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Insecticides for Mosquito Control in Maryland

Updated 2014 Recommendations

Introduction

To serve the citizens of Maryland, the Maryland Department of Agriculture annually reviews the insecticides available for mosquito control. The recommended insecticides are selected from the list of products registered by the U. S. Environmental Protection Agency (EPA) for mosquito control use. The Department of Agriculture bases its selection on experience and research and includes factors of risk, economy and effectiveness under Maryland conditions. The Department promotes integrated pest management of mosquitoes and advocates alternatives to insecticide application when possible. These alternatives include water management, biological control and public education.

When alternative controls are not possible to utilize or are not effective in reducing the mosquito population below a level that may cause unacceptable annoyance or constitute a public health threat, the use of insecticide is an approved option as part of an integrated pest management program.

Insecticides which control mosquito larvae generally have a narrower range of impact to nontarget species and can be applied in a more site-specific manner than mosquito adulticides. Larvicides are, therefore, preferred over adulticides. However, if larviciding is not possible due to weather conditions, logistical problems (area too large, too remote), or larvae are in a prohibited/restricted area (wildlife refuge, national park, military reservation), adult mosquito control is a valid option, and may be the only control option.

All of the insecticides listed below are classified by EPA as general use pesticides. No restricted use insecticides are used by public agencies in Maryland for mosquito control.

Mosquito Control Larvicides

The following are guidelines for mosquito larvae control in various habitats. A

direct application of any insecticide to water in Maryland requires a permit from the Maryland Department of the Environment.

The following nonresidual products are recommended for general use in mosquito larvae habitats in Maryland, including freshwater marshes, salt marshes, woodland pools, ditches and dredged spoil disposal areas:

1. Altosid Liquid Larvicide - active ingredient - methoprene
2. Altosid Liquid Larvicide Concentrate - active ingredient - methoprene
3. Natular - active ingredient - spinosa - Saccharopolyspora spinosa
4. Vectobac or Aquabac - active ingredient - Bacillus thuringiensis israelensis

Vectolex is a biological pesticide with the active ingredient Bacillus sphaericus. It displays limited residual activity. Vectolex is recommended for control of Culex mosquito larvae. Vectolex has a low activity against other genera of mosquitoes and is not recommended for control of Aedes, Psorophora, Anopheles, etc.

The residual products listed below have restrictions imposed by the Maryland Department of the Environment prohibiting their use in water inhabited by fish. Use of these products is acceptable in other mosquito breeding habitats:

1. Altosid Briquets - active ingredient - methoprene
2. Altosid XR Briquets - active ingredient - methoprene
3. Altosid Pellets - active ingredient - methoprene
4. Altosid XR Granules - active ingredient - methoprene

Mosquito Control Adulticides

Type of Application

Aerial ULV	1. Trumpet - active ingredient = naled - applied at 0.05 to 0.10 lb. a.i. per acre
Ground ULV	1. Biomist 30+30 diluted in mineral oil - active ingredients = Permethrin and piperonyl butoxide - applied at approximately 0.0031 lb. a.i. per acre. The restriction that prohibited use of this product within 100 feet of lakes, streams, ponds, rivers and other water was removed in 2006.

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50 Harry S. Truman Parkway, Annapolis, MD 21401

(410) 841-5700



BIOMIST® 30+30 ULV

For Use Outdoors as an Ultra-Low Volume (ULV) Application to Control Adult Mosquitoes in Residential and Recreational Areas. Also for use against Biting and Non-Biting Midges and Blackflies.

For use only by federal, state, tribal or local government officials responsible for public health or vector control, or by persons certified in the appropriate category or otherwise authorized by the state or tribal lead pesticide regulatory agency to perform adult mosquito control applications, or by persons under their direct supervision.

