Schering Canada Inc.
3535 Trans-Canada
Pointe Claire, Quebec
Canada H9R 1B4

MATERIAL SAFETY DATA SHEET

Schering-Plough 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:	**Muskol Aerosol, 23.5% DEET**
SYNONYM(S):	Muskol Aerosol, 23.5% Deet
MSDS NUMBER:	SP001588
EMERGENCY NUMBER(S):	Schering-Plough Security Control Center (908) 820-6921 (24 Hours) Transportation Emergencies - CANUTEC: (613) 996-6666 (Canada)
INFORMATION:	Schering-Plough HealthCare Products Canada Customer Service (English): 1-800-361-6550 Service à la clientèle (French): 1-800-361-2431
SCHERING-PLOUGH MSDS HELPLINE:	(800) 770-8878 (US and Canada) (908) 629-3657 (Worldwide) Monday to Friday, 9am to 5pm (US Eastern Time)

SECTION 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Clear, Light yellow
Aerosol
Alcohol-like odor

Flammable.

May be severely irritating to the eyes.
May be harmful by inhalation.
Absorbed through the skin.
Harmful if swallowed or absorbed through the skin in large amounts.

May cause effects to:
- nervous system
- cardiovascular system
- liver
- kidney

May be harmful to fish and aquatic organisms.

Consumers: Refer to the package insert or product label for appropriate consumer-specific information about this product when used according to manufacturer's directions.

POTENTIAL HEALTH EFFECTS:

The following summary is based upon available information about the individual ingredients of the mixture, or of the expected properties of the mixture.

DEET is a common insect repellent which is applied directly to the skin. DEET may cause stinging and slight to moderate eye and mucous membrane irritation. DEET may cause contact dermatitis or excerbation of pre-existing skin disease in sensitive individuals. DEET is efficiently absorbed from the skin or gut. If large amounts of DEET are inhaled, ingested, or applied dermally (especially areas of skin that are occluded), the potential for severe toxicity exists. However, compared to the widespread use of the product, there are relatively few cases of toxicity. Reported acute or chronic effects from overexposure to DEET were restlessness, drowsiness, irritability, weakness, headaches, incoordination, slurred speech, confusion, insomnia, tremor, flexing or extending of extremities, decreases in blood pressure, decreased heartbeat, skin effects (rashes, bullous eruptions and necrosis), pyschosis, seizures, prolonged disability, coma, or anaphylactic reaction. Death has been reported when large amounts of DEET were ingested.

Ethanol (ethyl alcohol) is an eye, nose, and mucous membrane irritant. It may cause skin irritation or sensitization after prolonged exposure. Acute effects of ethanol may include headache, dizziness, nausea, sensations of warmth and cold, numbness, fatigue, breathing difficulty, cough, tearing, vision impairment, incoordination, decreased reaction time, alteration of mood and personality, slurred speech, coma and respiratory depression. Chronic effects may include concentration difficulty, sleepiness, kidney and liver damage, and cardiac effects. Chronic ingestion of ethanol may cause cancer of the oral cavity, pharynx, larynx, esophagus, and liver. Oral ingestion of alcohol during pregnancy may cause Fetal Alcohol Syndrome (FAS) including joint, limb, and cardiac abnormalities and behavioral and learning impairment. There have been no reports of FAS as a result of occupational handling of ethanol.

Isobutane and propane are simple asphixiant gases (displaces oxygen from the breathing atmosphere), anesthetics, and central nervous system depressants. Inhalation exposure to high concentrations may cause fatigue, vomiting, nausea dizziness, decreased vision, mood disturbances, numbness of extremities (e.g. fingers), headache, confusion, decreased coordination and judgement, breathing difficulties, irregular heartbeat, cyanosis, convulsions, or coma. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. Direct contact with liquefied isobutane or propane may cause frostbite or burns to the eyes or following prolonged skin contact.

LISTED CARCINOGENS

CHEMICAL NAME	CAS NUMBER	OSHA	IARC	NTP	ACGIH
Ethyl Alcohol	64-17-5		Listed.		Group A4 Not classifiable as a human carcinogen.

Ethanol (ethyl alcohol): IARC (International Agency for Research on Cancer) has classified Alcoholic Beverages as Group 1 (indicating in their evaluation that the agent is carcinogenic to humans). However, occupational handling or manufacturer's specified use of this product is not expected to result in relevant exposures.

