Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
WSD FLY STRIKE POWDER

SYNONYMS
"WSD Fly Strike Powder to Control Flystrike and For Wound Dressing for Animals."

PRODUCT USE
Wound dressing after marking, mulesing and de-homing.
Not to be used for any purpose other than that stated on the label.

SUPPLIER
Company: Rebop Holdings Pty Ltd t/a Western Stock Distributors
Lot 23 & 24 Koojan Avenue
South Guildford
WA,
Australia
Telephone: +61 8 9321 2888
Emergency Tel: 0419964773
Fax: +61 8 9322 4163

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE
NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. According to NOHSC Criteria, and ADG Code.

RISK
■ Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
■ Toxic to bees.

SAFETY
• Do not breathe dust.
• Avoid contact with skin.
• Avoid exposure - obtain special instructions before use.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>diazinon</td>
<td>333-41-5</td>
<td>1.5</td>
</tr>
<tr>
<td>(15g/kg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pyrethrins</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>piperonyl butoxide</td>
<td>51-03-6</td>
<td>0.08</td>
</tr>
<tr>
<td>other ingredients</td>
<td></td>
<td>balance</td>
</tr>
<tr>
<td>determined not to be</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hazardous, proprietary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Section 4 - FIRST AID MEASURES

SWALLOWED
• If swallowed do NOT induce vomiting.

continued...
• If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
• Observe the patient carefully.
• Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
• Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
• Seek medical advice.

EYE
■ If this product comes in contact with the eyes:
• Wash out immediately with fresh running water.
• Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
• Seek medical attention without delay; if pain persists or recurs seek medical attention.
• Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN
■ If skin or hair contact occurs:
• Flush skin and hair with running water (and soap if available).
• Seek medical attention in event of irritation.

INHALED
• If fumes, aerosols or combustion products are inhaled remove from contaminated area.
• Other measures are usually unnecessary.

NOTES TO PHYSICIAN
■ Treat symptomatically.
Atropine sulfate, usually in doses of 600 microgram may be given intravenously, intramuscularly, or subcutaneously to control the muscarinic effects of choline esterase inhibitors. Supportive treatment may be required.

MARTINDALE: The Extra Pharmacopoeia, Twenty-ninth Edition
While other antimuscarinic agents (e.g., scopolamine) can counteract the effects of cholinesterase inhibitors, their inherent toxic effects in patients who do not have cholinesterase inhibitor poisoning have led to their rejection in favor of atropine. Glycopyrrolate in doses of 1-2 mg, I.V., (0.025 mg/kg in children) has been suggested as an alternative to atropine, and is said to have fewer CNS side effects. However, its use has not been extensively evaluated.
Atropine works by competitively occupying muscarinic receptor sites, thus reducing the effects of excessive acetylcholine on these sites brought about by cholinesterase inhibition.
Atropine is not thought to have significant effect on nicotinic receptors, and thus does not counteract fasciculations, weakness, or flaccid paralysis. Thus, even when given sufficient doses of atropine, patients may need artificial ventilation, sometimes for weeks.
A number of authors have recommended the “atropine challenge” as an aid to diagnosis.
When given to a normal person who has not been exposed to cholinesterase inhibitors, a 2 mg dose of atropine (0.025-0.050/kg in pediatric cases) causes:
• A dry mouth.
• An increase in heart rate of about 35 beats/minute (which is usually not noticed by the recipient) within 3-5 minutes of an I.V. dose, and a maximal increase in heart rate of about 35-45 beats/minute with I.M. or autoinjector administration, respectively, within about 35-45 minutes (the longer being with I.M. injection).
• Blurred near-vision.
• Dry, hot skin.
• Mydriasis (pupillary dilation).
Most of these effects will dissipate within 4-6 hours, except blurred near-vision which may persist for 24 hours.
It has been suggested that when these physiological changes do not occur with this dose (sometimes referred to as an atropine challenge), this is indicative of cholinesterase inhibitor toxicity.
Cautions
• If miosis (pupillary constriction) is due to direct conjunctival vapor exposure, it is relatively unresponsive to parenteral atropine. Although, it does respond to topical administration).
Section 4 - FIRST AID MEASURES

