Merck Animal Health
One Merck Dr.
Whitehouse Station, NJ 08889

MATERIAL SAFETY DATA SHEET

Merck Animal Health urges each user or recipient of this MSDS to read the entire data sheet to become aware of the hazards associated with this material.

SECTION 1. IDENTIFICATION OF SUBSTANCE AND CONTACT INFORMATION

MSDS NAME: **SYNERGIZED DELICE Pour-On Insecticide**

SYNONYM(S):
AGRILAB BACK SIDE PLUS
ASPEN ECTO ZAP PLUS
ATROBAN DELICE PLUS Insecticide
DURVET ECTIBAN SYNERGIZED DELICE
SYNERGIZED EXPAR Pour-On
SYNERGIZED DELICE Pour-On For Cattle, Sheep, and Their Premises

MSDS NUMBER: SP000915

EMERGENCY NUMBER(S): (908) 423-6000 (24/7/365) English Only

Transportation Emergencies - CHEMTREC:
(800) 424-9300 (Inside Continental USA)
(703) 527-3887 (Outside Continental USA)

Rocky Mountain Poison Center (For Human Exposure):
(303) 595-4869

Animal Health Technical Services:
For Animal Adverse Events: Small Animals and Horses: (800) 224-5318
For Animal Adverse Events: Livestock: (800) 211-3573
For Animal Adverse Events: Poultry: (800) 219-9286

INFORMATION: Animal Health Technical Services:
For Small Animals and Horses: (800) 224-5318
For Livestock: (800) 211-3573
For Poultry: (800) 219-9286

MERCK MSDS HELPLINE: (800) 770-8878 (US and Canada)
(908) 473-3371 (Worldwide)
Monday to Friday, 9am to 5pm (US Eastern Time)

SECTION 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Liquid
Clear, Amber
Odorless
Absorbed through the skin.
May be irritating to respiratory system.
May be an aspiration hazard if ingested.
May be harmful by inhalation.
May cause allergic reactions in susceptible individuals.
May cause effects to:
central nervous system
gastrointestinal tract
respiratory system
cardiovascular system
fetus
Very toxic to aquatic organisms.

POTENTIAL HEALTH EFFECTS:

This product is a permethrin insecticide and contains petroleum distallates. This product may cause mild skin sensitization in susceptible individuals or may cause slight eye irritation.

The U.S. Environmental Protection Agency's (EPA) labeling criteria indicate that this product is harmful if absorbed through skin.

This product contains permethrin, a synthetic Type I pyrethroid ester. Occupational exposure to permethrin has induced temporary skin and facial sensations (feelings of numbness and tingling). Workers exposed to permethrin have also reported irritative symptoms, such as itching and burning of the skin, itching and irritation of the eyes, and irritation of the upper respiratory tract as well as increased nasal secretions. Anaphylactic reactions including bronchospasm and shock may occur in very sensitive individuals. Ingestion of large amounts may cause central nervous system effects resulting in seizures, coma, and respiratory arrest.

Ingestion of pyrethroid esters has caused stomach pain, nausea and vomiting, headache, dizziness, numbness and tingling, anorexia, fatigue, tremors, and intermittent convulsions.

Piperonyl butoxide is used to enhance the action of pyrethrin and pyrethroid insecticides. Piperonyl butoxide can inhibit the action of liver enzymes. Clinical effects from piperonyl butoxide exposure include nausea, vomitting, diarrhea, loss of appetite, and mild central nervous system depression. It has been reported to cause decreases in the number of red blood cells, white blood cells and platelets in the circulating blood. Based on animal studies Piperonyl butoxide is harmful if absorbed through skin.

Petroleum distillates may be skin, eye, and respiratory tract irritants. Repeated skin contact may cause oil acne or dermatitis. Exposure to large amounts of petroleum distillates by inhalation or ingestion may cause CNS depression or excitement, headaches, drowsiness, nausea, vomiting, diarrhea, laxative effects, lung damage, or an irregular heartbeat. Aspiration of liquid into the lungs may produce chemical pneumonitis.

