MATERIAL SAFETY DATA SHEET

Date of Issue: November 27, 2003

1. IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND SUPPLIER

Product name	**Folidol® 450 CS Insecticide**
Other names	None
Product codes and pack sizes	4953192 (4 x 5 L)
Chemical group	Organophosphorus
Recommended use	Agricultural insecticide
Formulation	Capsule suspension (aqueous suspension containing microencapsulated parathion-methyl)
Supplier	Bayer CropScience Pty Ltd ABN 87 000 226 022
Address	391 - 393 Tooronga Road, East Hawthorn Victoria 3123, Australia
Telephone	(03) 9248 6888
Facsimile	(03) 9248 6800
Website	www.bayercropscience.com.au
Contact	Development Manager (03) 9248 6888
Emergency Telephone Number	1800 033 111 – Orica SH&E Shared Services

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

HAZARDOUS SUBSTANCE (see Risk phrases below) – NON DANGEROUS GOOD (road/rail)
Poisonous. Cholinesterase inhibitor.
The encapsulation of the active ingredient, parathion-methyl, reduces the toxicity of this product. Parathion-methyl is a very toxic substance. Very toxic to aquatic invertebrates and birds.

Hazard classification Hazardous (National Occupational Health and Safety Commission - NOHSC)

Risk phrases
R22 – Harmful if swallowed.
R23 – Toxic by inhalation.

Safety phrases See Sections 4, 5, 6, 7, 8, 9, 13

ADG classification Not classified as a "Dangerous good" for transport by road or rail according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. For transport by sea this product is a Marine Pollutant, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains parathion-methyl), Class 9, Packing Group III, UN 3082.

SUSDP classification Schedule 6 (Standard for the Uniform Scheduling of Drugs and Poisons)

3. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredients	CAS Number	Concentration (g/L)
Parathion-methyl	[298-00-0]	450
Other ingredients, including water	(non hazardous)	680

4. FIRST AID MEASURES

If poisoning occurs, immediately contact a doctor or Poisons Information Centre (telephone 13 11 26), and follow the advice given. Show this Material Safety Data Sheet to the doctor.

Inhalation

If inhaled, remove to fresh air and keep at rest. Obtain **urgent** medical advice. If breathing stops or shows signs of failing, start artificial respiration. If advised by doctor or Poisons Information Centre, atropine tablets may be administered - giving one atropine tablet 0.6 mg every 5 minutes until dryness of the mouth occurs. DO NOT attempt to give anything by mouth to a semi-conscious or unconscious person.

Skin contact

Immediately remove contaminated clothing. Wash affected areas with soap and water. Seek **urgent** medical aid. Persons assisting the patient should protect themselves from contamination. If advised by doctor or Poisons Information Centre, atropine tablets may be administered - giving one atropine tablet 0.6 mg every 5 minutes until dryness of the mouth occurs. DO NOT attempt to give anything by mouth to a semi-conscious or unconscious person.

Eye contact

Rinse eyes immediately with clean water for at least 15 minutes and obtain **urgent** medical aid.

Ingestion

Wash out mouth with water. Keep patient at rest and seek **urgent** medical advice as above. **Transport patient to doctor or hospital quickly.** If advised by doctor or Poisons Information Centre, atropine tablets may be administered - giving one atropine tablet 0.6 mg every 5 minutes until dryness of the mouth occurs.
DO NOT attempt to give anything by mouth to a semi-conscious or unconscious person.

First Aid Facilities

Provide eyewash and safety shower facilities in the workplace.
Obtain an emergency supply of atropine tablets 0.6 mg.

Medical attention

Folidol 450 CS contains parathion-methyl which is an organophosphorus compound, and as such it is a cholinesterase inhibitor.

Symptoms of poisoning

Mild intoxication causes headache, blurred vision, weakness, sweating, mild chest pain, nausea and vomiting. Severe intoxication causes cyanosis (blueness of the skin, as from lack of oxygen), muscular twitching, spasms, miosis (pinpoint pupils) and respiratory paralysis. These symptoms commence from one to three hours after excessive exposure.
Repeated minor exposure may have a cumulative poisoning effect.

Treatment

Basic aid, decontamination, symptomatic treatment and if necessary administration of antidote. Antidote: Atropine sulphate, possibly in conjunction with toxogonin or obidoxime (PAM). Monitor respiratory, cardiac and central nervous system function. Monitor red blood cell and plasma cholinesterase levels. Administer oxygen if necessary. Watch for pulmonary oedema and delayed neurological symptoms. Continued absorption of parathion-methyl may occur and relapse may occur after initial improvement. VERY CLOSE SUPERVISION OF THE PATIENT IS INDICATED FOR AT LEAST 48 HOURS.

Contraindications

Adrenergic derivatives. DO NOT give morphine or tranquilisers.

