Section 1 - Identification of Chemical Product and Company

Statement of Hazardous Nature
This product is classified as: Hazardous according to the criteria of NOHSC Australia.
Not a Dangerous Good according to the Australian Dangerous Goods (ADG) Code.

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Substance:	Bifenthrin is a pyrethroid derivative.
Trade Name:	Farmoz Optiforce Termiticide & Insecticide
Product Use:	For the treatment of termites and certain urban pests as specified on the label.
Creation Date:	**October, 2002**
Revision Date:	**November, 2003**

Section 2 – Composition/Information on Ingredients

Ingredients	CAS No	Conc,%	TWA (mg/m^3)	STEL (mg/m^3)
Bifenthrin	82657-04-3	10	not set	not set
N-Methyl-2-pyrrolidone	872-50-4	5	not set	not set
Liquid hydrocarbons	no data	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 3 - Hazards Identification

Risk Phrases: R22, R36. Harmful if swallowed. Irritating to eyes.
Safety Phrases: S20, S25. When using, do not eat or drink. Avoid contact with eyes.
SUSDP Classification: S6
ADG Classification: None allocated. Not a Dangerous Good.
UN Number: None allocated

Emergency Overview

Physical Description & colour: Straw to amber coloured liquid.
Odour: Mild citronella odour.
Major Health Hazards: Bifenthrin is moderately toxic to mammals when ingested. Large doses may cause incoordination, tremor, salivation, vomiting, diarrhoea, and irritability to sound and touch. LD_{50}, for Bifenthrin is about 54 mg/kg in female rats and 70 mg/kg in male rats. The LD_{50} for rabbits whose skin is exposed to Bifenthrin is greater than 2,000 mg/kg. Bifenthrin does not sensitize the skin of guinea pigs. Although it does not cause inflammation or irritation on human skin, it can cause a tingling sensation which lasts about 12 hours. It is virtually non-irritating to rabbit eyes. No major health hazards are known.

Potential Health Effects

See section 11 for Chronic exposure studies.

Inhalation
Short term exposure: Available data indicates that this product is not harmful. However product may be mildly irritating, although 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. However product is believed to be mildly 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. However product is an eye irritant. Symptoms may include stinging and reddening of eyes and watering which may become copious. Other symptoms may also become evident. If exposure is brief, symptoms should disappear once exposure has ceased. However, lengthy exposure or delayed treatment may cause permanent damage.

Ingestion:

Short term exposure: Available data shows that this product is harmful, but symptoms are not available. This product is unlikely to cause any irritation problems in the short or long term.

Carcinogen Status:

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

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: No first aid measures normally required. However, if inhalation has occurred, and irritation has developed, remove to fresh air and observe until recovered. If irritation becomes painful or persists more than about 30 minutes, seek medical advice.
Skin Contact: Blot or brush away excess chemical. Wash gently and thoroughly with water (use non-abrasive soap if necessary) for 10 minutes or until chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g. watchbands and belts). If irritation persists, repeat flushing and obtain medical advice.
Eye Contact: Quickly and gently blot or brush away product. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water until the product is removed or until a few minutes after irritation has ceased, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face.
Ingestion: If swallowed, do NOT induce vomiting. Wash mouth with water and contact a Poisons Information Centre, or call a doctor.

Section 5 – Fire Fighting Measures

Fire and Explosion Hazards: There is a slight risk of an explosion from this product if commercial quantities are involved in a fire. Violent steam generation or eruption may occur upon application of direct water stream on hot liquids. Vapours from this product are heavier than air and may accumulate in sumps, pits and other low-lying spaces, forming potentially explosive mixtures. They may also flash back considerable distances.
Fire decomposition products from this product may be toxic if inhaled. Take appropriate protective measures.
Extinguishing Media: Preferred extinguishing media are carbon dioxide, dry chemical, foam, water fog.
Fire Fighting: When fighting fires involving significant quantities of this product, wear a splash suit complete with self contained 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. Immediately call the Fire Brigade. Wear full protective clothing including face mask, face shield and gauntlets. All skin areas should be covered. See above under Personal Protection regarding Australian Standards relating to personal protective equipment. Suitable materials for protective clothing include rubber, PVC, Viton. Stop leak if safe to do so, and contain spill. Absorb onto sand, vermiculite or other suitable absorbent material. If spill is too large or if absorbent material is not available, try to create a dike to stop material spreading or going into drains or waterways. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage, and dispose of promptly. Recycle containers wherever possible after careful cleaning. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. This material may be suitable for approved landfill. 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.