ACTIVE INGREDIENTS

Permethrin (3-Phenoxyphenyl) methyl (+/-) cis, trans-3-(2,2-dichloroethenyl)-2,2-dimethyl cyclopropanecarboxylate	30.0%
Piperonyl Butoxide*	30.0%
OTHER INGREDIENTS**	40.0%
	100.0%

Contains 2.5 pounds of Permethrin and 2.5 pounds of PBO per gallon

*PBO, (butyl carbonyl) (6-propylpiperonyl) ether and related compounds

** Contains petroleum distillate

KEEP OUT OF REACH OF CHILDREN CAUTION

FIRST AID

Have product container or label with you when calling a poison control center or doctor, or going for treatment. For Medical Emergencies, call the International Poison Control Center at 1-800-214-7753.

IF SWALLOWED: Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing the eye. Call a poison control center or doctor for treatment advice.

IF INHALED: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth. Call a poison control center or doctor for further treatment advice.

NOTE TO PHYSICIAN: Product contains a petroleum distillate. Gastric lavage is indicated if material was taken internally. Vomiting may cause aspiration pneumonia.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION Harmful if swallowed. Harmful if absorbed through skin. Avoid contact with skin, eyes or clothing. Causes moderate eye irritation. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

Personal Protective Equipment (PPE): Some materials that are chemical-resistant to this product are: barrier laminate, nitrile rubber, neoprene rubber, or Viton. Mixers, loaders, applicators, and other handlers must wear long-sleeve shirt and long pants, shoes plus socks. In addition, all handlers except for applicators using motorized ground equipment, pilots and flaggers, must wear chemical-resistant gloves. In addition, mixers/loaders, persons cleaning equipment, and other persons exposed to the concentrate must wear a chemical-resistant apron. See engineering controls for additional requirements.

User Safety Requirements: Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

Engineering Controls: Pilots must use an enclosed cockpit that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(6)]. Human flagging is prohibited. Flagging to support aerial application is limited to use of the Global Positioning System (GPS) or mechanical flaggers.

USER SAFETY RECOMMENDATIONS: Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Users should remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is extremely toxic to aquatic organisms, including fish and invertebrates. Runoff from treated areas or deposition of spray droplets into a body of water may be hazardous to fish and aquatic invertebrates. Before making the first application in a season, it is advisable to consult with the state or tribal agency with primary responsibility for pesticide regulation to determine if other regulatory requirements exist. Do not apply over bodies of water (lakes, rivers, permanent streams, natural ponds, commercial fish ponds, swamps, marshes or estuaries), except when necessary to target areas where adult mosquitoes are present, and weather conditions will facilitate movement of applied material away from the water in order to minimize incidental deposition into the water body. Do not contaminate bodies of water when disposing of equipment rinsate or wash waters.

This product is highly toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the treatment area, except when applications are made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes, or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

PHYSICAL OR CHEMICAL HAZARDS

Do not use or store near heat or open flame.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

Not for use in metered release systems. Not for use in outdoor residential misting systems. Do not contaminate cropland (other than crops listed) or potable water supplies with spray drift. Do not make applications during rain.

USE INFORMATION: BIOMIST 30+30 ULV is approved for applications as a thermal aerosol and an ultra low volume (ULV) nonthermal aerosol (cold fog) to control adult mosquitoes in residential and recreational areas and other areas these insects occur, such as but not limited to parks, campsites, woodlands, athletic fields, golf courses, residential areas and municipalities, gardens, playgrounds, and overgrown waste areas.

BIOMIST 30+30 ULV can be applied over specific growing crops and range grasses prior to harvest for the control of adult mosquitoes within or adjacent to these areas. In the treatment of corrals, feedlots, swine lots, poultry ranges and zoos cover any exposed drinking water, drinking fountains and animal feed before application. Application can be made where the following crops are present:

