

## Section 1 - Identification of The Material and Supplier

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<b>Chemical nature:</b>	Metal phosphide.
<b>Trade Name:</b>	Rentokil Gastion Phosphine Fumigation Products
<b>Other Names:</b>	This data sheet covers a range of products; Tablets, Pellets, and Fumigation Belt.
<b>Product Code:</b>	32071, 33879 and 46212
<b>Product Use:</b>	For the control of various pests as indicated on product label.
<b>Creation Date:</b>	<b>February, 2004</b>
<b>This version issued:</b>	<b>March, 2011</b>

## Section 2 - Hazards Identification

**WATER MUST NOT BE ALLOWED TO COME INTO CONTACT WITH THE PRODUCT SINCE A DANGEROUS REACTION WILL TAKE PLACE, RELEASING TOXIC, FLAMMABLE GAS.**

### Statement of Hazardous Nature

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

**Risk Phrases:** R29, R34, R41, R14/15, R39/26/28. Contact with water liberates toxic gas. Causes burns. Risk of serious damage to eyes. Reacts violently with water liberating highly flammable gases. Very toxic: danger of very serious irreversible effects through inhalation and if swallowed.

**Safety Phrases:** S14, S20, S23, S25, S26, S28, S38, S37/9, S36/37/39. Keep away from water and all water-containing preparations. When using, do not eat or drink. Do not breathe dusts. Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water and contact a doctor or Poisons Information Centre. After contact with skin, wash immediately with plenty of flowing water. In case of insufficient ventilation, wear suitable respiratory equipment. Keep container tightly closed in a cool, well ventilated place. Wear suitable protective clothing, gloves and eye/face protection.

**SUSDP Classification:** S7

**ADG Classification:** Class 4.3: Substance which, in contact with water, emits flammable gas.

Sub Risk: Class 6.1: Toxic substances.

**UN Number:** 1397, ALUMINIUM PHOSPHIDE

## Emergency Overview

**Physical Description & colour:** White pellets or tablets. May be presented in belts.

**Odour:** Produces colourless phosphine gas with carbide-like odour.

**Major Health Hazards:** 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<sub>50</sub> 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. very toxic by inhalation and if swallowed, may cause very serious irreversible effects, causes burns, may cause serious damage to eyes. This product has a hydrophobic wax coating which moderates the release of phosphine gas.

## Potential Health Effects

See section 11 for Chronic exposure studies.

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 laboratory animals exposed to high concentrations of phosphine. Mild exposure is reversible.

### Inhalation

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

**Eye Contact:**

**Short term exposure:** Exposure via 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 to be unlikely because of the nature of the product as sold. However, data shows that this product is very toxic. See symptoms above.

**Carcinogen Status:**

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

**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 <sup>3</sup> )	STEL (mg/m <sup>3</sup> )
Aluminum phosphide	20859-73-8	55-60	not set *	not set
Other non hazardous ingredients	secret	to 100	not set	not set

\* Phosphine gas is liberated from this product by moisture (even moist air) and has a TWA of 0.42 mg/m<sup>3</sup>.

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.

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**Section 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 such a patient.**

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 (0800 764 766 in New Zealand) 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. DO NOT administer mouth-to-mouth resuscitation - use other forms of resuscitation. The preferred type is a Balloon Type resuscitator. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary oedema can be delayed up to 48 hours after exposure.

**Skin Contact:** Wash gently and thoroughly with water (use non-abrasive soap if necessary) for 10 minutes or until chemical is removed. If irritation persists, repeat flushing and obtain medical advice. If any unusual symptoms become evident, or if in doubt, contact a Poisons Information Centre or a doctor.

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

**Ingestion:** If swallowed, rinse mouth thoroughly with water and contact a Poisons Information Centre. Urgent hospital treatment is likely to be needed. Do NOT give mouth to mouth resuscitation of this product has been swallowed. 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 such a patient.

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**Section 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.

**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.

**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:** Not flammable.

**Upper Flammability Limit:** No data.

**Lower Flammability Limit:** No data.

**Autoignition temperature:** No data.

**Flammability Class:** No data.

## 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 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 rubber, 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 should be 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 cleanup 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 as it may react with moisture in the container, and explode, with the likelihood of spontaneous ignition. If large quantities need to be disposed, consider wet deactivation described in Section 13 below. To dispose of small quantities, (no more than about 5kg aluminium phosphide), it may be spread on the ground in an open and remote area to be degraded by atmospheric moisture. 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 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. The use of electronic chemical sensors to track phosphine concentrations is recommended.

**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. Make sure that the product does not come into contact with substances listed under "Materials to avoid" in Section 10. If you keep more than 500kg of Dangerous Goods of Packaging Group I, you may be required to license the premises or notify your Dangerous Goods authority. If you have any doubts, we suggest you contact your Dangerous Goods authority in order to clarify your obligations. 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**.

### SWA Exposure Limits

### TWA (mg/m<sup>3</sup>)

### STEL (mg/m<sup>3</sup>)

Exposure limits have not been established by SWA for any of the significant ingredients in this product.

**However, for phosphine:**

0.42 (0.3ppm)

1.4 (1ppm)

**Ventilation:** Provide local exhaust or process enclosure ventilation system. Ventilation equipment should be explosion – resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

**Eye Protection:** If the respiratory equipment recommended below is used, further eye protection will not be necessary.