LISTED CARCINOGENS

Permethrin technical is classified by IARC as a Group 3 carcinogen (unclassifiable as to carcinogenicity in humans).
Piperonyl Butoxide is classified by IARC as a Group 3 carcinogen (unclassifiable as to carcinogenicity in humans).

SECTION 3. COMPOSITION AND INFORMATION ON INGREDIENTS

PRODUCT USE: Veterinary product

CHEMICAL FORMULA: Mixture.

The formulation for this product is proprietary information. Only hazardous ingredients in concentrations of 1% or greater and/or carcinogenic ingredients in concentrations of 0.1% or greater are listed in the Chemical Composition table. Active ingredients in any concentration are listed. For additional information about carcinogenic ingredients see Section 2.

CHEMICAL COMPOSITION

INGREDIENT	CAS NUMBER	PERCENT

Piperonyl Butoxide	51-03-6	1
Distillates, petroleum, solvent-refined light paraffinic	64741-89-5	40-80
Distillates, petroleum, solvent-refined heavy paraffinic	64741-88-4	20-50
Permethrin Technical	52645-53-1	1

ADDITIONAL INFORMATION: This MSDS is written to provide health and safety information for individuals who will be handling the final product formulation during research, manufacturing, and distribution. For health and safety information for individual ingredients used during manufacturing, refer to the appropriate MSDS for each ingredient. Refer to the package insert or product label for handling guidance for the consumer.

SECTION 4. FIRST AID MEASURES

INHALATION: Remove to fresh air. If any trouble breathing, get immediate medical attention. Administer artificial respiration if breathing has ceased. If irritation or symptoms occur or persist, consult a physician.

SKIN CONTACT: In case of skin contact, IMMEDIATELY flush exposed skin thoroughly with plenty of water. While wearing protective gloves, remove any contaminated clothing, including shoes and continue to wash skin thoroughly with soap and water for at least 15 minutes. Get IMMEDIATE medical attention. Treat symptomatically.

EYE CONTACT: In case of eye contact, immediately rinse eyes thoroughly with plenty of water. If wearing contact lenses, remove only after initial rinse, and continue rinsing eyes for at least 15 minutes. If irritation occurs or persists, consult a physician.

INGESTION: DO NOT induce vomiting or give any liquid to drink. IMMEDIATELY consult a physician for treatment advice.

NOTE TO PHYSICIAN: This product is a permethrin insecticide and contains petroleum distallates. Vomiting is contraindicated due to the possibility of aspiration pneumonia.

SECTION 5. FIRE FIGHTING MEASURES

FLAMMABILITY DATA:

Flash Point: 93.3 deg C (> 200 deg F) Method: Tagliabue closed cup (TCC)

SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing and self-contained breathing apparatus (SCBA).

SUITABLE EXTINGUISHING MEDIA:
Water spray. Dry chemical. Foam.

See Section 9 for Physical and Chemical Properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:
Keep personnel away from the clean-up area. Wear appropriate personal protective equipment as specified in Section 8.

SPILL RESPONSE / CLEANUP:
All spills should be handled according to site requirements and based on precautions cited in the MSDS. In the case of liquids, use proper absorbent materials. For laboratories and small-scale operations, incidental spills within a hood or enclosure should be cleaned by using a HEPA filtered vacuum or wet cleaning methods as appropriate. For large dry or liquid spills or those spills outside enclosure or hood, appropriate emergency response personnel should be notified. In manufacturing and large-scale operations, HEPA vacuuming prior to wet mopping or cleaning is required.

ENVIRONMENTAL PRECAUTIONS:
This product is very toxic to aquatic organisms. Do not allow product to reach ground water, water course, sewage or drainage systems.

See Sections 9 and 10 for additional physical, chemical, and hazard information.

