

Section 1 - Identification of The Material and Supplier

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Chemical nature: Deltamethrin is a pyrethroid insecticide.,
Trade Name: Farmoz Ballistic Elite Insecticide
Product Use: Agricultural insecticide for use as described on the product label.
Creation Date: March, 2003
This version issued: August, 2012 and is valid for 5 years from this date.

Section 2 - Hazards Identification

Statement of Hazardous Nature

This product is classified as: Hazardous according to the criteria of SWA Australia.

Not a Dangerous Good according to the Australian Dangerous Goods (ADG) Code.

Risk Phrases: R22, R36. Harmful if swallowed. Irritating to eyes.

Safety Phrases: S20, S24/25, S36/37. When using, do not eat or drink. Avoid contact with skin and eyes. Wear suitable protective clothing and gloves.

SUSMP Classification: S6

ADG Classification: None allocated. Not a Dangerous Good.

UN Number: None allocated

Emergency Overview

Physical Description & colour: Clear yellow liquid.

Odour: Characteristic hydrocarbon odour.

Major Health Hazards: Acute exposure effects of Deltamethrin in humans include the following: ataxia, convulsions leading to muscle fibrillation and paralysis, dermatitis, oedema, diarrhoea, dyspnoea, headache, hepatic microsomal enzyme induction, irritability, peripheral vascular collapse, rhinorrhea, serum alkaline phosphatase elevation, tinnitus, tremors, vomiting and death due to respiratory failure. Physical signs of deltamethrin poisoning can include dermatitis after skin contact; exposure to sunlight can make it worse. Severe swelling of the face including lips and eyelids can occur. Symptoms and consequences of poisoning include: sweating, fever, anxiety and rapid heartbeat. If swallowed, symptoms are likely to include feeling sick, vomiting, diarrhea, twitching of arms and legs, and convulsions if poisoning is severe. Studies have shown many cases of dermal deltamethrin poisoning after agricultural use with inadequate handling precautions, and many cases of accidental or suicidal poisoning by the oral route at doses estimated to be 2-250 mg/kg. Oral ingestion caused epigastric pain, nausea, vomiting and coarse muscular fasciculations. With doses of 100-250 mg/kg, coma was caused within 15-20 minutes.

Potential Health Effects

See section 11 for Chronic exposure studies.

Inhalation

Short term exposure: Available data indicates that this product is not harmful. In addition product is unlikely to cause any discomfort or irritation.

Skin Contact:

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

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.

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Ingestion:

Short term exposure: Available data shows that this product is harmful - see above for symptoms. This product is unlikely to cause any irritation problems in the short or long term.

Carcinogen Status:

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

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

IARC: Deltamethrin is Class 3 - unclassifiable as to carcinogenicity to humans.

Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc,%	TWA (mg/m ³)	STEL (mg/m ³)
Deltamethrin	52918-63-5	2.75	not set	not set
Aromatic hydrocarbons	64742-94-5	89	not set	not set
Other non hazardous ingredients	secret	to 100	not set	not set

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

The TWA exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. The STEL (Short Term Exposure Limit) is an exposure value that should not be exceeded for more than 15 minutes and should not be repeated for more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak" is used when the TWA limit, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:

You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 1126 from anywhere in Australia (0800 764 766 in New Zealand) and is available at all times. Have this MSDS with you when you call.

Inhalation: First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Skin Contact: If skin contact occurs, contact a Poisons Information Centre, or call a doctor. Irritation is unlikely. However, if irritation does occur, flush with lukewarm, gently flowing water for 5 minutes or until chemical is removed. If in doubt 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. Obtain medical advice if irritation becomes painful or lasts more than a few minutes.

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: This product is classified as a C1 combustible product. 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. Fires involving significant quantities of aromatic hydrocarbons often generate large clouds of black smoke.

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.

Fire Fighting: When fighting fires involving significant quantities of this product, wear a splash suit complete with self contained breathing apparatus.

Flash point: 65-69°C (PMCC)

Upper Flammability Limit: No data.

Lower Flammability Limit: No data.

Autoignition temperature: No data.

Flammability Class: C1

Section 6 - Accidental Release Measures

Accidental release: In the event of a major spill, prevent spillage from entering drains or water courses. Wear full protective clothing including face mask, face shield and gauntlets. All skin areas should be covered. See above under

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Personal Protection regarding Australian Standards relating to personal protective equipment. Suitable materials for protective clothing include rubber, PVC. 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. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. Full details regarding disposal of used containers, spillage and unused material may be found on the label. If there is any conflict between this MSDS and the label, instructions on the label prevail. Ensure legality of disposal by consulting regulations prior to 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: Note that this product is combustible and therefore, for Storage, meets the definition of Dangerous Goods in some states. We suggest you consult your state's Dangerous Goods laws in order to clarify your obligations regarding the storage of this product.

