

Bioallethrin

sc-202501



The Power is Question

Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Bioallethrin

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Company: Santa Cruz Biotechnology, Inc.

Address:

2145 Delaware Ave

Santa Cruz, CA 95060

Telephone: 800.457.3801 or 831.457.3800

Emergency Tel: CHEMWATCH: From within the US and
Canada: 877-715-9305

Emergency Tel: From outside the US and Canada: +800 2436
2255 (1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE

Insecticide used mainly to control flies and mosquitoes in the home, also in combinations for both flying and crawling insects.
Intermediate

SYNONYMS

C19-H26-O3, "2, 2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid", "2, 2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid", "2-methyl-4-oxo-3-(2-propenyl)-2-cyclopenten-1-yl ester", "2-methyl-4-oxo-3-(2-propenyl)-2-cyclopenten-1-yl ester", "DL-2-allyl-4-hydroxy-3-methyl-3-methyl-2-cyclopenten-1-one ester of", "DL-2-allyl-4-hydroxy-3-methyl-3-methyl-2-cyclopenten-1-one ester of", "D-trans-2, 2-dimethyl-3-(2-methylpropenyl)cyclopropanecarboxylic acid", "D-trans-2, 2-dimethyl-3-(2-methylpropenyl)cyclopropanecarboxylic acid", "DL-2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one ester of", "DL-2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one ester of", "D-trans-chrysanthemum monocarboxylic acid", "D-trans-chrysanthemum monocarboxylic acid", "(+)-trans-chrysanthemum acid ester of (+/-)-allethrolone", "allyl homologue of cinerin I", "allyl homologue of cinerin I", bioallethrin, "ENT 16275", "2, 2-dimethyl-3-(2-methylpropenyl)cyclopropanecarboxylic acid", "2, 2-dimethyl-3-(2-methylpropenyl)cyclopropanecarboxylic acid", "ester with 2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one", "ester with 2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one", insecticide

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Harmful by inhalation, in contact with skin and if swallowed.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
- Ingestion of pyrethroids may produce nausea and vomiting, abdominal pain and diarrhea. Large doses may produce central nervous system disturbances resulting in tremor, muscular incoordination, weakness of the limbs, convulsions, coma and death from respiratory depression.
- Rats fed on a diet of allethrin for 16 weeks exhibited tremor and convulsions at dose levels of 10000 mg/kg. No gross effects were seen at 5000 mg/kg. At near-lethal doses, allethrins are likely to cause hyperactivity, tremors and convulsions.

EYE

- There is some evidence to suggest that this material can cause eye irritation and damage in some persons.
- Irritation of the eyes may produce a heavy secretion of tears (lachrymation).
- Instilled 10% and 50% solutions of allethrin dissolved in olive oil produced eye-lid-closure, slight conjunctival hyperaemia and eye-discharge in rabbits. Lachrymation was observed in the group treated with the 50% solution.

SKIN

- Skin contact with the material may be harmful; systemic effects may result following absorption.
- The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives .
- Allethrin did not produce dermal sensitisation in guinea pigs although repeated applications in an olive oil carrier did produce slight lymphocytic and monocytic infiltration of the dermis.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions 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.
- Skin contact with natural pyrethrins may result in severe dermatitis and may also be associated with allergic rhinitis and asthma. Absorption through the skin may result in a toxic syndrome similar to that produced by inhalation. Systemic effects, following skin absorption, may include liver and kidney damage. Prolonged or repeated exposure may cause central nervous system effects and allergic skin reaction.

INHALED

- Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.
- The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of vapors, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
- Inhalation of allethrin by mice at a level of 3000 mg/m³ for 4 hours per day, 6 days a week, over 4 weeks resulted in eye-discharge in all animals. Histopathological examination of the lungs revealed bronchopneumonia.
- This material, like natural pyrethrins, may cause central stimulation with nausea, vomiting, stomach upset, diarrhea, hypersensitivity, inco-ordination, tremors, muscle paralysis, convulsion, coma and respiratory failure. There may be aggressive behavior, tremor and weakness. Synthetic pyrethrins, unlike natural species, rarely cause allergic responses in humans. The above symptoms are sometimes collectively called "Type I Syndrome".
- Inhalation of pyrethrins may produce nausea, vomiting, sneezing, serious nasal discharge, nasal stuffiness and asthma. High concentrations may produce hyperexcitability, incoordination, tremors, muscular paralysis and death (due to respiratory failure). There have been some reports of transient facial tingling (paraesthesia) which lasts a few hours after exposure.