SECTION 7. HANDLING AND STORAGE

HANDLING:
Avoid contact with eyes. Avoid contact with skin and clothing. Keep containers adequately sealed during material transfer, transport, or when not in use. Wash face, hands, and any exposed skin after handling. Do not eat, drink, or smoke when using this substance or mixture.

Appropriate handling of this material is dependent on many factors, including physical form, duration and frequency of process or task, and effectiveness of engineering controls. Site-specific risk assessments should be conducted to determine the feasibility and the appropriateness of all exposure control measures. See Section 8 (Exposure Controls) for additional guidance.

STORAGE:
Store in a cool, dry, well ventilated area. Do not store near heat or open flame.

See Section 8 for exposure controls and additional safe handling information.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

EXPOSURE CONTROLS
The health hazard risks of handling this material are dependent on many factors, including physical form, duration and frequency of process or task, and effectiveness of engineering controls. Site-specific risk assessments should be conducted to determine the feasibility and the appropriateness of all exposure control measures. Exposure controls for normal operating or routine procedures follow a tiered strategy. Engineering controls are the preferred means of long-term or permanent exposure control. If engineering controls are not feasible, appropriate use of personal protective equipment (PPE) may be considered as alternative control measures. Exposure controls for non-routine operations must be evaluated and addressed as part of the site-specific risk assessment.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

Respiratory Protection:	Respiratory protective equipment (RPE) may be required for certain laboratory and large-scale manufacturing tasks if potential airborne breathing zone concentrations of substances exceed the relevant exposure limit(s). Workplace risk assessment should be completed before specifying and implementing RPE usage. Potential exposure points and pathways, task duration and frequency, potential employee contact with the substance, and the ability of the substance to be rendered airborne during specific tasks should be evaluated. Initial and ongoing strategies of quantitative exposure measurement should be obtained as required by the workplace risk assessment. All RPE must conform to local and regional specifications for efficacy and performance. Consult your site or corporate health and safety professional for additional guidance.
Skin Protection:	Gloves that provide an appropriate barrier to the skin are recommended if there is potential for contact with this material. Consult your site safety staff for guidance.
Eye Protection:	Safety glasses with side shields. Use of goggles or full face protection may be required based on hazard, potential for contact, or level of exposure. Consult your site safety staff for guidance.
Body Protection:	In small-scale or laboratory operations, lab coats or equivalent protection is required. Disposable Tyvek or other dust impermeable suit should be considered based on procedure or level of exposure. Use of additional PPE such as shoe coverings, gauntlets, hood, or head covering may be necessary. Consult your site safety staff for guidance. In large-scale or manufacturing operations, disposable Tyvek or other dust impermeable suit is recommended and based on level of exposure. Use of additional PPE such as shoe coverings, gauntlets, hood, or head covering may be necessary. Consult your site safety staff for guidance.

EXPOSURE LIMIT VALUES

No exposure limits are available for the active ingredient(s) or any other hazardous ingredient in this formulation.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

FORM:	Liquid
COLOR:	Clear, Amber
ODOR:	Odorless
VAPOR PRESSURE:	< 2 mmHg @ 25 deg C
SPECIFIC GRAVITY:	0.840 to 0.890 at 20 deg C
SOLUBILITY:	
Water:	Negligible
Other:	Kerosene, diesel fuel, and xylene: Miscible
ADDITIONAL INFORMATION:	Viscosity: 25 to 40 cps

See Section 5 for flammability/explosivity information.

SECTION 10. STABILITY AND REACTIVITY

STABILITY/ REACTIVITY:
Stable under normal conditions.

INCOMPATIBLE MATERIALS / CONDITIONS TO AVOID:
Open flames and high temperatures. Oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS / REACTIONS:
Carbon oxides (COx). Organic vapors. Chlorine.

SECTION 11. TOXICOLOGICAL INFORMATION

The information presented below is for the formulation or from studies using similar formulas containing the same active and/or hazardous ingredients found in this product.