Make sure that containers of this product are kept tightly closed. 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**, Occupational Protective Clothing: AS/NZS 4501 set 2008, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

SWA Exposure Limits	TWA (mg/m ³)	STEL (mg/m ³)
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Exposure limits have not been established by SWA for any of the significant ingredients in this product.

The ADI for Deltamethrin 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, Sept 2011.

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: Prevent skin contact by wearing impervious gloves, clothes and, preferably, apron. Make sure that all skin areas are covered. See below for suitable material types.

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

Respirator: Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned above.

Eye baths or eyewash stations and safety deluge showers should be provided near to where this product is being used.

Section 9 - Physical and Chemical Properties:

Physical Description & colour:	Clear yellow liquid.
Odour:	Characteristic hydrocarbon odour.
Boiling Point:	Not available.
Freezing/Melting Point:	No specific data. Liquid at normal temperatures.
Volatiles:	No data.
Vapour Pressure:	No data.
Vapour Density:	No data.
Specific Gravity:	0.914
Water Solubility:	Emulsifiable.

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pH:	No data.
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. Protect this product from light.

Incompatibilities: strong oxidising agents.

Fire Decomposition: Carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Aromatic hydrocarbons tend to form dense clouds of black smoke. Water. 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 is unlikely to undergo polymerisation processes.

Section 11 - Toxicological Information

Toxicity: Deltamethrin produces typical type II motor symptoms in mammals. Type II symptoms include a writhing syndrome in rodents, as well as copious salivation. The acute oral LD₅₀ in male rats ranged from 128 mg/kg to greater than 5,000 mg/kg depending on the carrier and conditions of the study; the LD₅₀ for female rats was 52 mg/kg and other published values range from 31 to 139 mg/kg. Values ranging from 21 to 34 mg/kg were obtained for mice; while dogs had a reported LD₅₀ of 300 mg/kg. The acute percutaneous LD₅₀ for rats was reported to be greater than 2,000 mg/kg; greater than 10,000 mg/kg for quail; and greater than 4,640 mg/kg for ducks. The acute dermal LD₅₀ for rabbits was greater than 2,000 mg/kg. No skin irritation and slight eye irritation were reported. **Chronic Toxicity:** In 2-year feeding trials, the reported NEL (no effect level) was 12 mg/kg diet for mice; and 2.1 mg/kg diet for rats. The dose without activity in rats over a 90-day period was 10 mg/kg/day. Suspected chronic exposure effects in humans include the following: choreoathetosis, hypotension, prenatal damage and shock. Workers exposed to deltamethrin during its manufacture over 7-8 years experienced transient cutaneous and mucous membrane irritation, which could be prevented by use of gloves and face masks. No other ill effects were seen.

Reproductive Effects: A reproductive 3-generation study in rats reported a reproductive NOEL to be greater than 2.5 mg/kg/day. Levels tested were 0, 0.1, 1.0 and 2.5 mg/kg/day. Oral administration of deltamethrin to mice on days 7 to 16 of gestation produced a dosage-related reduction of weight gain but no effect on the number of implants, fetal mortality, fetal weight or malformations.

Teratogenic Effects: There were no reported teratogenic effects in mice, rats and rabbits. Deltamethrin has no teratogenic activity.

Mutagenic Effects: There were no mutagenic effects in mice, rats and rabbits. Deltamethrin has no mutagenic activity.

Carcinogenic Effects: No information was available.

Organ Toxicity: Deltamethrin is hydrolyzed by liver microsomal enzymes to 3-(2,2-dibromovinyl) 2,2-cyclopropane carboxylic acid and 3-phenoxybenzaldehyde.