<i>Alfalfa</i>	<i>Cauliflower</i>	<i>Garlic</i>	<i>Peach</i>
<i>Almond</i>	<i>Celery</i>	<i>Range grasses</i>	<i>Pepper, bell</i>
<i>Apple</i>	<i>Cherry</i>	<i>Horseradish</i>	<i>Pistachio</i>
<i>Artichoke</i>	<i>Corn, forage</i>	<i>Leaf petioles subgroup</i>	<i>Potato</i>
<i>Asparagus</i>	<i>Corn, grain</i>	<i>4B</i>	<i>Soybean, seed</i>
<i>Avocado</i>	<i>Corn, stover</i>	<i>Leafy greens subgroup</i>	<i>Spinach</i>
<i>Broccoli</i>	<i>Corn, sweet, kernel + cob</i>	<i>4A</i>	<i>Tomato</i>
<i>Brussels sprouts</i>	<i>with husks removed</i>	<i>Lettuce, head</i>	<i>Vegetable, cucurbit, group 9*</i>
<i>Cabbage</i>	<i>Eggplant</i>	<i>Mushroom</i>	<i>Walnut</i>
	<i>Fruit, pome, group 11</i>	<i>Onion, bulb</i>	<i>Watercress</i>

* 40 CFR 180.41 Crop Group 9: Cucurbit Vegetables, includes Crop Subgroup 9A (melon) and Crop Subgroup 9B (squash/cucumber).

For best results treat when mosquitoes are most active and weather conditions are conducive to keeping the spray cloud close to the ground. An inversion of air temperatures and a light breeze is preferable. Application in calm air conditions is to be avoided. Apply only when wind speed is greater than 1 mph. Air temperature should be greater than 50°F when conducting all types of applications.

Do not treat a site with more than 0.007 lbs of each active ingredient, permethrin and PBO, per acre in a 3-day period. Retreatments within a 3-day period shall not exceed 0.007 total lbs permethrin in any site. Do not exceed 25 applications at 0.007 lbs permethrin or PBO per acre at any site in one year, or exceed 0.18 lbs of permethrin or PBO per acre per site per year. When rotating this product with other insecticides containing PBO, do not exceed 2 lbs PBO per acre per site per year. More frequent applications may be made to prevent or control a threat to public and/or animal health determined by a state, tribal, or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

SPRAY DROPLET SIZE DETERMINATION

Ground-based Application: Spray equipment must be adjusted so that the volume median diameter (VMD) is less than 30 microns (Dv 0.5 < 30 um) and that 90% of the spray is contained in droplets smaller than 50 microns (Dv 0.9 < 50 um). Directions from the equipment manufacturer or vendor, pesticide registrant, or a test facility using a laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

Aerial Application made at or below 200 feet above ground elevation: Spray equipment must be adjusted so that the volume median diameter produced is less than 60 microns (Dv 0.5 < 60 um) and that 90% of the spray is contained in droplets smaller than 100 microns (Dv 0.9 < 100 um). The effects of flight speed and, for non-rotary nozzles, nozzle angle on the droplet size spectrum must be considered. Directions from the equipment manufacturer or vendor, pesticide registrant, or a test facility using a wind tunnel and laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

Aerial Application made at greater than 200 feet above ground elevation: Spray equipment must be adjusted so that the volume median diameter produced is less than 70 microns (Dv 0.5 < 70 um) and that 90% of the spray is contained in droplets smaller than 145 microns (Dv 0.9 < 145 um). The effects of flight speed and, for non-rotary nozzles, nozzle angle on the droplet size spectrum must be considered. Directions from the equipment manufacturer or vendor, pesticide registrant, or a test facility using a wind tunnel and laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

GROUND ULV APPLICATION: Apply BIOMIST 30+30 ULV through a standard ULV cold aerosol or non-thermal aerosol (Cold Fog) generator undiluted at a flow rate of 0.5 to 2.2 fluid ounces per minute, and an average vehicle speed of 10 MPH. If a different vehicle speed is used, adjust rate accordingly. These rates are equivalent to 0.00175 to 0.007 pounds each of Permethrin and PBO per acre. BIOMIST 30+30 ULV may also be applied by diluting with a suitable solvent such as mineral oil and applying so as not to exceed 0.007 pounds Permethrin per acre. The following charts represent suggested dilution and application rates for ground ULV applications. If an alternate dilution rate is used, adjust flow rate accordingly. Vary flow rate according to vegetation density and mosquito population. Use higher flow rate in heavy vegetation or when populations are high.