ACUTE TOXICITY DATA

PRODUCT / CHEMICAL NAME	EXPOSURE ROUTE	STUDY DESCRIPTION	RESULT
Synergized Delice Pour-On Insecticide	Oral	LD50 (rat)	> 5000 mg/kg
Ectiban Pour-On Insectcide	Dermal	LD50 (rabbit)	> 2 mL/kg
	Eye	Eye Irritation (rabbit)	Slightly irritating
	Skin	Skin Irritation (rabbit)	Slightly irritating
		Skin Sensitization (guinea pig)	Not sensitizing

INHALATION:
Permethrin: LC50 (4hr): 2.3 mg/L (rat)

SKIN:
A 5% permethrin cream was absorbed percutaneously in only small amounts and metabolized rapidly in the skin and excreted in the urine.

REPEAT DOSE TOXICITY DATA

SUBCHRONIC / CHRONIC TOXICITY:
In sub-chronic studies ranging from 14 days to 26 weeks, rats and mice were treated with oral dosages of permethrin up to 10,000 mg/kg. Dose-dependent effects such as an increase in liver/body weight ratio, hypertrophy of the liver, and clinical signs of poisoning such as tremor were observed. The no-observed effects-level (NOEL) in rats ranged from 20 mg/kg diet (in studies lasting 90 days or 6 months) to 1500 mg/kg diet (in a 6-month study). Chronic studies ranging from 1 to 2 years were conducted in rats, mice and dogs. Dosages varied with species ranging from 1 mg/kg/day to 375 mg/kg/day of permethrin. Target organs of toxicity were the liver (increased liver weight and hepatocellular swelling), lung (increased weight), and testes (decreased weight). Depression and increased mortality were observed in mice at 75 mg/kg/day and above. Additional signs and symptoms of toxicity in the rat include hyperexcitation, sparring behavior, aggressiveness, enhanced startle response, whole body tremor and prostration.

Piperonyl Butoxide: Mice given 0.3 to 0.9% in their diet for 20 days had increased liver weights and other signs of liver toxicity. Repeat dose toxicity studies on piperonyl butoxide were conducted in mice, rats, and dogs in studies ranging from 7 weeks to 1 year in duration, and at dosage levels ranging from 62.5 to 30,000 mg/kg. Effects on body weight, food consumption, organ weights, and the liver were observed.

REPRODUCTIVE / DEVELOPMENTAL TOXICITY:
In a three-generation reproductive study with permethrin, rats were administered doses ranging from 25 to 125 mg/kg/day. Systemic effects observed in the offspring were seen in the liver (hepatocyte hypertrophy and eosinophilia) and eye (infantile glaucoma). Body tremors were observed in the parents and offspring at 125 mg/kg/day. No teratogenic effects, maternal toxicity or fetotoxicity were observed in rats and rabbits administered 200 and 400 mg/kg/day, respectively, of permethrin.

Piperonyl Butoxide: Teratogenicity was reported in a rabbit study. Fetotoxicity (fetal deaths and reduced body weights) and teratogenicity (limb deformity and decreased digits) were observed in mice and rats given oral dosages as high as 1800 mg/kg on days 9 through 11 of gestation. Effects on litter sizes, pup survival, pup weights, and behavioral parameters were observed in 1-, 2-, and 3-generation reproductive studies in rats and mice given dosages as high as 8000 mg/kg or 0.8% in the diet. In addition, deviations in neurobehavioral changes were also noted in mice in subsequent generations.

MUTAGENICITY / GENOTOXICITY:
Permethrin was negative in a bacterial mutagenicity study (Ames) and in a mammalian mutagenicity study (mouse lymphoma).

Piperonyl Butoxide: Not mutagenic in bacteria, silkworms, cultured mammalian cells, an Ames assay, and a dominant lethal test. It was negative in an unscheduled DNA synthesis study and in a chromosome aberration study. It induced sister chromatid exchanges in cultured Chinese hamster ovary cells in both the presence and absence of metabolic activation, and was positive in a mouse lymphoma assay with metabolic activation. Equivocal results were noted in a point mutation assay without metabolic activation, and it was negative with activation.