SECTION 3. COMPOSITION AND INFORMATION ON INGREDIENTS

PRODUCT USE: Consumer 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.

HAZARDOUS COMPONENTS

CHEMICAL NAME	CAS NUMBER	PERCENT
Ethyl Alcohol	64-17-5	30-60
Diethyltoluamide (DEET)	134-62-3	23.5
Propane	74-98-6	10-30
Isobutane	75-28-5	

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, while wearing protective gloves, carefully remove any contaminated clothing, including shoes, and wash skin thoroughly with soap and water. If irritation or symptoms occur or persist, consult a physician.

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. Get IMMEDIATE medical attention.

INGESTION: Rinse mouth and drink a glass of water. Do not induce vomiting. If symptoms persist, consult a physician.

SECTION 5. FIRE FIGHTING MEASURES

FLAMMABILITY DATA:

FLASH POINT:	Concentrate (Similar Product Formulation): 13 deg C (55.4 deg F) Method: Tagliabue closed cup (TCC) Ethanol (50%): 24 deg C (79 deg F) Method: Close cup Propellant:: -84.4 deg C (-120 deg F)
CLASSIFICATION:	Flammable (US OSHA Criteria) Flammable (Canada WHMIS Criteria)
AUTOIGNITION TEMPERATURE:	Concentrate: 422 deg C (791.6 deg F)

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

SUITABLE EXTINGUISHING MEDIA:
Carbon dioxide (CO2), extinguishing powder or water spray.

See Section 9 for Physical and Chemical Properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

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.

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

SECTION 7. HANDLING AND STORAGE

HANDLING:
Keep containers adequately sealed during material transfer, transport, or when not in use.

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. Keep away from heat, sparks, open flames, and direct sunlight.

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. However, PPE should not be used as a method of permanent or long-term exposure control. 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: None required for consumer use of this product.

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: None required for consumer use of this product.

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: None required for consumer use of this product.

Safety glasses with side shields. Use of goggles or full face protection is required if there is potential for contact with this material. Consult your site safety staff for guidance.

Body Protection: None required for consumer use of this product.

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

CHEMICAL NAME	CAS NUMBER	ACGIH TLV (TWA)	OSHA PEL (TWA)
Ethyl Alcohol	64-17-5	1000 ppm	1900 mg/m^3 1000 ppm
Propane	74-98-6		1800 mg/m^3 1000 ppm

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

FORM: Aerosol
COLOR: Clear, Light yellow
ODOR: Alcohol-like odor
BOILING POINT / RANGE: 79-100 deg C
VAPOR PRESSURE: 45-55 psi @ 20 deg C
VAPOR DENSITY: >1
SPECIFIC GRAVITY: Aerosol: 0.75-0.79
Concentrate: 0.85-0.89
SOLUBILITY:
Water: Not determined
EVAPORATION RATE: >1

See Section 5 for flammability/explosivity information.

SECTION 10. STABILITY AND REACTIVITY

STABILITY/ REACTIVITY:
Stable under normal conditions.

INCOMPATIBLE MATERIALS / CONDITIONS TO AVOID:
Oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS / REACTIONS:
No dangerous decomposition is expected if used according to manufacturer's specifications.

SECTION 11. TOXICOLOGICAL INFORMATION

There are no data specifically for this formulation. The data presented below pertains to the following individual ingredients in the formulation, or are from studies conducted using similar formulas containing the same active and/or hazardous ingredients found in this product.

ACUTE TOXICITY DATA

INHALATION:
Deet: LC50: 5.95 mg/L

Ethanol: Inhalation LC50 (10hr): 20,000ppm
Ethanol caused dose dependent effects following inhalation exposure in rats on the central nervous system including drowsiness, incoordination, narcosis and excitation.

Propane caused irregular breathing, tremors, stupor, and CNS depression in guinea pigs exposed to 2.2 to 5.5% (24,000 to 55,000 ppm). Effects were rapidly reversible upon cessation of exposure. In cats, 89% propane caused a decrease in blood pressure, and in dogs, 1% to 3.3% caused hemodynamic changes, decreases in mean arotic pressure, stroke volume, and cardiac output, increase in pulmonary vascular resistance, and decreases in the contractility of the heart muscle. Weak cardiac sensitization was observed in mice and dogs exposed to 10 to 15% propane. Resporatory depression was observed in non-human primates exposed to 20% propane.