CONDITIONS and RATES to USE for MOSQUITO CONTROL - UNDILUTED

Permethrin/PBO Pounds per Acre	Application Rates Fl.oz./Minute				Fl.oz. BIOMIST 30+30 ULV per Acre
	5 MPH	10 MPH	15 MPH	20 MPH	
0.007	1.1	2.2	3.3	4.3	0.36
0.0035	0.5	1.1	1.6	2.2	0.18
0.00175	0.3	0.5	0.8	1.1	0.09

FOR A 1:2 BIOMIST 30+30 ULV/SOLVENT DILUTION RATIO: Mix one (1) part BIOMIST 30+30 with two (2) parts solvent and apply at the following rates:

Permethrin/PBO Pounds per Acre	Application Rates Fl.oz./Minute				Fl.oz. finished spray per Acre
	5 MPH	10 MPH	15 MPH	20 MPH	
0.007	3.3	6.5	9.8	13.0	1.08
0.0035	1.6	3.3	4.9	6.5	0.54
0.00175	0.8	1.6	2.4	3.3	0.27

FOR A 1:4 BIOMIST 30+30 ULV/SOLVENT DILUTION RATIO: Mix one (1) part BIOMIST 30+30 with four (4) parts solvent and apply at the following rates:

Permethrin/PBO Pounds per Acre	Application Rates Fl.oz./Minute				Fl.oz. finished spray per Acre
	5 MPH	10 MPH	15 MPH	20 MPH	
0.007	5.4	10.9	16.3	21.7	1.79
0.0035	2.7	5.4	8.2	10.9	0.90
0.00175	1.4	2.7	4.1	5.4	0.45

FOR A 1:8 BIOMIST 30+30 ULV/SOLVENT DILUTION RATIO: Mix one (1) part BIOMIST 30+30 with eight (8) parts solvent and apply at the following rates:

Permethrin/PBO Pounds per Acre	Application Rates Fl.oz./Minute				Fl.oz. finished spray per Acre
	5 MPH	10 MPH	15 MPH	20 MPH	
0.007	9.8	19.6	29.3	39.1	3.23
0.0035	4.9	9.8	14.7	19.6	1.61
0.00175	2.4	4.9	7.3	9.8	0.81

Failure to follow the above directions may result in reduced effectiveness..

BIOMIST 30+30 ULV may be applied through truck-mounted thermal fogging equipment. Do not exceed the maximum rates listed above. To reduce oil requirement and sludge buildup in equipment, use a 60- 100-second viscosity mineral "fog" oil or other fuel-type oil. Use a clean, well-maintained and properly calibrated fogger. Do not wet foliage since oil base formulations may be phytotoxic. For use with hand carried foggers, use same rates of active ingredient per acre and a swath width of 50 ft with a walking speed of 2 mph. Do NOT use hand carried thermal fogger for application in enclosed spaces. Fog downwind, with the wind at your back.

AERIAL APPLICATION: BIOMIST 30+30 ULV may be applied undiluted at rates up to 0.36 fl.oz. BIOMIST 30+30 ULV per acre by fixed wing or rotary aircraft equipped with suitable ULV application equipment. BIOMIST 30+30 ULV may also be diluted with a suitable solvent such as mineral oil and applied by aerial ULV equipment so long as 0.007 pounds permethrin or PBO per acre is not exceeded. Do not apply by fixed wing aircraft at a height less than 100 feet, or by helicopter at a height less than 75 feet, unless specifically approved by the state or tribe based on public health needs. Aerial applications shall only be made when recommended by public health officials and trained personnel of mosquito abatement districts and other mosquito control programs.

IN FLORIDA: Aerial applications of this product require trained personnel to perform industry accepted assays to monitor resistance formation in targeted mosquitoes.

STORAGE & DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

PESTICIDE STORAGE AND SPILL PROCEDURES: Store upright at room temperature. Avoid exposure to extreme temperatures. In case of spill or leakage, soak up with an absorbent material such as sand, sawdust, earth, fuller's earth, etc. Dispose of with chemical waste.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

CONTAINER HANDLING:

For Non-Refillable Containers, capacity 5 gallons or less:

Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with mineral oil and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

For Refillable Containers:

Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into rinsate collection system. Repeat this rinsing procedure two more times. Then offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

NOTICE: To the extent provided by law, seller makes no warranty, expressed or implied, concerning the use of this product other than as indicated on the label. Buyer assumes all risk of use/handling of this material when use and/or handling is contrary to label instructions.