Fate in Humans and Animals: Elimination of the compound in the rat occurs within 2-4 days of administration. Pyrethroid-poisoned mice and rats die during seizures within one or two hours after treatment. Metabolites of the cyano substituent are eliminated more slowly, and tissue levels remain relatively high, especially in the skin and stomach. Deltamethrin at an oral dosage of 50 mg/kg produces a marked increase of cGMP but not cAMP in the brain of rats. Metabolism of deltamethrin in rats involves rapid ester cleavage and hydroxylation. Deltamethrin has a half-life in the rat brain of 1 to 2 days, but it is more persistent in body fat, with a half-life of 5 days. In mammals, the point of death from deltamethrin poisoning is sharply defined by respiratory or cardiac failure. Rats and dogs given oral doses of 10 mg/kg/day for 13 weeks exhibited some motor symptoms but no fatalities or pathological changes. The dogs exhibited diarrhea and vomiting. In another study, rats given 15 daily oral doses of 10 mg/kg showed severe motor symptoms, but a full neuropathological examination of the central nervous system showed no pathological changes. A health survey of 199 workers who repacked pyrethroid insecticides into boxes by hand indicated that about two-thirds of the workers had a burning sensation and tightness and numbness on the face, while one-third had sniffs and sneezes. Abnormal sensations in the face, dizziness, tiredness and red rashes on the skin were more common in summer than in winter. Workers did not wear protective gloves in summer because of the heat. The symptoms usually occurred thirty minutes after exposure to the pyrethroids and rarely lasted more than 24 hours. Cold burning and numbness of the skin occurred to two-thirds of humans in a Chinese factory exposed to about 5-12 mg deltamethrin per cubic meter of air. The other third suffered from sneezing and eye-watering. In addition, headache, heartburn and skin spots were reported, and these symptoms were dependent on the time of the year.

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Section 12 - Ecological Information

Effects on Birds: The reported 8-day LC₅₀ for ducks was greater than 4,640 mg/kg diet; and greater than 10,000 mg/kg diet for quail.

Effects on Aquatic Organisms: As is common with many pyrethroids, deltamethrin has a high toxicity to fish under laboratory conditions. However, in field conditions under normal conditions of use, fish are not harmed. Deltamethrin had an impact on aquatic herbivorous insects. This impact led to an increase of algae. Although the fish (fathead minnows) accumulated the deltamethrin, no mortality could be observed. In laboratory trials, the LC₅₀ for fish was 1-10 micrograms/l. Aquatic fauna, particularly crustacea, may be affected, but fish are not harmed under normal conditions of use.

Effects on Other Animals (Nontarget species): Deltamethrin is considered toxic to bees. The 24 hour oral LD₅₀ for technical deltamethrin fed to bees was 0.079µg/bee; and the 24 hour oral LD₅₀ for the EC formulation of deltamethrin was equal to or greater than 0.4µg/bee. The reported contact LD₅₀ for bees is 0.05µg/bee, but with a field rate of only 12 g active ingredient/ha, the hazard ratio is very low. A hazard ratio is defined as exposure (g active ingredient/ha) divided by intrinsic toxicity (LD₅₀ in µg/bee). The hazard ratio is a risk estimate, or an indicator of the level of mortality that is to be expected in the field. A ratio of greater than 50 indicates the chemical is not dangerous to bees. A ratio between 50 and 2,500 indicates a field test is needed, and over 2,500 indicates the compound is considered dangerous to bees. Although the intrinsic toxicity of deltamethrin is similar to that of organophosphates such as azinphos-methyl, the low rate of use of deltamethrin makes its hazard ratio considerably lower (the azinphos-methyl hazard ratio is 8937). Deltamethrin is very toxic over long periods to the predatory mite *Typhlodromum pyri*. The parasitic wasp *Encarsia formosa*, released in greenhouses to combat whitefly, is too sensitive to allow a treatment with deltamethrin against excessive outbreaks of whiteflies. Deltamethrin had little or no effect on adults or cocoons of *Apanteles plutellae*, a parasite of the diamond back moth in India. Spiders were also indicated to be strongly affected in field investigations.

ENVIRONMENTAL FATE

Breakdown of Chemical in Soil and Groundwater: In soil, degradation occurs within 1-2 weeks.

Breakdown of Chemical in Surface Water: Deltamethrin in pond water was rapidly adsorbed, mostly by sediment, in addition to uptake by plants and evaporation into the air.

Breakdown of Chemical in Vegetation: About 10 days after use, there are no deltamethrin residues observed on plants. There is no known phytotoxicity to crops.

Section 13 - Disposal Considerations

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

Section 14 - Transport Information

ADG Code: 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 product are compliant with NICNAS regulations.

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, 7th Edition
AICS	Australian Inventory of Chemical Substances
CAS number	Chemical Abstracts Service Registry Number
Hazchem Number	Emergency action code of numbers and letters that provide information to emergency services especially firefighters
IARC	International Agency for Research on Cancer
SWA	Safe Work Australia, formerly ASCC and NOHSC

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NOS	Not otherwise specified
NTP	National Toxicology Program (USA)
R-Phrase	Risk Phrase
SUSMP	Standard for the Uniform Scheduling of Medicines & 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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