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 inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.

There is limited evidence that, skin contact with this product is more likely to cause a sensitization reaction in some persons compared to the general population.

Racemic allethrin added to the diet of rats for 80 weeks, produced bile-duct proliferation at levels of 1000 mg/kg diet and a decrease in glutamine-oxaloacetic acid transaminase activity at 2000 mg/kg diet. No oncogenic effects were observed at any dose level.

In a two year study on rats, the no-observed-adverse-effect level for.

Chronic poisoning by natural pyrethrins may result in convulsion, tetanic paralysis, rapid and uneven heart beat, liver and kidney damage, or death.

The natural pyrethrins may produce hypersensitivity, especially following previous sensitising exposure. In general, repeated exposures over 2 or 3 years are required to elicit a response and involve exposure to pyrethrum rather than its individual components (including pyrethrins). The sesquiterpene lactone (pyrethrosin) and the pyrethrum glycoproteins account for the immediate and delayed hypersensitivity seen in guinea pigs following a single injection of ground chrysanthemum in Freud's adjuvant. Mild erythematic vesicular dermatitis (with papules), pruritus, localized oedema (particularly of the face, lips and eyelids), rhinitis, tachycardia, pallor and sweating are the most common syndromes. An initial skin sensitisation can progress to marked dermal oedema and skin cracking. Pyrethrum dermatitis appears to increase in hot weather or under conditions where heavy perspiration is produced. The active ingredients of pyrethrum (except pyrethrin II) are inactive in patch tests. Those patients allergic to ragweed pollen are particularly sensitive to pyrethrin.

Rats fed on a diet of pyrethrins for 5000 ppm for 2 years showed some signs of tissue damage including liver lesions, bile duct proliferation and focal necrosis of the liver cells. A no-effect level of 1000 ppm found in animal experiments correspond to a daily dose of 3600 mg/man.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARD RATINGS

Flammability: 1  Min Max

Toxicity:	2	
Body Contact:	2	
Reactivity:	1	
Chronic:	2	

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



NAME	CAS RN	%
trans-allethrin	22431-63-6	100
isomer of		
allethrin	584-79-2	

Section 4 - FIRST AID MEASURES

SWALLOWED

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
 - Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
 - For advice, contact a Poisons Information Center or a doctor.
 - Urgent hospital treatment is likely to be needed.
 - If conscious, give water to drink.
 - INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- NOTE: Wear a protective glove when inducing vomiting by mechanical means.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
 - If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
 - If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

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.
- 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 contact occurs:
- Immediately remove all contaminated clothing, including footwear
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

NOTES TO PHYSICIAN

For chronic or short term repeated exposures to pyrethrum and synthetic pyrethroids: Mammalian toxicity of pyrethrum and synthetic pyrethroids is low, in part because of poor bioavailability and a large first pass extraction by the liver. The most common adverse reaction results from the potent sensitizing effects of pyrethrins. Clinical manifestations of exposure include contact dermatitis (erythema, vesiculation, bullae); anaphylactoid reactions (pallor, tachycardia, diaphoresis) and asthma [Ellenhorn Barceloux] In cases of skin contact, it has been reported that topical application of Vitamin E Acetate (alpha-tocopherol acetate) has been found to have high therapeutic value, eliminating almost all skin pain associated with exposure to synthetic pyrethroids. [Incitec].

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	9.001 x 10(-4) mm
Upper Explosive Limit (%):	Not applicable
Specific Gravity (water=1):	0.997 (20 C)
Lower Explosive Limit (%):	Not applicable

EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.

- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- 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.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).
- May emit acrid smoke.
- Mists containing combustible materials may be explosive.

Combustion products include: carbon dioxide (CO₂), other pyrolysis products typical of burning organic material. May emit poisonous fumes.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Respirator:

Type A-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

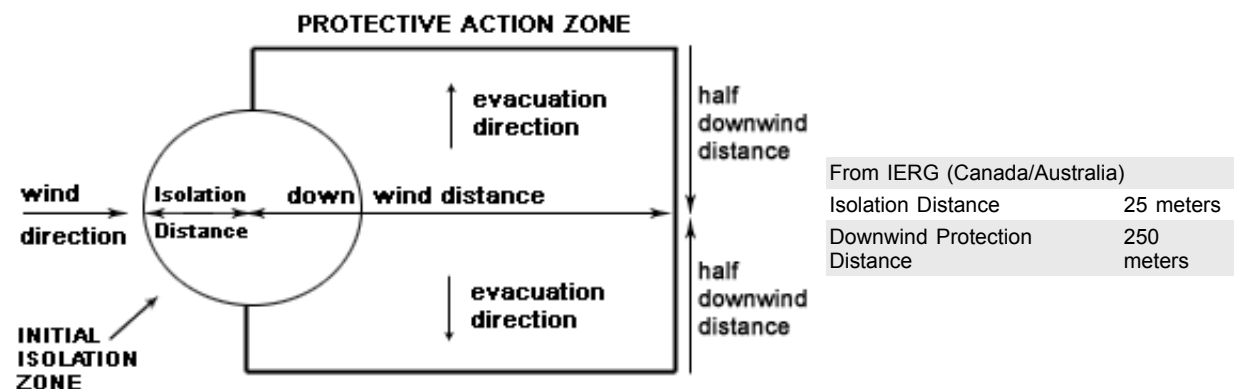
MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapors and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable labeled container for waste disposal.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labeled containers for recycling.
- Neutralize/decontaminate residue.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL



FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5 Guide 151 is taken from the US DOT emergency response guide book.

6 IERG information is derived from CANUTEC - Transport Canada.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

-
- DO NOT allow clothing wet with material to stay in contact with skin
- 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.

RECOMMENDED STORAGE METHODS

- Glass container.
- Lined metal can, Lined metal pail/drum
- Plastic pail
- Polyliner drum
- Packing as recommended by manufacturer.
- Check all containers are clearly labeled and free from leaks.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):

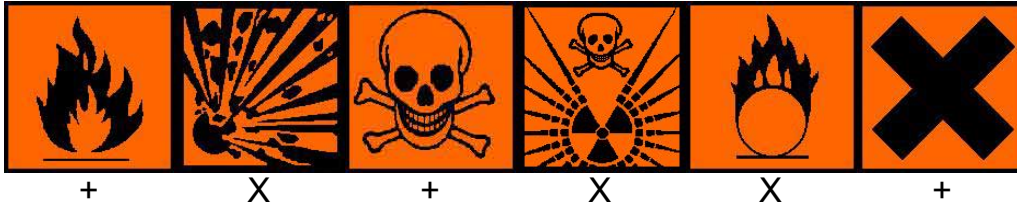
- Removable head packaging;
- Cans with friction closures and
- low pressure tubes and cartridges may be used.

- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages * . - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a close fitting molded plastic box and the substances are not incompatible with the plastic.

STORAGE REQUIREMENTS

-
- Store in original containers.
- Keep containers securely sealed.
- 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.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X: Must not be stored together
 O: May be stored together with specific preventions
 +: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	trans-allethrin (Turpentine and selected monoterpenes)	20	111						
Canada - Alberta Occupational Exposure Limits	allethrin (Turpentine and selected monoterpenes)	20	111						

MATERIAL DATA

ALLETHRIN:

TRANS-ALLETHRIN:

■ For pyrethrum and its active components:

IDLH Level: 5000 mg/m³

Pyrethrum and/or its active components, the pyrethrins, cause dermatitis and sensitisation. Ingestion of massive doses can induce convulsions, vomiting and bradycardia. Animals exhibit liver damage and death through respiratory failure. The recommended TLV-TWA is equivalent to an occupational dose of 0.7 mg/kg/day and is thought to minimise the potential for systemic effects. The TLV may NOT prevent the development of hypersensitisation, particularly among those with pre-existing allergies to pollen and related agents.

Synthetic pyrethrins (pyrethroids) often produce a range of toxic effects resembling pyrethrum; in the absence of a regulated exposure limit prudence dictates that the value for pyrethrum serves as a reference.

ALLETHRIN:

REL TWA: 3.8 mg/m³

PERSONAL PROTECTION



Consult your EHS staff for recommendations

EYE

-
- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. DO NOT wear contact lenses.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.

Wear safety footwear or safety gumboots, eg. Rubber.

NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- 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).

- 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) 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) 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.

For higher monobasic carboxylic esters ;

Butyl, chlorinated polyethylene (CPE), natural rubber, neoprene, nitrile rubber, polyethylene (PE), and PVC are all rated poorly.

OTHER

- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.

RESPIRATOR

■ Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half-face Respirator	Full-Face Respirator
1000	10	A-1 P	-
1000	50	-	A-1 P
5000	50	Airline*	-
5000	100	-	A-2 P
10000	100	-	A-3 P
	100+		Airline* *

* - Continuous Flow ** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

■ Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator. Correct fit is essential to obtain adequate protection an approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapors, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favorable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Does not mix with water.