BIOMIST® is a Registered Trademark of Clarke Mosquito Control Products, Inc.

IN CASE OF MEDICAL EMERGENCY, CALL THE INTERNATIONAL POISON CONTROL CENTER 1-800-214-7753

IN CASE OF TRANSPORTATION EMERGENCY, CALL INFO-TRAC 1-800-553-5053

FOR MORE INFORMATION CALL 1-800-323-5727

MANUFACTURED FOR:
CLARKE MOSQUITO CONTROL PRODUCTS, INC.
159 N. GARDEN AVENUE, ROSELLE, ILLINOIS 60172

EPA Reg. No.: 8329-42
EPA Est. No.: _____
Net Contents: Marked on Container
Lot No.: _____



SAFETY DATA SHEET

BIOMIST[®] 30 + 30 ULV

Effective Date: 1 June 2015

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SECTION 1. Identification of the Substance/Mixture and of the Company

1.1 Product Identifier

Formulation Identifier: BIOMIST[®] 30 + 30 ULV

EPA Registration Number: 8329-42

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Relevant identified uses: Insecticide for control of adult mosquitoes, biting and non-biting midges, and blackflies

Uses advised against: See product label for use restrictions

1.3 Details of the Supplier of the Safety Data Sheet

Clarke Mosquito Control Products, Inc.
675 Sidwell Court
St. Charles, IL 60174 U.S.A.
+1 (630) 894-2000
Email: Clarke@clarke.com

1.4 Emergency Telephone Number

24-Hour Medical Emergency: POISON CONTROL Toll-free (800) 214 – 7753

24-Hour Transportation Emergency: INFOTRAC (800) 535-5053

SECTION 2. Hazards identification

United States (US)
According to OSHA 29 CFR 1910.1200 HCS (2012)

2.1 Classification of the Substance or Mixture

Aspiration Hazard: Category 1
Acute Toxicity (Oral): Category 4
Acute Toxicity (Inhalation): Category 4

Pictogram:



Signal Word: Danger

Hazard Statements: May be fatal if swallowed and enters airways.
Harmful if swallowed
Harmful if inhaled

Precautionary Statements:

PREVENTION: Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid breathing spray. Use only outdoors or in a well-ventilated area,



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- RESPONSE: If swallowed: Immediately call a poison control center or doctor. Do NOT induce vomiting. Rinse mouth.
- If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center or doctor if you feel unwell.
- STORAGE: Store locked up.
- DISPOSAL: Dispose of contents and container in accordance with local/regional/national regulations.

2.2 Other Hazards Not Classifiable Under OSHA 2012 HCS

See product label for any additional hazards

SECTION 3. Composition/Information on Ingredients

3.1 Components

Substance Name	CAS No.	Concentration % w/w
Permethrin	52645-53-1	30.0
Piperonyl Butoxide	51-03-6	30.0
White Mineral Oil	8042-47-5	< 40.0

Ingredients not identified are non-hazardous and/or are not required to be disclosed pursuant to 29 CFR 1910.1200 (2012), and are withheld as trade secret.

SECTION 4. First Aid Measures

4.1 Description of First Aid Measures

- If Inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.
- If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person. .

4.2 Most Important Symptoms and Effects, Both Acute and Delayed.

See section 2 and/or section 11.

4.3 Indication of Immediate Medical Attention and Special Treatment

- Treatment: Contains petroleum distillate. Gastric lavage is indicated if material was taken internally. May pose an aspiration pneumonia hazard. Appropriate supportive and symptomatic treatment is indicated by the patient's condition is recommended. For medical treatment information, contact the poison control hotline at 1-800-214-7753. Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

SECTION 5. Fire-Fighting Measures

5.1 Extinguishing Media

- Suitable Extinguishing Media: Carbon Dioxide (CO₂), Dry Chemical, Foam
- Unsuitable Extinguishing Media: Water jet

5.2 Special Hazards Arising From the Substance or Mixture



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Specific Hazards: Under fire conditions some components may decompose. Combustion products may include CO and NOx.