Storage: This product is a Scheduled Poison. Observe all relevant regulations regarding sale, transport and storage of this class of poison. Make sure that containers of this product are kept tightly closed. Pressure may build up in sealed containers, so do not seal tightly. Make sure that the product does not come into contact with substances listed under "Materials to avoid" in Section 10. Some liquid preparations settle or separate on standing and may require stirring before use. 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)**

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

The ADI for Bifenthrin is set at 0.01mg/kg/day. The corresponding NOEL is set at 1mg/kg/day. ADI means Acceptable Daily Intake and NOEL means No-observable-effect-level. Values taken from Australian ADI List, June 2002.

Ventilation: No special ventilation requirements are normally necessary for this product. However make sure that the work environment remains clean and that dusts are minimised.

Eye Protection: Protective glasses or goggles should be worn when this product is being used. Failure to protect your eyes may cause them harm. Emergency eye wash facilities are also recommended in an area close to where 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: rubber, PVC, Viton.

Respirator: Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned above. Otherwise, not normally necessary.

Eyebaths or eyewash stations should be provided near to where this product is being used.

Section 9 - Physical and Chemical Properties:

Physical Description & colour:	Straw to amber coloured liquid.
Odour:	Mild citronella odour.
Boiling Point:	Not available.
Freezing/Melting Point:	No specific data. Liquid at normal temperatures.
Volatiles:	No specific data. Expected to be low at 100°C.
Vapour Pressure:	No data.
Vapour Density:	No data.
Specific Gravity:	0.94 approx at 20°C
Water Solubility:	Emulsifiable.
pH:	Neutral.
Volatility:	No data.
Odour Threshold:	No data.
Evaporation Rate:	No data.
Coeff Oil/water distribution:	No data
Autoignition temp:	No data.

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.

Conditions to Avoid: This product should be kept in a cool place, preferably below 30°C. Keep containers and surrounding areas well ventilated.
Incompatibilities: No particular incompatibilities.
Fire Decomposition: Carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Nitrogen and its compounds, and under some circumstances, oxides of nitrogen. Occasionally hydrogen cyanide gas. Water. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death. Hydrogen cyanide poisoning signs and symptoms are weakness, dizziness, headache, nausea, vomiting, coma, convulsions, and death. Death results from respiratory arrest. Hydrogen cyanide gas acts very rapidly; symptoms and death can both occur quickly.
Polymerisation: This product is unlikely to undergo polymerisation processes.