Floats on water.

State	LIQUID	Molecular Weight	302.45
Melting Range (°F)	Not available.	Viscosity	Not Available
Boiling Range (°F)	284 (0.1 mm Hg)	Solubility in water (g/L)	Immiscible
Flash Point (°F)	266 d-allethrin	pH (1% solution)	Not applicable.
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available.	Vapor Pressure (mmHg)	9.001 x 10(-4) mm
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	0.997 (20 C)
Lower Explosive Limit (%)	Not applicable	Relative Vapor Density (air=1)	Not available.

Volatile Component (%vol)	Not available.	Evaporation Rate	Not available
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APPEARANCE

Clear amber viscous liquid. Practically insoluble in water, soluble in alcohol, petroleum ether, kerosine, carbon tetrachloride, ethylene nitromethane. Harmful. Allethrins are synthetic pyrethroids and are a mixture of stereoisomers, the insecticidal activity and toxicity of which varies.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

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

STORAGE INCOMPATIBILITY

- Pyrethrins and permethrins:
 - are unstable in the presence of light, heat, moisture and air
 - are hydrolysed by oxygen and/ or sunlight
 - may react with strong oxidisers to produce fire and explosions
 - are incompatible with alkalis
 - Avoid strong bases.

Avoid reaction with oxidizing agents.

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

Section 11 - TOXICOLOGICAL INFORMATION

trans-allethrin

TOXICITY AND IRRITATION

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

■ For allethrin:

Acute toxicity: Allethrin is slightly to moderately toxic by dermal absorption and ingestion Short-term dermal exposure to allethrin may cause itching, burning, tingling, numbness, a feeling of warmth, with no dermatitis Exposure to large doses by any route may lead to nausea, vomiting, diarrhea, hyperexcitability, incoordination, tremors, convulsive twitching, convulsions, bloody tears, incontinence, muscular paralysis, prostration and coma. Persons sensitive to ragweed pollen are at increased risk from exposure to allethrin .

Allethrin is a central nervous system stimulant . Heavy respiratory exposure caused incoordination and urinary incontinence in mice and rats .

Chronic toxicity: A dosage of 50 mg/kg/day for 2 years produced no detectable effect in the dog .

In a 90-day dietary study with rats fed 0, 25, 75, 250 or 500 mg/kg of bioallethrin, the NOEL was 25 mg/kg. Rats fed 75 mg/kg exhibited decreased body weight gain, increased liver weights and, in females only, increased levels of serum liver enzymes .

A 6-month study with dogs fed 0, 5, 25 or 125 mg/kg of bioallethrin, effects on the liver were seen at 5 mg/kg .

Teratogenic Effects: No developmental defects were seen in the offspring of rats given doses as high as 195 mg/kg/day .

Mutagenic Effects: Allethrin has been found to be mutagenic under certain conditions in strains of the bacterium Salmonella typhimurium . However, 2 other tests of bioallethrin for mutagenicity (DNA damage and reverse mutation) were negative.

Carcinogenic Effects: Rats fed 2,000 mg/kg of d-allethrin for 2 years did not develop cancer .

Organ Toxicity: Pyrethroids may cause adverse effects on the central nervous system. Long-term feeding studies have caused increased liver and kidney weights and adverse changes in liver tissues in test animals.

CARCINOGEN

Non-arsenical insecticides (occupational exposures in spraying and application of)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group 2A
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Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

ALLETHRIN:

TRANS-ALLETHRIN:

- Very toxic to aquatic organisms.
 - 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

Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993 Commission of the European Communities.

- DO NOT discharge into sewer or waterways.
- Synthetic pyrethroids are examples of optimized insecticidal activity, selectivity and tailored environmental persistence. Through modifications of both acid and alcohol portions of the ester, compounds of desired residual activity have been synthesized whilst maintaining a biodegradable ester linkage. These compounds are generally very toxic to crustaceans and fish in laboratory bioassays. Under field conditions, however the residues are tightly bound in sediment, and ingested residues are readily metabolized. Their toxicity in natural systems are generally less than laboratory test data might indicate. They are generally non-persistent in the environment.
- Substances containing unsaturated carbons are ubiquitous in indoor environments. They result from many sources (see below). Most are reactive with environmental ozone and many produce stable products which are thought to adversely affect human health. The potential for surfaces in an enclosed space to facilitate reactions should be considered.