5.3 Special Protective Equipment and Precautions for Fire-Fighters

Protection Against Fire: Wear positive pressure, self-contained breathing apparatus and protective firefighting clothing (includes fire-fighting helmet, coat, pants, boots, and gloves).

Special Procedures: Treat as oil fire. Move container from fire area if it can be done without risk. Do not scatter spilled material with high-pressure water streams. Dike for later disposal. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

SECTION 6. Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

General Precautions: Use appropriate protection (see section 8)

Environmental Precautions: Prevent product from entering into drains and waterways. Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water. Collect and dispose of this material and its container in accordance with national and regional regulations. If the product has contaminated surface water, inform the appropriate authorities. See Section 12 for additional ecological information.

6.2 Methods and Material for Containment and Cleaning Up

Clean Up Methods: Soak up with absorbent, non-combustible material, such as sand, silica gel, clay, or sawdust, while using appropriate personal protection equipment. Collect material in appropriate container for disposal.

SECTION 7. Handling and Storage

7.1 Precautions for Safe Handling

Handling: Keep out of reach of children. Do not take internally. Avoid contact with skin and eyes. Avoid inhalation of vapors from product. Do not take internally.

Hygiene Measures: Remove Personal Protective Equipment (PPE) immediately after handling this product. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Remove soiled clothing immediately and clean thoroughly before using again.

7.2 Conditions for Safe Storage, Including Any Incompatibilities

Storage: Product should be stored in compliance with local regulations. Store in a cool, dry, well-ventilated place in the original container. Protect from excessive heat and cold. Do not store near food, drink, animal feeding stuffs, pharmaceuticals, cosmetics or fertilizers. Keep out of reach of children.

SECTION 8. Exposure Controls / Personal Protection

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

8.1 Control Parameters

Component Name	CAS No.	List/Source	Type	Value
Permethrin	52645-53-1	ACGIH	TWA	5 mg/m ³
		NIOSH	REL	5 mg/m ³



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White Mineral Oil	8042-47-5	OSHA	PEL	5 mg/m ³
		ACGIH	TLV	5 mg/m ³ inhalable fraction
		NIOSH	REL	5 mg/m ³ form: mist
		OSHA	PEL	5 mg/m ³

8.2 Exposure controls

Engineering Controls: Use with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Wash hands thoroughly after handling. Wash clothing before re-using.

Individual Protection Measures, such as Personal Protection Equipment:

Eye Protection: Safety Glasses, Goggles or Face Shield

Skin Protection: Wear suitable protective clothing including long-sleeve shirt, long pants, shoes and socks. Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron.

Hand Protection: Protective glove selection must be based on the user's assessment of the workplace hazards. Suitable protective chemical resistant materials include barrier laminate, nitrile, neoprene or Viton.

Respiratory Protection: Not usually required. In instances where exposure limits are exceeded, wear a NIOSH-approved pesticide respirator with an organic-vapor removing cartridge with a prefilter approved for pesticides.

SECTION 9. Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Appearance:	Liquid
Color:	Pale Yellow
Odor:	Light Petroleum
Odor Threshold:	Not Available
pH:	7.0
Melting Point:	Not Applicable
Freezing Point:	Not Determined
Initial Boiling Point:	Not Determined
Flash Point:	302° F
Evaporation Rate:	Not Determined
Flammability:	Not Determined
Explosion limits [U/L]:	Not Applicable
Vapor Pressure:	Not Determined
Vapor Density:	Not Determined
Relative Density:	8.33 lbs/gal
Solubility:	Not Determined
Partition Coefficient:	Not Determined
Auto-Ignition Temperature:	Not Determined
Viscosity:	15.10 cp at 40°C
Decomposition Temperature:	Not Available
Explosive Properties:	Not Available
Oxidizing Properties:	Not Available



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SECTION 10. Stability and Reactivity

10.1 Reactivity

Not Available

10.2 Chemical Stability

Stable under normal conditions

10.3 Possibility of Hazardous Reactions

Hazardous Reactions: None under normal conditions

Hazardous Polymerization: Not known to occur

10.4 Conditions to avoid

Protect from direct sunlight and excessive heat.