• In 2-13% of cases of cholinesterase inhibitor toxicity, mydriasis (pupillary dilation) --- rather than miosis (pupillary constriction), and tachycardia --- rather than bradycardia (3-77% of cases), may be a presenting sign.
• One author points out that this strategy has never been empirically tested and may not be very sensitive or specific (Parenteral atropine is not generally recommended for those whose sole manifestation of toxicity is miosis (pupillary constriction).
• Some cases of mild to moderate poisonings may improve with these doses of atropine. Thus, signs of atropinization do not always exclude the presence of cholinesterase inhibitor toxicity.

In approximate order of preference, the following routes of administration can be used for the administration of atropine:

1. Intravenous: bolus, followed by I.V. drip.
2. Intraosseous: Military MARK I atropine autoinjector. Although intravenous injection is the preferred route of administration, use of the autoinjector may be more practical in the field, where it can be rapidly administered even through clothing.
3. Paediatric atropine autoinjector syringes are available in 0.5 mg and 1 mg sizes.
4. Intramuscular: Research for this Case Study did not turn up any comparisons of intramuscular with inhalation routes of atropine administration.
5. Inhalation: by nebulised inhalation intratracheal route. The intratracheal route can be used, but absorption is notably less complete and less reliable than the intravenous or intraosseous routes, which are preferred. The optimal intratracheal dose is unknown, but is typically administered in an amount 2-2½ times the intravenous dose. The American Heart Association recommends that the dose be diluted in 5-10 ml water or normal saline. American Heart Association 2005; American Heart Association 2005)
6. Oral: use has been reported after I.V. administration became unnecessary.
7. Ophthalmic: Anticholinergic eye drops (e.g., atropine or homatropine) have been recommended for severe eye pain caused by miosis (pupillary constriction), and secondary reflex nausea and vomiting, but may result in blurred vision. However, one author questions whether there is enough evidence to recommend this practice.

Tachycardia should not be used as an end-point, because it sometimes is a nicotinic manifestation of toxicity. Resolution of miosis [Miosis has been defined as pupillary diameter of <3 mm in the dark, along with sluggish or absent response to light] should not be used as an end-point, because:

• Miosis (pupillary constriction) from systemic exposure may be a late finding.
• When miosis pupillary constriction) is present, it may be resistant to systemic atropine therapy.
• Miosis (pupillary constriction) may reflect only localized ophthalmic exposure to vapor without systemic effects.
• Pupils are of normal size in a significant minority of poisoned patients (20% in one series).
• Toxic patients may present with mydriasis (pupillary dilation) due to occasional dominance of nicotinic effects from cholinesterase inhibitors.


Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
• There is no restriction on the type of extinguisher which may be used.
• Use extinguishing media suitable for surrounding area.

FIRE FIGHTING
• Alert Fire Brigade and tell them location and nature of hazard.
• Wear breathing apparatus plus protective gloves for fire only.
• Prevent, by any means available, spillage from entering drains or water courses.
• Use fire fighting procedures suitable for surrounding area.
• DO NOT approach containers suspected to be hot.
• Cool fire exposed containers with water spray from a protected location.
• If safe to do so, remove containers from path of fire.
• Equipment should be thoroughly decontaminated after use.
FIRE/EXPLOSION HAZARD
- Non combustible.
- Not considered a significant fire risk, however containers may burn.
- May emit poisonous fumes.

FIRE INCOMPATIBILITY
- None known.