Source of unsaturated substances	Unsaturated substances (Reactive Emissions)	Major Stable Products produced following reaction with ozone.
	Isoprene, nitric oxide, squalene,	Methacrolein, methyl vinyl ketone, nitrogen dioxide, acetone, formaldehyde, peroxyacetyl nitrate

Occupants (exhaled breath, ski oils, personal care products)	unsaturated sterols, oleic acid and other unsaturated fatty acids, unsaturated oxidation products	hydrogen peroxide, acetone, dimethyl geranyl acetone, 4OPA, formaldehyde, nonanol, decanal, 9-oxo-nonanoic acid, azelaic acid, nonanoic acid.
Soft woods, wood flooring, including cypress, cedar and silver fir boards, houseplants	Isoprene, limonene, alpha-pinene, other terpenes and sesquiterpenes	Formaldehyde, 4-AMC, pinoaldehyde, pinic acid, pinonic acid, formic acid, methacrolein, methyl vinyl ketone, SOAs including ultrafine particles
Carpets and carpet backing	4-Phenylcyclohexene, 4-vinylcyclohexene, styrene, 2-ethylhexyl acrylate, unsaturated fatty acids and esters	Formaldehyde, acetaldehyde, benzaldehyde, hexanal, nonanal, 2-nonenal
Linoleum and paints/polishes containing linseed oil	Linoleic acid, linolenic acid	Propanal, hexanal, nonanal, 2-heptenal, 2-nonenal, 2-decanal, 1-pentene-3-one, propionic acid, n-butyric acid
Latex paint	Residual monomers	Formaldehyde
Certain cleaning products, polishes, waxes, air fresheners	Limonene, alpha-pinene, terpinolene, alpha-terpineol, linalool, linalyl acetate and other terpenoids, longifolene and other sesquiterpenes	Formaldehyde, acetaldehyde, glycoaldehyde, formic acid, acetic acid, hydrogen and organic peroxides, acetone, benzaldehyde, 4-hydroxy-4-methyl-5-hexen-1-ol, 5-ethenyl-dihydro-5-methyl-2(3H)-furanone, 4-AMC, SOAs including ultrafine particles
Natural rubber adhesive	Isoprene, terpenes	Formaldehyde, methacrolein, methyl vinyl ketone
Photocopier toner, printed paper, styrene polymers	Styrene	Formaldehyde, benzaldehyde
Environmental tobacco smoke	Styrene, acrolein, nicotine	Formaldehyde, benzaldehyde, hexanal, glyoxal, N-methylformamide, nicotinaldehyde, cotinine
Soiled clothing, fabrics, bedding	Squalene, unsaturated sterols, oleic acid and other saturated fatty acids	Acetone, geranyl acetone, 6MHO, 4OPA, formaldehyde, nonanal, decanal, 9-oxo-nonanoic acid, azelaic acid, nonanoic acid
Soiled particle filters	Unsaturated fatty acids from plant waxes, leaf litter, and other vegetative debris; soot; diesel particles	Formaldehyde, nonanal, and other aldehydes; azelaic acid; nonanoic acid; 9-oxo-nonanoic acid and other oxo-acids; compounds with mixed functional groups (=O, -OH, and -COOH)
Ventilation ducts and duct liners	Unsaturated fatty acids and esters, unsaturated oils, neoprene	C5 to C10 aldehydes
"Urban grime"	Polycyclic aromatic hydrocarbons	Oxidized polycyclic aromatic hydrocarbons
Perfumes, colognes, essential oils (e.g. lavender, eucalyptus, tea tree)	Limonene, alpha-pinene, linalool, linalyl acetate, terpinene-4-ol, gamma-terpinene	Formaldehyde, 4-AMC, acetone, 4-hydroxy-4-methyl-5-hexen-1-ol, 5-ethenyl-dihydro-5-methyl-2(3H) furanone, SOAs including ultrafine particles
Overall home emissions	Limonene, alpha-pinene, styrene	Formaldehyde, 4-AMC, pinoaldehyde, acetone, pinic acid, pinonic acid, formic acid, benzaldehyde, SOAs including ultrafine particles

Abbreviations: 4-AMC, 4-acetyl-1-methylcyclohexene; 6MHQ, 6-methyl-5-heptene-2-one, 4OPA, 4-oxopentanal, SOA, Secondary Organic Aerosols

Reference: Charles J Weschler; Environmental Health Perspectives, Vol 114, October 2006.

■ For allethrin:

Environmental fate:

The extremely photolabile nature of allethrin in general suggest they will be significantly degraded.