10.5 Incompatible materials

Avoid contact with strong oxidizing agents, strong acids, strong bases

10.6 Hazardous decomposition products

None known under normal conditions of storage and use

SECTION 11. Toxicological information

11.1 Information on Likely Routes of Exposure

Inhalation: May be harmful if inhaled

Ingestion: May be harmful if ingested.

May be fatal if swallowed and enters airways due to petroleum distillate. Vomiting may cause aspiration pneumonia.

11.2 Information on Toxicological Effects

Acute Toxicity

Oral, Rat LD₅₀ 891 mg/kg-bw

Dermal, Rat LD₅₀ > 2,000 mg/kg-bw

Inhalation, Rat LC₅₀ > 4.3 mg/L

Skin Corrosion/Irritation: Not corrosive or irritating to the skin on acute exposure. Mild skin irritation or cracking may occur from prolonged or repeated exposure to this product.

Serious Eye Damage/Irritation: Mild (transient) eye irritation may occur from direct exposure of the product in the eyes.

Skin Sensitization: Not a skin sensitizer

STOT – Single exposure

No data is available to indicate product or any components present at greater than 0.1% present a specific target organ toxicity hazard from single exposure.

Chronic Toxicity/Effects Germ Cell Mutagenicity

This product has not been tested. No data is available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic. For



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	permethrin and for piperonyl butoxide, no mutagenic effect was found in various tests with microorganisms and mammalian cell culture.
Carcinogenicity	<p>This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP. Permethrin and Piperonyl Butoxide are classified by IARC as Group 3: Not classifiable as to carcinogenicity to humans.</p> <p>Permethrin caused at high dose levels an increased incidence of tumors in mice in the following organ(s): liver, Lungs. The mechanism that triggers tumors in rodents is not relevant for the low exposures encountered under normal use conditions. Piperonyl butoxide was not carcinogenic in lifetime feeding studies in rats and mice.</p>
Reproductive Effects:	No data is available to indicate product or any components present at greater than 0.1% cause reproductive or teratogenic toxicity. Permethrin did not cause reproductive toxicity in a two-generation study in rats. Piperonyl butoxide did not cause reproductive toxicity in a two-generation study in rats.
STOT – Repeated exposure	<p>No data is available to indicate product or any components present at greater than 0.1% present a specific target organ toxicity hazard from repeat exposure. Permethrin did not cause specific target organ toxicity in experimental animal studies. Piperonyl butoxide did not cause specific target organ toxicity in experimental animal studies..</p> <p>Piperonyl butoxide did not cause specific target organ toxicity in experimental animal studies.</p>

SECTION 12. Ecological Information

12.1 Ecotoxicity

Product specific data is not available. Data referenced is in relation to the active ingredients, Permethrin and Piperonyl Butoxide.

Toxicity to Fish:	Permethrin: 96-hr Acute LC ₅₀ 0.79 ppb, Bluegill Sunfish (<i>Lepomis macrochirus</i>) Piperonyl Butoxide: 96-hr Acute LC ₅₀ 6.12 ppm, Rainbow Trout (<i>Oncorhynchus mykiss</i>)
Toxicity to Aquatic Invertebrates:	Permethrin: 96-hr LC ₅₀ 0.019 ppb, Mysid Shrimp (<i>Americamysis bahia</i>) Piperonyl Butoxide: 96-hr LC ₅₀ 0.49 ppm, Mysid Shrimp (<i>Americamysis bahia</i>)
Toxicity to Aquatic Plants:	Permethrin: 72-hr EC ₅₀ 0.5 mg/L, Algae Piperonyl Butoxide: 72-hr EC ₅₀ > 9.1 mg/L, Algae

12.1 Persistence and Degradability

Product specific data not available. Data referenced is in relation to the active ingredients, Permethrin and Piperonyl Butoxide.