HAZCHEM
- None

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
- Environmental hazard - contain spillage.
- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

MAJOR SPILLS
- Environmental hazard - contain spillage.
  Moderate hazard.
  - CAUTION: Advise personnel in area.
  - Alert Emergency Services and tell them location and nature of hazard.
  - Control personal contact by wearing protective clothing.
  - Prevent, by any means available, spillage from entering drains or water courses.
  - Recover product wherever possible.
  - IF DRY: Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. IF WET: Vacuum/shovel up and place in labelled containers for disposal.
  - ALWAYS: Wash area down with large amounts of water and prevent runoff into drains.
  - If contamination of drains or waterways occurs, advise Emergency Services.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
• Observe manufacturer’s storing and handling recommendations.
• Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

SUITABLE CONTAINER
• Packaging as recommended by manufacturer.
Puffer pack & drum.

STORAGE INCOMPATIBILITY
■ None known.

STORAGE REQUIREMENTS
• Store in original containers.
• Keep containers securely sealed.
• No smoking, naked lights or ignition sources.
• Store in a cool, dry, well-ventilated area.
• Store away from incompatible materials and foodstuff containers.
• Protect containers against physical damage and check regularly for leaks.
• Observe manufacturer’s storing and handling recommendations.

---

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

<table>
<thead>
<tr>
<th>Source</th>
<th>Material</th>
<th>TWA mg/m³</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia Exposure Standards</td>
<td>diazinon (Diazinon)</td>
<td>0.1</td>
<td>Sk</td>
</tr>
</tbody>
</table>

The following materials had no OELs on our records
• piperonyl butoxide: CAS:51-03-6

MATERIAL DATA

DIAZINON:
WSD FLY STRIKE POWDER:
■ The recommended TLV-TWA for diazinon is the same as that of parathion. Exposure at or below this value is thought to protect workers from the significant risk of cholinesterase inhibition, weakness, headache, nausea, and vomiting.

WSD FLY STRIKE POWDER:
■ It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.
   At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.
   NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

DIAZINON:
■ Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers’ responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure
limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:
- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

PERSONAL PROTECTION

EYE
- Safety glasses with side shields
- Chemical goggles.
- Contact lenses may pose a special hazard: soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent].

HANDS/FEET
- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
  - frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and
dexterity
- Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.
- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocautchouc
- polyvinyl chloride
Gloves should be examined for wear and/or degradation constantly.

OTHER
- Overalls.
- P.V.C. apron.
- Barrier cream.

continued...
• Skin cleansing cream.
• Eye wash unit.

RESPIRATOR
• Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)
• Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
• The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
• Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory. These may be government mandated or vendor recommended.
• Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
• Use approved positive flow mask if significant quantities of dust becomes airborne.
• Try to avoid creating dust conditions.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS
■ Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.

• Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
• If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered.

Such protection might consist of:
(a): particle dust respirators, if necessary, combined with an absorption cartridge;
(b): filter respirators with absorption cartridge or canister of the right type;
(c): fresh-air hoods or masks.

APPEARANCE
Brown powder with a distinct smell; does not mix with water.

PHYSICAL PROPERTIES
Does not mix with water.

<table>
<thead>
<tr>
<th>State</th>
<th>Divided Solid</th>
<th>Molecular Weight</th>
<th>Viscosity</th>
<th>Solubility in water (g/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°C)</td>
<td>Not Available</td>
<td>Not Applicable</td>
<td>Not Available</td>
<td></td>
</tr>
<tr>
<td>Boiling Range (°C)</td>
<td>Not Available</td>
<td>Not Applicable</td>
<td>Not Available</td>
<td>Immiscible</td>
</tr>
</tbody>
</table>

continued...
### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash Point (°C)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Decomposition Temp (°C)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Autoignition Temp (°C)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Volatile Component (%vol)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Diazinon log Kow (Sangster 1997)</td>
<td>3.81</td>
</tr>
</tbody>
</table>

### Section 10 - STABILITY AND REACTIVITY

**CONDITIONS CONTRIBUTING TO INSTABILITY**

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

*For incompatible materials - refer to Section 7 - Handling and Storage.*

### Section 11 - TOXICOLOGICAL INFORMATION

**POTENTIAL HEALTH EFFECTS**

**ACUTE HEALTH EFFECTS**

**SWALLOWED**

- Accidental ingestion of the material may be damaging to the health of the individual.