CARCINOGENICITY:
Six carcinogenicity assays, three each in mice and rats, were conducted with permethrin. No tumorigenicity was seen in rat studies. However, species specific increases in pulmonary adenomas, a common benign tumor of mice with a high spontaneous background incidence, were seen in the three mouse studies. In one of these studies, there was an increased incidence of pulmonary alveolar cell carcinomas and benign liver adenomas when permethrin was administered in the diet at 5,000 ppm.

Piperonyl Butoxide: Liver tumors were noted in rats given concentrations as high as 2.4% in the diet for approximately two years. Hepatocellular carcinomas were induced in male mice administered concentrations as high as 1.2% in the diet for a year. However, in other studies, no carcinogenic effects were noted in mice or rats.

SECTION 12. ECOLOGICAL INFORMATION

There are no data for the final product or its formulation(s). The information presented below pertains to the following ingredient(s).

ECOTOXICITY DATA

INGREDIENT ECOTOXICITY

Permethrin:96-hr LC50 (rainbow trout): 0.1 to 314 ug/L
Permethrin: 96-hr LC50 (brook trout): 2.3 to 5.2 ug/L
Permethrin: 96-hr LC50 (channel catfish): 1.1 ug/L
Permethrin: 48-hr EC50 (daphnid): 0.2 to 22 ug/L

Piperonyl Butoxide: 48-hr LC50 (ceriodaphnid): 330 ug/L
Piperonyl Butoxide: 96-hr LC50 (bluegill): 4.2 ug/L
Piperonyl Butoxide: 96-hr LC50 (rainbow trout): 3.4 ug/L

ENVIRONMENTAL DATA

OTHER INGREDIENT ENVIRONMENTAL DATA:

Permethrin is readily biodegradable.

Piperonyl Butoxide is potentially biodegradable based on data from related chemicals.

ADDITIONAL ECOTOXICITY / ENVIRONMENTAL INFORMATION:
This pesticide is extremely toxic to fish and aquatic organisms.

SECTION 13. DISPOSAL CONSIDERATIONS

MATERIAL WASTE:
Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations. Incineration is the preferred method of disposal, when appropriate. Operations that involve the crushing or shredding of waste materials or returned goods must be handled to meet the recommended exposure limit(s).

PACKAGING AND CONTAINERS:
Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations.

SECTION 14. TRANSPORT INFORMATION

This material is not subject to the transportation regulations of DOT, IATA, and the IMO. Refer to site-specific procedures and requirements for additional guidance.

ADR CLASSIFICATION:

Proper Shipping Name:	Environmentally hazardous substance, liquid, n.o.s. (permethrin)
Hazard Class:	9
UN Number:	UN 3082
Packing Group:	III
Classification Code:	M6

ADDITIONAL INFORMATION:
Although this material is regulated only under the ADR, both the IATA and IMO have special provisions that allow the shipper to transport materials under the shipping name "Environmentally hazardous substance, liquid, n.o.s." if the material is being transported under both ADR and either IATA or IMO regulations.

SECTION 15. REGULATORY INFORMATION

SECTION 15. REGULATORY INFORMATION

TSCA LISTING

INGREDIENT	TSCA
Piperonyl Butoxide	X
Distillates, petroleum, solvent-refined light paraffinic	X
Distillates, petroleum, solvent-refined heavy paraffinic	X

U.S. STATE REGULATIONS

INGREDIENT	California Proposition 65	CARTK	NJRTK	CTRTK	MARTK
Piperonyl Butoxide			3732		
Distillates, petroleum, solvent-refined light paraffinic					X
Permethrin Technical			3422		X

INGREDIENT	PARTK	MNRTK	MIRTK	RIRTK
Distillates, petroleum, solvent-refined light paraffinic		X		
Distillates, petroleum, solvent-refined heavy paraffinic		X		

Fields in the above tables that do not contain data indicate that those materials have not been listed by local regulations.

SECTION 16. OTHER INFORMATION

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequence of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

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