Section 11 – Toxicological Information

Toxicity: Bifenthrin is moderately toxic to mammals when ingested. Large doses may cause incoordination, tremor, salivation, vomiting, diarrhoea, and irritability to sound and touch. LD_{50}, for Bifenthrin is about 54 mg/kg in female rats and 70 mg/kg in male rats. The LD_{50} for rabbits whose skin is exposed to Bifenthrin is greater than 2,000 mg/kg. Bifenthrin does not sensitize the skin of guinea pigs. Although it does not cause inflammation or irritation on human skin, it can cause a tingling sensation which lasts about 12 hours. It is virtually non-irritating to rabbit eyes.
Chronic Toxicity: No information Available.
Reproductive Effects: The dose at which no toxic effect of Bifenthrin is observed on the mother (maternal toxicity NOEL) is 1 mg/kg/day for rats and 2.67 mg/kg/day for rabbits. At higher doses, test animals had tremors. The dose at which no toxic effect is observed on development (developmental toxicity NOEL) is 1 mg/kg/day for rats and is greater than 8 mg/kg/day for rabbits.
Teratogenic Effects: Bifenthrin does not demonstrate any teratogenic effects at the highest levels tested (100 ppm, approximately 5.5 mg/kg/day) in a two-generational study in rats.
Mutagenic Effects: Evidence of mutagenic effects from exposure to Bifenthrin are inconclusive. Studies of mouse white blood cells were positive for gene mutation. However, other tests of Bifenthrin's mutagenic effects, including the Ames test and studies in live rat bone marrow cells, were negative.
Carcinogenic Effects: There was no evidence of cancer in a 2-year study of rats who ate as much as 10 mg/kg/day of Bifenthrin. However, an 87 week feeding study of mice with doses of 7, 29, 71, and 86 mg/kg showed a significantly higher, dose related trend of increased tumor incidence in the male urinary bladder. The incidence was significantly increased at 86 mg/kg/day. Also, females had higher incidences of lung cancer than the controls at doses of 7 mg/kg and higher. The EPA has classified Bifenthrin as a class C carcinogen, a possible human carcinogen.
Organ Toxicity: Pyrethroids are poisons that affect the electrical impulses in nerves, over-stimulating nerve cells causing tremors and eventually causing paralysis.
Fate in Humans and Animals: Bifenthrin is absorbed through intact skin when applied topically. It undergoes similar modes of breakdown within animal systems as other pyrethroid insecticides. In mammals, Bifenthrin is rapidly broken down and promptly excreted. Rats treated with 4 to 5 mg/kg, excreted 70 % in the urine and 20% in the faeces within 7 days. After 7 days, the remaining Bifenthrin was found accumulated in tissues with high fat content such as the skin and fat in males and females and the ovaries of females. Bifenthrin is less toxic to warm-blooded animals, such as mammals, than to cold-blooded animals.

Section 12 – Ecological Information

This product is biodegradable. It will not accumulate in the soil or water or cause long term problems.
Effects on Birds: Bifenthrin is moderately toxic to many species of birds. The dietary concentration (8 day) at which half of the test animals die, the LC_{50}, is 1,280 ppm for mallard ducks and 4,450 ppm for bobwhite quail. The acute oral LD_{50} is 1,800 mg/kg for bobwhite quail and 2,150 mg/kg for mallard ducks. There is concern about possible bioaccumulation in birds.
Effects on Aquatic Organisms: Bifenthrin is very highly toxic to fish, crustaceans and aquatic animals. The LC_{50} after a 96-hour exposure is 0.00015 mg/l for rainbow trout, 0.00035 mg/l for bluegill, and 0.0016 mg/l for Daphnia. Because of its low water solubility and high affinity for soil, Bifenthrin is not likely to be found in aquatic systems.
Effects on Other Animals (Nontarget species): Bifenthrin is toxic to bees.
ENVIRONMENTAL FATE
Breakdown of Chemical in Soil & Groundwater: Bifenthrin does not move in soils with large amounts of organic matter, clay and silt. It also has a low mobility in sandy soils that are low in organic matter. Bifenthrin is relatively insoluble in water, so there are no concerns about groundwater contamination through leaching. It's half-life in soil, the amount of time it takes to degrade to half of its original concentration, is 7 days to 8 months depending on the soil type and the amount of air in the soil.
Breakdown of Chemical in Vegetation: Bifenthrin is not absorbed by plant foliage, nor does it translocate in the plant.

Section 13 – Disposal Considerations

Disposal: Containers should be emptied as completely as practical before disposal. If possible, recycle containers either in-house or send to recycle company. If this is not practical, send to a commercial waste disposal site. Please do NOT dispose into sewers or waterways.

Section 14 – Transport Information

ADG Code: This product is not classified as a Dangerous Good. No special transport conditions are necessary unless required by other regulations.

Section 15 – Regulatory Information

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

Section 16 – Other Information

Much of the Information in this MSDS came from Extoxnet, a Pesticide Information Project of Cooperative Extension Offices of Cornell University, Oregon State University, the University of Idaho, and the University of California at Davis and the Institute for Environmental Toxicology, Michigan State University.

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
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
NOHSC	National Occupational Health and Safety Commission
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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