The photodegradation rate was measured of a thin film of allethrin on glass under a sun lamp. Approximately 8 h of exposure were needed for 90% degradation. S-Bioallethrin was rapidly decomposed, when similarly exposed to sunlight. The major photoreactions were ester cleavage, di-pi-methane rearrangement, oxidation at the isobutenyl methyl group, epoxidation at the isobutenyl double bond, and cis/trans-isomerisation. The major degradation products formed were CA, the 3-(2-hydroxymethyl) or the 3-(1-epoxy) derivative of allethrin, and cyclopropylrethronyl chrysanthemate. Sunlight photolysis of allethrin in solution yielded similar products. Allethrin was decomposed by rapid pyrolysis at over 400 deg C. When kept at 150 deg. C. for 9 h in an aluminum foil vessel in air, it vapourised (28 - 35%), polymerised (24 - 45%), and decomposed (18 - 40%). CA, allethrolone, pyrocin, and cis-dihydrochrysanthemo-delta-lactone were the degradation products formed.

Ecotoxicity:

Allethrin, bioallethrin, and S-Bioallethrin are all toxic for fish with LC50 values of 9 - 90 ug/litre, S-Bioallethrin being the most toxic. Allethrin is generally less toxic for Daphnia and aquatic insect larvae with LC50 values of 150 - 50 000 ug/litre. The toxicity of allethrin is low for birds (LD50 > 2000 mg/kg), but high for honey-bees (LD50 3 - 9 ug/bee).

Bird LD50: bobwhite quail 2030 mg/kg; mallard duck >2000 mg/kg

Bird dietary LD50: mallard duck, bobwhite quail 5620 ppm (d-allethrin)

Fish LC50 (96 h): 4-56 ug/l

Invertebrate LC50 (96 h): 1-11 ug/l

Bee LD50: 0.003-0.009 mg/bee; allethrin is slightly toxic to bees.

■ 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.

TRANS-ALLETHRIN:

■ The material is classified as an ecotoxin* because the Daphnia EC50 (48 hours) is less than or equal to 0.1 mg/l

* Classification of Substances as Ecotoxic (Dangerous to the Environment)

Appendix 8, Table 1

Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993 Commission of the European Communities.

ALLETHRIN:

■ Fish LC50 (96hr.) (mg/l):

0.019- 0.05

■ Daphnia magna EC50 (48hr.) (mg/l): 0.021

/53

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
trans-allethrin	HIGH		LOW	MED
allethrin	HIGH		LOW	MED

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Puncture containers to prevent re-use and bury at an authorized landfill.

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,
- 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. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. 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.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols:	None	Hazard class or Division:	6.1
Identification Numbers:	UN2902	PG:	III
Label Codes:	6.1	Special provisions:	IB3, T7, TP2, TP28
Packaging: Exceptions:	153	Packaging: Non-bulk:	203
Packaging: Exceptions:	153	Quantity limitations: Passenger aircraft/rail:	60 L
Quantity Limitations: Cargo aircraft only:	220 L	Vessel stowage: Location:	A
Vessel stowage: Other:	40		

Hazardous materials descriptions and proper shipping names:

Pesticides, liquid, toxic, n.o.s.

Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	2902	Packing Group:	III
Special provisions:	A3		

Shipping Name: PESTICIDE, LIQUID, TOXIC, N.O.S. *(CONTAINS TRANS-ALLETHRIN)

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	2902	Packing Group:	III
EMS Number:	F-A,S-A	Special provisions:	61 223 274 944

Limited Quantities: 5 L

Shipping Name: PESTICIDE, LIQUID, TOXIC, N.O.S.(contains trans-allethrin)

Section 15 - REGULATORY INFORMATION

trans-allethrin (CAS: 22431-63-6,28057-48-9,28434-00-6) is found on the following regulatory lists;

"US EPCRA Section 313 Chemical List","US List of Lists - Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act"

Regulations for ingredients

allethrin (CAS: 584-79-2,28434-00-6) is found on the following regulatory lists;

"Canada Domestic Substances List (DSL)", "US - New Jersey Right to Know Hazardous Substances", "US Toxic Substances Control Act (TSCA) - Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Cumulative effects may result following exposure*.
 - May produce discomfort of the eyes*.
 - Possible respiratory and skin sensitizer*.
- * (limited evidence).

Ingredients with multiple CAS Nos

Ingredient Name	CAS
trans-allethrin	22431-63-6, 28057-48-9, 28434-00-6
allethrin	584-79-2, 28434-00-6

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■ Classification of the mixture 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.

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