5. FIRE FIGHTING MEASURES

Extinguishing media	Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires.
Hazards from combustion products	In a fire, dimethyl sulfide, sulphur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide, and nitrogen oxides may be formed.
Precautions for fire fighters	Firefighters should wear full protective gear, including self-contained breathing apparatus (AS/NZS 1715/1716). Keep unnecessary people away and move all other personnel to windward side of fire. Isolate hazard area and deny entry. Consider evacuation, taking all relevant factors into account. In case of doubt, evacuate immediate vicinity and request emergency services assistance. Use water spray to cool fire-exposed containers. Bund area with sand or earth to prevent contamination of drains or waterways. Dispose of fire control water or other extinguishing agent and spillage safely later.
Hazchem code	Not applicable

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with the spilled material or contaminated surfaces. Do not smoke, eat or drink during the cleanup process. Personnel involved in cleanup should wear full body protective clothing and equipment as described in Section 8 - PERSONAL PROTECTION, with self-contained breathing apparatus. Keep people and animals away and upwind. Consider evacuation and obtain assistance from emergency services if needed. Prevent spilled material from entering drains or watercourses. Contain spill and absorb with earth, sand, clay, or other absorbent material. Collect and store in properly labelled drums for safe disposal. Clean floor with a damp cloth and place cloth in drum. Any heavily contaminated clothing should be placed in a plastic garbage bag and placed in the drum too. Cover and label drums for safe disposal. Deal with all spillages immediately. If contamination of drains, streams, watercourses, etc. is unavoidable, warn the local water authority. Decontaminate tools and equipment used in the cleanup. Parathion-methyl can be hydrolysed in water by heating and adjusting the pH to alkaline (e.g. with lye).

7. HANDLING AND STORAGE

Handling	Keep out of reach of children. Product and spray are poisonous if absorbed by skin contact, inhaled or swallowed. May irritate the eyes and skin. Repeated minor exposure may have a cumulative poisoning effect. Avoid contact with eyes, skin and clothing. Do not inhale spray mist. If clothing becomes contaminated with product, or wet with spray, remove clothing immediately. If product on skin, immediately wash area with soap and water. After use and before eating, drinking or smoking, wash hands, arms and face thoroughly with soap and water. After each day's use wash gloves, respirator and contaminated clothing with detergent and warm water.
Storage	Store in the closed, original container in a cool, well-ventilated area. Store below 30°C. Do not store for prolonged periods in direct sunlight. Do not store near any material intended for use or consumption by humans or animals.
Flammability	Combustible liquid, Class C1 - flashpoint between 61° C and 150º C.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure standards

TWA for methyl parathion is 0.2 mg/m^3. Skin notation

Exposure standard – time weighted average (TWA) – the average airborne concentration of a particular substance when calculated over a normal eight-hour working day, for a five-day working week.
Skin notation – Absorption through the skin may be a significant source of exposure.

Biological limit values

Production workers and agricultural workers handling this product should be monitored for cholinesterase levels. A baseline level should be established prior to any potential exposure. See Guidelines for Health Surveillance [NOHSC:7039(1995)]

Engineering controls

Control process conditions to avoid contact. Use in a well-ventilated area only.

Personal Protective Equipment

Product is poisonous if absorbed by skin contact, inhaled or swallowed.

- Wear elbow-length PVC gloves
- Wear protective waterproof clothing, cotton overalls buttoned to the neck and wrist, a washable hat and impervious footwear.
- Wear full facepiece respirator - AS/NZS 1715/1716 approved, with combined dust and gas cartridge. In enclosed spaces a respirator with an independent air supply should be worn.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Beige viscous liquid
Odour:	Pungent garlic-like
pH:	6.1 (10% in water)
Vapour pressure:	Not available
Vapour density:	Not available
Boiling point:	Above 100° C
Freezing/melting point:	Not available
Solubility:	Disperses in water
Specific Gravity:	1.13 at 20° C
Flash Point:	Above 100° C (Pensky-Martens closed cup)
Flammability (explosive) limits:	Not available
Auto-ignition temperature:	Not available
Partition coefficient (octanol/water):	*Parathion-methyl*: Log P_{ow} = 3.0
Viscosity:	6.9 x 10^6 cP at shear stress 0.15 Pa at 25° C

10. STABILITY AND REACTIVITY

Chemical stability

Stable under normal conditions of use.

Conditions to avoid

Temperatures above 100° C. The product should not be allowed to dry up.

Incompatible materials

Solvents, strong alkalis, amines and strong oxidising agents

10. STABILITY AND REACTIVITY - continued

Hazardous decomposition products

When the product is dried up, the active ingredient parathion-methyl will decompose rapidly when heated to temperatures above 100° C, significantly increasing the risk of inducing explosion. The decomposition is dependent on time as well as temperature due to exothermic and autocatalytic reactions. The reactions involve rearrangements and polymerisation releasing volatile malodorous and flammable compounds such as dimethyl sulfide.

In a fire, dimethyl sulphide, sulphur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide, and nitrogen oxides may be formed.

Hazardous reactions

Hazardous polymerisation may occur.

11. TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

The active ingredient in Folidol 450 CS is an anticholinesterase compound. Symptoms typical of cholinesterase inhibition (for all routes of entry):

Mild cases

Headache, blurred vision, weakness, sweating, mild chest pain, nausea and vomiting.

