary.

Section 9 - Physical and Chemical Properties:

Physical Description & colour:	White tablets or pellets.
Odour:	Produces colourless phosphine gas which has a carbide-like odour.
Boiling Point:	Not available.
Freezing/Melting Point:	More than 1000°C
Volatiles:	No specific data. Expected to be low at 100°C.
Vapour Pressure:	No data. Expected to be low at normal room temperatures.
Vapour Density:	No data.
Specific Gravity:	Approx 2.85
Water Solubility:	Decomposes in water.
pH:	No data.
Volatility:	No data.
Odour Threshold:	No data.
Evaporation Rate:	No data.
Coeff Oil/water distribution:	No data
Autoignition temp:	Not applicable - does not burn.

Section 10 – Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.

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The product may react while sealed with the moisture in the air in the container, liberating toxic phosphine gas. Phosphine may react spontaneously with oxygen. Consequently there is a chance that when the lid is removed from a package that has been stored for a lengthy period, a flash may take place. You should therefore make sure that when removing the lid, it be done in a well ventilated area, with no flammable materials close by.

Conditions to Avoid: This product should be kept in a cool place, preferably below 30°C. Containers should be kept dry. Keep containers and surrounding areas well ventilated. Handle and open containers carefully.

Incompatibilities: water, acids, bases.

Fire Decomposition: Oxides of phosphorus and other phosphorus compounds. aluminium compounds.

Polymerisation: This product is unlikely to undergo polymerisation processes.

Section 11 – Toxicological Information

Toxicity: Acute Toxicity: Aluminum 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 LD₅₀ is 11.5 mg/kg for the refined version, with that for the technical compound presumably lower. Aluminum 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. Phosphine may cause denaturing of oxyhaemoglobin (the carrier for systemic distribution of oxygen) as well as enzymes important for respiration and metabolism, and may also have effects on cellular membranes. Inhaled aluminum phosphide dust undergoes the same reaction in the moist air sacs of the lung, although at a lower rate, resulting in similar local and systemic effects. The rodent 4-hour inhalation LC₅₀ 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 LC₅₀ may exceed 15 mg/m³. In this study, male and female rats experienced no mortality at one-time 6-hour exposure levels of 15 mg/meters cubed. Red mucous discharge from the nostrils ceased during a 14-day recovery period; postmortem examination revealed no gross or microscopic treatment-related effects. Symptoms of mild to moderate acute aluminum 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. Severe exposure may also result in proteinuria or glucosuria (low molecular weight proteins or glucose in the urine) indicating kidney damage. Pathological examination of exposed laboratory animal tissue and results of post-mortem examinations of phosphine poisoning victims generally indicate hypoxia, with evidence of local trauma in the gastrointestinal tract or lungs, liver, kidneys and central nervous system. Data from a cohort of occupationally-exposed Indian agricultural fumigation workers undergoing single exposures of approximately 1-3 mg/m³ (0.71 - 2.22 ppm) revealed reversible (within 2 weeks) symptoms of mild acute exposure (of the types noted above).

Chronic Toxicity: Rats fed aluminum phosphide-fumigated food averaging 0.51 ppm phosphine residues (approximately 0.43 mg/kg/day) showed no differences from the control animals with respect to blood or urine chemistry and no observable differences in tissue structure. It was reported that workers had probably encountered similar exposures on an intermittent basis (in some cases over as long as a 20 year period) and had yet to show signs of toxicity, which suggests that chronic effects may be minor or have a very long latency period. Inhalation studies were conducted on the effects of phosphine gas on male and female rats exposed at levels of 0.5, 1.5, and 4.5 mg/m³ for six hours per day over a 13 week period. Higher exposure groups (7.5 and 15 mg/m³) were added following preliminary acute test results. Results indicated that 15 mg/m³ was lethal to 4 out of ten female rats following three days of exposure. Significant treatment-related effects on body weight and decreased food consumption were seen across all treatment groups and sexes, but were reversible. Decreases in red-blood cell counts, haemoglobin, haematocrit and increased platelet counts were seen in male rats of the 4.5 mg/m³ group. Dose-related changes in blood urea nitrogen and other clinical parameters were also seen across exposure groups. Post-mortem examination of test animals revealed microscopic lesions in the outer cortex of the kidneys of rats exposed to 15 mg/m³, but not at lower exposure levels. All of these effects were apparently reversible following a four-week recovery period.

Reproductive Effects: Post-mortem examination of test animals revealed apparently reversible damage to seminal vesicles in male rats exposed to 1.5 mg/m³ phosphine. Pregnancy rates for female rats exposed to 4.5 mg/m³ on days 6-10 of gestation were comparable to those in the unexposed group. No adverse effects on uterine implantation were seen in the 0.3, 3 and 4.5 mg/m³ exposure groups, although a statistically significant elevation in resorptions was seen in the 0.015 mg/m³ exposure group. Thus, this effect may not be dose-related as it there was not increased effect with increased dose. The available evidence for reproductive effects in animals suggest that reproductive effects are not likely in humans under normal conditions.