Adverse effects of choline esterase inhibitors include nausea, vomiting, abdominal pain, flushing, sweating, salivation, lachrymation, rhinorrhea, eruction, involuntary defecation, and urination, bradycardia, and peripheral vasodilation leading to hypotension, transient heart block, bronchioconstriction and a feeling of constriction beneath the chest.

**EYE**

- Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

**SKIN**

- The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

Open cuts, abraded or irritated skin should not be exposed to this material.

Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

**INHALED**

- The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.

**CHRONIC HEALTH EFFECTS**

- Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
- There is some evidence that human exposure to the material may result in developmental toxicity. This evidence is based on animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.
- Repeated or prolonged exposures to cholinesterase inhibitors produce symptoms similar to acute effects. In addition workers exposed repeatedly to these substances may exhibit impaired memory and loss of concentration, severe depression and acute psychosis, irritability, confusion, apathy, emotional lability, speech difficulties, headache, spatial disorientation, delayed reaction times, sleepwalking, drowsiness or insomnia.
- An influenza-like condition with nausea, weakness, anorexia and malaise has been described. There is a growing body of evidence from epidemiological studies and from experimental laboratory studies that short-term exposure to some cholinesterase-inhibiting insecticides may produce behavioural or neuro-chemical changes lasting for days or months, presumably outlasting the cholinesterase inhibition. Although the number of adverse effects following humans poisonings subsides, there are still effects in some workers months after cholinesterase activity returns to normal. These long-lasting effects include blurred vision, headache, weakness, and anorexia. The neurochemistry of animals exposed to chlorpyrifos or fenthion is reported to be altered permanently after a single exposure. These effects may be more severe in developing animals where both acetyl- and butyrylcholinesterase may play an integral part in the development of the nervous system.


**TOXICITY AND IRRITATION**

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

**DIAZINON:**

- **WSD FLY STRIKE POWDER:**
  - For diazinon:
    - Acute toxicity: The toxicity of encapsulated formulations is relatively low because diazinon is not released readily while in the digestive tract. Some formulations of the compound can be degraded to more toxic forms. This transformation may occur in air, particularly in the presence of moisture, and by ultraviolet radiation.
    - Most modern diazinon formulations in the U.S. are stable and do not degrade easily. The symptoms associated with diazinon poisoning in humans include weakness, headaches, tightness in the chest, blurred vision, nonreactive pinpoint pupils, salivation, sweating, nausea, vomiting, diarrhea, abdominal cramps, and slurred speech. Death has occurred in some instances from both dermal and oral exposures at very high levels.
    - Chronic toxicity: Chronic effects have been observed at doses ranging from 10 mg/kg/day for swine to 1000 mg/kg/day for rats. Inhibition of red blood cell cholinesterase, and enzyme response occurred at lower doses in the rats. Enzyme inhibition has been documented in red blood cells, in blood plasma, and in brain cells at varying doses and with different species.
    - Teratogenetic effects: The data on teratogenic effects due to chronic exposure are inconclusive. One study has shown that injection of diazinon into chicken eggs resulted in skeletal and spinal deformities in the chicks. Bobwhite quail born from eggs treated in a similar manner showed skeletal deformities but no spinal abnormalities. Acetylcholine was significantly affected in this latter study. Tests with hamsters and rabbits at low doses (0.125 0.25 mg/kg/day) showed no developmental effects, while tests with dogs and pigs at higher levels (1.0 10.0 mg/kg/day) revealed gross abnormalities.
    - Mutagenic effects: While some tests have suggested that diazinon is mutagenic, current evidence is inconclusive.
    - Carcinogenic effects: Diazinon is not considered carcinogenic. Tests on rats over a 2-year period at moderate
Section 11 - TOXICOLOGICAL INFORMATION

Doses (about 45 mg/kg) did not cause tumor development in the test animals.