Biodegradability:	Not rapidly biodegradable.
Partition Coefficient, K _{oc} :	Permethrin: 100,000 Piperonyl Butoxide: 399 - 830
Bioaccumulation:	Bioconcentration (BCF) Permethrin: 300 Bioconcentration (BCF) Piperonyl Butoxide: 2,175
Mobility in Soil:	Permethrin: Immobile in soil Piperonyl Butoxide: Moderately mobile in soil Piperonyl Butoxide: Moderately mobile in soil



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SECTION 13. Disposal Considerations

13.1 Waste Treatment and Disposal methods

Pesticide wastes are regulated. Consult product label for chemical substance and container disposal instructions. Avoid release to the environment. Improper disposal of excess product or rinsate is a violation of Federal law. If these wastes cannot be disposed or by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA regional office for guidance.

Container disposal: Rinse thoroughly in accordance with label instructions.

SECTION 14. Transport Information

14.1 DOT (US)

Not regulated (Bulk and Non-Bulk Quantities)

14.2 IMDG (Vessel)

UN Number: 3082

Hazard Class: 9

Packing Group: III

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE LIQUID, N.O.S. (PERMETHRIN)

Marine Pollutant: Yes

14.3 ICAO/IATA (Air transport)

UN Number: 3082

Hazard Class: 9

Packing Group: III

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE LIQUID, N.O.S. (PERMETHRIN)

Environmental Hazard: Yes

SECTION 15. Regulatory Information

FIFRA Information: This chemical is a pesticide product regulated by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information for safety data sheet, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

Signal Word: CAUTION

KEEP OUT OF REACH OF CHILDREN

FIRST AID

Have product container or label with you when calling a poison control center or doctor, or going for treatment. For Medical Emergencies, call the International Poison Control Center at 1-800-214-7753.

IF SWALLOWED:	Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.
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IF ON SKIN OR CLOTHING:	Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
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IF IN EYES:	Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing the eye. Call a poison control center or doctor for treatment advice.
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IF INHALED:	Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth. Call a poison control center or doctor for further treatment advice.
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NOTE TO PHYSICIAN: Product contains a petroleum distillate. Gastric lavage is indicated if material was taken internally. Vomiting may cause aspiration pneumonia.

PRECAUTIONARY STATEMENTS: HAZARDS TO HUMANS AND DOMESTIC ANIMALS



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CAUTION. Harmful if swallowed. Harmful if absorbed through skin. Avoid contact with skin, eyes or clothing. Causes moderate eye irritation. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

Personal Protective Equipment (PPE): Some materials that are chemical-resistant to this product are: barrier laminate, nitrile rubber, neoprene rubber, or Viton. Mixers, loaders, applicators, and other handlers must wear long-sleeve shirt and long pants, shoes plus socks. In addition, all handlers except for applicators using motorized ground equipment, pilots and flaggers, must wear chemical-resistant gloves. In addition, mixers/loaders, persons cleaning equipment, and other persons exposed to the concentrate must wear a chemical-resistant apron. See engineering controls for additional requirements.

User Safety Requirements: Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

Engineering Controls: Pilots must use an enclosed cockpit that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(6)]. Human flagging is prohibited. Flagging to support aerial application is limited to use of the Global Positioning System (GPS) or mechanical flaggers.

USER SAFETY RECOMMENDATIONS: Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Users should remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Other Federal Regulations

SARA TITLE III CLASSIFICATION

Section 302: None

Section 311/312: Immediate (acute) hazard

Section 313: This product contains the following toxic chemicals subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372

Permethrin	CAS# 52645-53-1	30.0%
Piperonyl Butoxide	CAS# 51-03-6	30.0%

CERCLA RQ: None

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

U.S. California Proposition 65: Not listed

STATE RIGHT-TO-KNOW : National, state, provincial or local emergency planning, community right-to-know or other laws, regulations or ordinances may be applicable--consult applicable national, state, provincial or local laws.

SECTION 16. Other Information

DISCLAIMER OF LIABILITY The information in this SDS was obtained from sources we believe to be reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared as is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable.

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