Teratogenic Effects: No effects on foetal birth weights or sex ratios were seen in offspring of rats exposed to up to 4.5 mg/m³ for six hours a day on days 6-10 of gestation. No statistically significant differences in development or morphology were seen in the offspring of rats in the exposed groups versus unexposed groups upon external, visceral or skeletal evaluation. The available evidence for teratogenic effects in animals suggests that such effects are not likely in humans under normal conditions.

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Mutagenic Effects: No evidence was available regarding the ability of aluminum phosphide or phosphine to cause mutations or increase the mutation rate. Studies of human lymphocyte cultures exposed under laboratory conditions showed significant increases in phosphine-induced total chromosomal aberrations (e.g. gaps, deletions, breaks or exchanges) with increasing phosphine concentrations. In the same study, analysis of lymphocyte cultures drawn from fumigators (using phosphine exclusively) exposed to phosphine showed significant increases in the same types of chromosomal aberrations.

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 aluminum 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: As stated above, aluminum phosphide rapidly reacts with water to form highly toxic phosphine gas. It has been reported that aluminum 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 aluminum 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 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 were available.

ENVIRONMENTAL FATE:

Breakdown of Chemical in Soil and Groundwater: Aluminum 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 aluminum phosphide or phosphine will be found in surface waters.

Breakdown of Chemical in Vegetation: No data were available.

Section 13 – Disposal Considerations

Disposal: Instructions concerning the disposal of this product and its containers are given on the product label. These should be carefully followed. Special help is available for the disposal of Agricultural Chemicals. The product label will give general advice regarding disposal of small quantities, and how to cleanse containers. However, for help with the collection of unwanted rural chemicals, contact ChemClear 1800 008 182 <http://www.chemclear.com.au/> and for help with the disposal of empty drums, contact DrumMuster <http://www.drummuster.com.au/> where you will find contact details for your area.

Section 14 – Transport Information

ADG Code: 1397, ALUMINIUM PHOSPHIDE

Hazchem Code: 4W

Special Provisions: None allocated

Limited quantities: ADG 7 specifies a Limited Quantity value of NONE for this class of product.

Packaging Group: I

Packaging Method: P403

Class 4.3 Dangerous When Wet Substances shall not be loaded in the same vehicle or packed in the same freight container with Classes 1 (Explosives), 2.1 (Flammable Gases), 5.1 (Oxidising Agents), 5.2 (Organic Peroxides), 7 (Radioactive Substances), 8 (Corrosive Substances). They may however be loaded in the same vehicle or packed in the same freight container with Classes, 2.2 (Non-Flammable, Non-Toxic Gases), 2.3 (Toxic Gases), 3 (Flammable Liquids), 4.1 (Flammable Solids), 4.2 (Spontaneously Combustible Substances), 6 (Toxic Substances), 9 (Miscellaneous Dangerous Goods), Foodstuffs and foodstuff empties.

Section 15 – Regulatory Information

AICS: All of the significant ingredients in this formulation are to be found in the public AICS Database.

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Section 16 – Other Information

This MSDS contains only safety-related information. For other data see product literature.

Acronyms:

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail, 7th Edition
AICS	Australian Inventory of Chemical Substances
CAS number	Chemical Abstracts Service Registry Number
Hazchem Number	Emergency action code of numbers and letters that provide information to emergency services especially firefighters
IARC	International Agency for Research on Cancer
ASCC	Office of the Australian Safety and Compensation Council
NOS	Not otherwise specified
NTP	National Toxicology Program (USA)
R-Phrase	Risk Phrase
SUSDP	Standard for the Uniform Scheduling of Drugs & Poisons
UN Number	United Nations Number

Contact Points:

Call Farmoz on (02)9431 7800

Fax: (02)9431 7700 and ask for the technical manager.

Police and Fire Brigade:

Dial 000

Emergency contact:

1800 024 973 (24 hours)

If ineffective:

**Dial Poisons Information Centre
(13 1126 from anywhere in Australia)**

The information contained in this Material Safety Data Sheet is provided in good faith and is believed to be correct at the date hereof. However, it is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Farmoz Pty Ltd makes no representation as to the accuracy or comprehensiveness of the information and to the full extent allowed by law excludes all liability whatsoever, whether with respect to negligence or otherwise, for any loss or damage arising from or connection with the supply or use of the information in this Material Safety Data Sheet.

Please read all labels carefully before using product.

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