Organ toxicity: Diazinon itself is not a potent cholinesterase inhibitor. However, in animals, it is converted to diazoxon, a compound that is a strong enzyme inhibitor.

 Fate in humans and animals: Metabolism and excretion rates for diazinon are rapid. The half-life of diazinon in animals is about 12 hours. The product is passed out of the body through urine and in the feces. The metabolites account for about 70% of the total amount excreted. Cattle exposed to diazinon may store the compound in their fat over the short term. One study showed that the compound cleared the cows within 2 weeks after spraying stopped. Application of diazinon to the skin of cows resulted in trace amounts in milk 24 hours after the application.

DIAZINON:

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (human) TDLo: 214 mg/kg</td>
<td>Skin (rabbit): 500 mg(open)- Moderate</td>
</tr>
<tr>
<td>Oral (rat) LD50: 66 mg/kg</td>
<td>Eye (rabbit): 100 mg - SEVERE</td>
</tr>
<tr>
<td>Inhalation (rat) LC50: 3500 mg/m³/4h</td>
<td></td>
</tr>
<tr>
<td>Dermal (rat) LD50: 180 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Dermal (rabbit) LD50: 180 mg/kg</td>
<td></td>
</tr>
</tbody>
</table>

- The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
- The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

Reproductive effectors

ADI: 0.001 mg/kg/day
NOEL: 0.1 mg/kg/day

PIPERONYL BUTOXIDE:

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (rat) LD50: 6150 mg/kg</td>
<td>Nil Reported</td>
</tr>
<tr>
<td>Dermal (rat) LD50: &gt;7950 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Dermal (rat) LD50: &gt;200 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Oral (Rabbit) LD50: 2650 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Oral (Mouse) LD50: 2600 mg/kg</td>
<td></td>
</tr>
</tbody>
</table>

- The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans.
- Evidence of carcinogenicity may be inadequate or limited in animal testing.

Dermal (rabbit) LD50: >1880 mg/kg [Handbook of Toxicology]

*Published value - probably not peer-reviewed

ADI: 0.03 mg/kg

CARCINOGEN

Non-arsenical insecticides (occupational exposures in spraying and application of)

Piperonyl butoxide

International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs

Group 2A

SKIN

diazinon

Australia Exposure Standards - Skin Notes Sk
Section 12 - ECOLOGICAL INFORMATION

PIPERONYL BUTOXIDE:

DIAZINON:
- The material is classified as an ecotoxin* because the Fish LC50 (96 hours) is less than or equal to 0.1 mg/l
  
  * Classification of Substances as Ecotoxic (Dangerous to the Environment)
  Appendix 8, Table 1

  - DO NOT discharge into sewer or waterways.
  - Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
  Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
  - Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

DIAZINON:
- Toxic to bees.

For diazinon:

Environmental fate:

Breakdown in soil and groundwater: Diazinon has a low persistence in soil. The half-life is 2 to 4 weeks.

Bacterial enzymes can speed the breakdown of diazinon and have been used in treating emergency situations such as spills. Diazinon seldom migrates below the top half inch in soil, but in some instances it may contaminate groundwater.

Breakdown in water: The breakdown rate is dependent on the acidity of water. At highly acidic levels, one half of the compound disappeared within 12 hours while in a neutral solution, the pesticide took 6 months to degrade to one half of the original concentration.

Breakdown in vegetation: In plants, a low temperature and a high oil content tend to increase the persistence of diazinon. Generally the half-life is rapid in leafy vegetables, forage crops and grass. The range is from 2 to 14 days. In treated rice plants only 10% of the residue was present after 9 days. Diazinon is absorbed by plant roots when applied to the soil and translocated to other parts of the plant.