**Skin Protection:** Wear appropriate elbow-length PVC gloves during normal usage. Cotton or leather gloves may be worn if this does not conflict with instructions on the label.

**Respirator:** Because of the dangers inherent in the use of aluminium phosphide, we recommend that under all normal usage conditions, respiratory equipment suited to phosphine gas be used. Our specific recommendation is a full face mask fitted with a type "B" cartridge (usually denoted by a grey band). A half face mask, similarly fitted, may be used in situations not conflicting with label instructions. In the event of an accident, or a spill, use of self contained breathing apparatus should be considered if large quantities of this product (or phosphine gas) are involved. Safety deluge showers (or at least running water) and eyewash facilities should be provided near to where this product is being used.

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## Section 9 - Physical and Chemical Properties:

<b>Physical Description &amp; colour:</b>	White pellets or tablets. May be presented in belts.
<b>Odour:</b>	Produces colourless phosphine gas with carbide-like odour.
<b>Boiling Point:</b>	Not available.
<b>Freezing/Melting Point:</b>	No specific data. Known to be above 1000°C
<b>Volatiles:</b>	No specific data. Expected to be low at 100°C.
<b>Vapour Pressure:</b>	No data.
<b>Vapour Density:</b>	No data.
<b>Specific Gravity:</b>	2.85 at 25°C
<b>Water Solubility:</b>	Decomposes in water.
<b>pH:</b>	No data.
<b>Volatility:</b>	No data.
<b>Odour Threshold:</b>	No data.
<b>Evaporation Rate:</b>	No data.
<b>Coeff Oil/water distribution:</b>	No data
<b>Autoignition temp:</b>	Not applicable - does not burn.

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## Section 10 - Stability and Reactivity

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

**Conditions to Avoid:** This product should be kept in a dry, secure place. Keep containers tightly closed.

Containers must be kept dry. Keep containers and surrounding areas well ventilated.

Do not store in buildings inhabited by humans or domestic animals. Do not allow water or other liquids to contact product. Do not pile up large quantities of this product during fumigation or disposal.

**Incompatibilities:** water, acids, oxidising agents.

Phosphine gas may react with certain metals and cause corrosion, especially at elevated temperatures and humidities. 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 this 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 phosphorus and other phosphorus compounds. Water, aluminium compounds. Nitrogen, and nitrogen compounds such as ammonia and nitrogen oxides. 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 processes.

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## Section 11 - Toxicological Information

**Toxicity:** An information profile for Aluminium Phosphide is available at <http://extoxnet.orst.edu/pips/ghindex.html>

**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<sub>50</sub> 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<sub>50</sub> for phosphine gas (the product of phosphide reaction with water) is widely reported as 15 mg/m<sup>3</sup> (15 µg/L, or approximately 10.7 ppm). Recent study indicates that the rodent 4-hour inhalation LC<sub>50</sub> may exceed 15 mg/m<sup>3</sup>. 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.

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## 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/m<sup>3</sup> 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 LC<sub>50</sub> 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. LC<sub>50</sub> or EC<sub>50</sub> 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.

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## Section 13 - Disposal Considerations

**Disposal:** The following may help you in properly addressing disposal of this product. 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 dispose of 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.

**Wet deactivation:** If available, prepare a 2% solution of low foam detergent as detergent solution will better wet the hydrophobic surface of the aluminium phosphide particles; otherwise use available water. A container should be filled with this solution to within a few centimetres of the top. The Aluminium phosphide should be added slowly to the solution and stirred so as to thoroughly wet all the Aluminium phosphide. This should be carried out in the open air and respiratory protection should be worn if necessary. No more than 1 part of 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 slurry or deactivated material, with or without preliminary decanting, at a landfill or other suitable site approved by local authorities.

An alternative method is to place belts into a suitable empty vessel, and 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.

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## Section 14 - Transport Information

**ADG Code:** 1397, ALUMINIUM PHOSPHIDE

**Hazchem Code:** 4W

**Special Provisions:** None allocated

**Limited quantities:** ADG 7 specifies no a Limited Quantity value for this class of product.

**Dangerous Goods Class:** Class 4.3: Substance which, in contact with water, emits flammable gas. Sub Risk: Class 6.1: Toxic substances.

**Packaging Group:** I

**Packaging Method:** P403

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

**Section 15 - Regulatory Information**

**AICS:** All of the significant ingredients in this formulation are to be found in the public AICS Database. The following ingredient: Aluminum phosphide, is mentioned in the SUSDP.

**Section 16 - Other Information**

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

**Acronyms:**

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

THIS MSDS 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. EACH USER MUST REVIEW THIS MSDS IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE.

IF CLARIFICATION OR FURTHER INFORMATION IS NEEDED TO ENSURE THAT AN APPROPRIATE RISK ASSESSMENT CAN BE MADE, THE USER SHOULD CONTACT THIS COMPANY SO WE CAN ATTEMPT TO OBTAIN ADDITIONAL INFORMATION FROM OUR SUPPLIERS. OUR RESPONSIBILITY FOR PRODUCTS SOLD IS SUBJECT TO OUR STANDARD TERMS AND CONDITIONS, A COPY OF WHICH IS SENT TO OUR CUSTOMERS AND IS ALSO AVAILABLE ON REQUEST.

Please read all labels carefully before using product.

This MSDS is prepared in accord with the SWA document "National Code of Practice for the Preparation of Material Safety Data Sheets" 2nd Edition [NOHSC:2011(2003)]

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