Severe cases

Cyanosis (blueness of the skin, as from lack of oxygen), muscular twitching, spasms, miosis (pinpoint pupils) and respiratory paralysis. These symptoms commence from one to three hours after excessive exposure.

Repeated minor exposure may have a cumulative poisoning effect.

While the encapsulation process per se does not alter the toxicity of the active ingredient parathion-methyl, the capsule wall protects mammalian species or humans from gross exposure to the pesticide by reducing the amount of material available for toxic action while the capsules pass through the digestive tract or through the skin by absorption. Prolonged contact may give rise to some skin effects especially if small cuts, scratches or abrasions are present. The size of the capsules prevents them from entering the respiratory system. The toxicity of encapsulated parathion-methyl is lower than that of the active ingredient. It approaches the toxicity of the active ingredient only in cases where grinding actions break up the capsules, thus freeing the active ingredient.

Inhalation

Poisonous by inhalation.

Skin contact

Poisonous if absorbed by skin contact. May irritate the skin.

Eye contact

May irritate the eyes.

Ingestion

Harmful if swallowed. Ingestion of the product may be fatal.

ANIMAL TOXICITY DATA - PRODUCT

Acute:

Oral toxicity

LD_{50} rat: 1335 mg/kg

Dermal toxicity

LD_{50} rat: > 4000 mg/kg

Inhalation toxicity

LC_{50} (4 h) rat: 0.12 mg/L air *(parathion-methyl)*

11. TOXICOLOGICAL INFORMATION - continued

Skin irritation Mildly irritating (rabbit)

Eye irritation Practically non irritating (rabbit)

Sensitisation Not a skin sensitiser (guinea pig).

Chronic:
The main health effects from repeated exposure would be toxic symptoms of cholinesterase inhibition as described above. Parathion-methyl is not mutagenic, not carcinogenic and is not expected to cause reproductive or teratogenic effects.

12. ECOLOGICAL INFORMATION

Parathion-methyl is very highly toxic to birds, moderately toxic to fish and very toxic to aquatic invertebrates. It is moderately dangerous to bees. The microencapsulation of parathion-methyl in Folidol 450 CS reduces the toxicity to these species.
DO NOT contaminate streams, rivers or waterways with Folidol 450 CS or the used containers.

Ecotoxicity

Parathion-methyl:
Fish toxicity:
LD_{50}: 6.9 mg/L (96 h); golden orfe (*Leuciscus idus melanotus*)
LC_{50}: 2.7 mg/L (96 h); trout (*Oncorhynchus mykiss*)
Aquatic invertebrate toxicity:
EC_{50}: 0.0073 mg/L (48 h); *Daphnia magna*
Algae toxicity:
IC_{50}: 3.0 mg/L (96 h); green algae (*Scenedesmus subspicatus)*
Bird toxicity:
LD_{50}: 6 mg/kg; bobwhite quail

Folidol 450 CS:
Fish toxicity:
LC_{50}: > 325 mg/L (96 h); trout (*Oncorhynchus mykiss*)
Aquatic invertebrate toxicity:
EC_{50}: 0.01 mg/L(48 h); *Daphnia magna*
Bird toxicity:
LD_{50}: 112.5 mg/kg; bobwhite quail

Environmental fate, persistence and degradability, mobility

Parathion-methyl:
Medium to low mobility in soil. Rapidly degraded in biologically active soils. Parathion-methyl is readily degraded in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Triple or preferably pressure rinse container before disposal or recycling. Add rinsings to spray tank. Do not dispose of undiluted chemicals on-site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush or puncture and bury empty containers in a local authority landfill. If no landfill is available, bury the containers below 500 mm in a disposal pit specifically marked and set up for this purpose, clear of waterways, desirable vegetation and tree roots. Empty containers and product should not be burnt. Dispose of waste product as hazardous waste via a licensed disposal contractor to an approved landfill. Do not discharge into drains or sewers.

14. TRANSPORT INFORMATION

Folidol 450 SC Insecticide is not classified as "Dangerous Goods" for transport by road and rail in Australia. For transport by sea, the classification below applies:

UN number	3082
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains parathion-methyl)
Class and	9
Subsidiary Risk	None
Packing Group	III
EPG	Guide 47 – Dangerous Goods - Initial Emergency Response Guide
Hazchem code	2X
Marine Pollutant	Yes (Parathion-methyl is a Class "PP", Severe Marine Pollutant)

15. REGULATORY INFORMATION

Registered according to the Agricultural and Veterinary Chemicals Act 1988
Australian Pesticides and Veterinary Medicines Authority approval number: 49848

See also Section 2.

16. OTHER INFORMATION

Trademark information	Folidol® is a Registered Trademark of Bayer.
Preparation information	Replaces August 1, 2002 MSDS. Reasons for revision: 16 heading format, Risk phrases, dangerous goods classification.

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 should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace including in conjunction with other products.

If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact this company.

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.

END OF MSDS