Ecotoxicity:
- Bird LD50: 2.75- 40.8 mg/kg
- Birds are quite susceptible to diazinon poisoning
- Fish LC50: rainbow trout 2.6-3.2 mg/l; fathead minnow, goldfish <15 mg/l

Diazinon is highly toxic to fish. In hard water, lake trout and cutthroat trout are somewhat more resistant. Warm water fish such as fathead minnows and goldfish are even more resistant. There is some evidence that saltwater fish are more susceptible than freshwater fish. Bioconcentration ratios range from 200 in minnows to 17.5 for guppies. These studies show that diazinon does not bioconcentrate significantly in fish.

Effects on other organisms: Diazinon is highly toxic to bees.

For organophosphorus compounds:

Environmental fate:

Organophosphorus compounds and pesticides are relatively non-persistent in the environment with half-lives ranging from hours to several weeks or months. Only rarely are pesticides found in crops beyond the growing season during which they are applied. Chemical or photochemical mechanisms may produce a leaving group which is easily degraded. As a rule these compounds do not represent a serious problem as contaminants of soil and water. Breakdown products are usually non-toxic being composed of low-molecular weight, volatile molecules that are easily degraded and utilised by micro-organisms.

Being esters they are also susceptible to hydrolysis. Most organophosphorus pesticides are stable to acid pHs but under alkaline conditions hydrolysis is rapid with the breakdown rate increasing 10-fold for each pH unit above 7. An increase of 10 deg. C of temperature will increase the hydrolysis rate approximately 4-fold. When these compounds are present in the soil their disappearance is affected by their interaction with the physical characteristics and water content of the soil, and the microflora present.

In certain types of soil strong binding may make them unavailable for biological decomposition. In such soils even running water produces little movement and thus minimal contamination of water supplies. Less tightly bound substances are similarly unlikely to produce substantial contamination because of rapid breakdown. Metallic ions in the soil interact with organophosphorus esters through hydrogen linkage whilst increased organic matter facilitates further binding.

In general only minute amounts of residue and their breakdown products are found in natural water systems.
In soil however there is a greater likelihood of the presence and buildup of toxic residues. Studies on various thiophosphates indicated complete mineralization within three weeks by acclimation. A water stability study demonstrated the nature of hydrolysis involves the attack of water molecule on the phosphorus ester involving P-O bond fission.

log Kow: 2.64-3.81
Koc: 40-432
Half-life (hr) air: 4.1
Half-life (hr) H2O surface water: 744-4440
Half-life (hr) soil: 811-1080
Henry's atm m³/mol: 1.13E-07
BCF: 3-200

PIPERONYL BUTOXIDE:

For piperonyls (as piperonyl butoxide - PBO):

Environmental fate:

PBO is relatively short-lived in the environment and has a low to moderate potential to contaminate groundwater. One study found PBO in river water at a concentration of 9.7 ug/L. It is rapidly degraded when exposed to sunlight, with a degradation half life of about one day in soil exposed to sunlight, and 14 days in soil without sunlight. The rate of degradation is also affected by how much oxygen is in the environment (particularly in aquatic systems), moisture levels, and application methods. There is less information available about PBO's persistence indoors, but one study found that PBO persisted for at least two weeks after a cockroach treatment on toys and in dust in a kindergarten.

Ecotoxicity:

Piperonyl is considered moderately toxic to fish, moderately to highly toxic to invertebrates (including crustaceans and insects), and highly toxic to amphibians. In one study, concentrations of less than one part per million (ppm) killed water fleas, shrimp, and oysters. It is also very toxic to a common type of earthworm. Ingested PBO has a low to very low toxicity in birds.

Not only does PBO kill organisms, it is known to interfere with the reproduction of many types of wildlife at much lower concentrations than those required for mortality. The bio-concentration potential for PBO is low but can be moderate in some aquatic organisms. PBO also inhibits the breakdown of toxic chemicals in wildlife and the soil, increasing the concentrations of other, more acutely potent, pesticides.

Chemical Watch Fact Sheet.

Designated as a marine pollutant in the International Marine Dangerous Goods Code (IMDG).

Fish Toxicity: 3.4 ug/l 96 hour LC50 (mortality): Rainbow trout, donaldson trout (Oncorhynchus mykiss); (carp) 24h LC50: 5.3 mg/L *

Bird toxicity (starlings) LD50: >100 mg/kg *

Invertebrate Toxicity: 1600 ug/l 24 hour LC50 (mortality) Kuruma shrimp (Penaeus japonicus).

Other toxicity: 1000 ug/l 96 day LC50 (mortality): Western chorus frog (Pseudacris triseriata triseria)

Not toxic to bees.

Toxicity Class EPA: IV

Ecotoxicity

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
<th>Bioaccumulation</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>diazinon</td>
<td>HIGH</td>
<td>No Data Available</td>
<td>LOW</td>
<td>MED</td>
</tr>
<tr>
<td>piperonyl butoxide</td>
<td>HIGH</td>
<td>No Data Available</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

---

**Section 13 - DISPOSAL CONSIDERATIONS**

- Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
- A Hierarchy of Controls seems to be common - the user should investigate:
  - Reduction

continued...
Section 13 - DISPOSAL CONSIDERATIONS

- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. In most instances the supplier of the material should be consulted.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Bury residue in an authorised landfill.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM:
None (ADG7)

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: ADG7, UN, IATA, IMDG

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE S5

REGULATIONS

Regulations for ingredients

diazinon (CAS: 333-41-5) is found on the following regulatory lists:
- Australia ADI list - Acceptable daily intakes for agricultural and veterinary chemicals
- Australia Council of Australian Governments (COAG) Chemicals of Security Concern
- Australia Exposure Standards
- Australia Hazardous Substances
- Australia Inventory of Chemical Substances (AICS)
- Australia New Zealand Food Standards Code - Maximum Residue Limits (Australia only) - Schedule 1
- Australia New Zealand Food Standards Code - Maximum Residue Limits (Australia only) - Schedule 3 - Chemical Groups
- International Maritime Dangerous Goods Requirements (IMDG Code) - Marine Pollutants
- International Maritime Dangerous Goods Requirements (IMDG Code) - Substance Index
- WHO Guidelines for Drinking-water Quality - Chemicals excluded from guideline value derivation

piperonyl butoxide (CAS: 51-03-6) is found on the following regulatory lists:
- Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - pesticides)
- Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (Domestic water supply quality)
- Australia ADI list - Acceptable daily intakes for agricultural and veterinary chemicals
- Australia Inventory of Chemical Substances (AICS)
- Australia New Zealand Food Standards Code - Maximum Residue Limits (Australia only) - Schedule 1
- International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs

No data for WSD Fly Strike Powder (CW: 4763-27)

Section 16 - OTHER INFORMATION

Denmark Advisory list for selfclassification of dangerous substances

<table>
<thead>
<tr>
<th>Substance</th>
<th>CAS</th>
<th>Suggested codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>piperonyl butoxide</td>
<td>51-03-6</td>
<td>Rep3; R63 N; R50/53</td>
</tr>
</tbody>
</table>

continued...
REPRODUCTIVE HEALTH GUIDELINES

- Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for the reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>ORG</th>
<th>UF</th>
<th>Endpoint</th>
<th>CR</th>
<th>Adeq TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>diazinon</td>
<td>0.00108 mg/m³</td>
<td>1000</td>
<td>D</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>piperonyl</td>
<td>0.90 mg/m³</td>
<td>1000</td>
<td>R</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>butoxide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.

CR = Cancer Risk/10000; UF = Uncertainty factor;
TLV believed to be adequate to protect reproductive health:
LOD: Limit of detection
Toxic endpoints have also been identified as:
D = Developmental; R = Reproductive; TC = Transplacental carcinogen
Jankovic J., Drake F.: A Screening Method for Occupational Reproductive

- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

This document is copyright. Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written permission from CHEMWATCH. TEL (+61 3) 9572 4700.

Issue Date: 20-Jan-2012
Print Date: 20-Jan-2012

This is the end of the MSDS.