Isobutane has exhibited CNS depression, rapid and shallow respiration, and apnea in mice exposed to high concentrations. In dogs, 45% isobutane caused anesthetic effects.

SKIN:
Similiar product formulations were shown to be slightly irritating to animals.

DEET caused minimal to moderate transient dermal irritation in animals, which cleared by day 7.

Ethanol was mildly to moderately irritating to the skin of rabbits.

Propane is a moderate irritant.

EYE:
Similar product formulations were shown to be moderate to severe eye irritants to animals.

Ethanol (95%) was irritating to the eyes of rabbits.

ORAL:
Clinical signs of toxicity noted in animals treated with DEET at 50 to 500 mg/kg included piloerection, increased vocalization and decreased activity. At lethal doses, animals showed signs of lacrimation, depression, prostration, tremors, asphyxial convulsions or respiratory failure usually preceding cardiac failure.

Ethanol: Oral LD50: 6.2 to 17.8 g/kg (rat)
Oral LD50: 5.5 to 6.6 g/kg (dog)

SENSITIZATION:
Ethanol has been shown to be a weak sensitizer in a human patch test. Ethanol was negative in the mouse ear sensitization assay.

REPEAT DOSE TOXICITY DATA

SUBCHRONIC / CHRONIC TOXICITY:
Subchronic (56 to 90 days) to chronic (2-year) oral studies with DEET were conducted in animals. Effects noted at dosages ranging from 8.4 to 10,000 mg/kg/day included decreases in food consumption and weight, salivation, tremors, elevated liver and kidney weights and cholesterol, and death (high dose groups only). Microscopic findings were observed in the kidneys, testis, epidiymides, and uterus. NOELs ranged from 61 to 100 mg/kg/day across species.

Ethanol: Repeated oral and inhalation exposure to high concentrations has caused kidney and liver damage in animals.

REPRODUCTIVE / DEVELOPMENTAL TOXICITY:
DEET caused no effects on reproduction or development in animals administered oral doses up to 1,000 mg/kg/day. Maternal toxicity was observed at the higher dosages and was consisted with that seen in acute, subchronic and chronic studies. The reproductive and developmental NOEL was 250 mg/kg/day.

Ethanol: Exposure to large doses during gestation is reported to cause effects on reproduction, including fetotoxicity and growth retardation in mice, rats, and rabbits. However, no teratogenic effects were reported.

MUTAGENICITY / GENOTOXICITY:
DEET was negative in a bacterial mutagenicity study (Ames), a chromosome aberration study, a dominant lethal test, and in an unscheduled DNA synthesis assay. DEET was negative in a mouse lymphoma assay without metabolic activation but positive with metabolic activation.

Ethanol was positive in a bacterial mutagenicity study (Ames) and negative in a mammalian mutagenicity study (mouse lymphoma).

Propane was negative in a bacterial mutagenicity study.

Isobutane was negative in a bacterial mutagenicity study (Ames).

CARCINOGENICITY:
This material or product has not been evaluated for carcinogenicity.

There was no evidence of carcinogenicity in mice or rats treated with DEET at dosages up to 1000 mg/kg/day for 78 weeks and 2 years, respectively.

Rats given 25 to 50% ethanol by oral gavage or in the drinking water for one to two years did not show a significant increase in tumors compared to the control groups. Mice given 43% ethanol in drinking water for three years showed an increase in papillomas of the forestomach, malignant lymphomas and lung adenomas. Ethanol was an effective promotor of liver tumors in rats given a single intraperitoneal dose of diethylnitrosamine followed by treatment of ethanol in the drinking water for 12 to 18 months.

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

Deet: 96-hr LC50 (rainbow trout): 75 mg/L
Deet: 48-hr EC50 (daphnid): 75 mg/L
Deet: Avian Oral LD50 (quail): 1375 mg/kg

Ethanol: 96-hr (static) LC50 (rainbow trout): 13 g/L
Ethanol: 96-hr (flow-through) LC50 (fathead minnow): 12.9-15.3 g/L

ENVIRONMENTAL DATA

OTHER INGREDIENT ENVIRONMENTAL DATA:

DEET: n-Octanol/Water Partition Coefficient (log Pow): 2.02
DEET will be stable to hydrolysis at pH levels 5 to 9.

SECTION 13. DISPOSAL CONSIDERATIONS

MATERIAL WASTE:
Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations. Incineration is not the preferred method of disposal. 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

Refer to site-specific procedures and requirements for additional guidance.

DOT CLASSIFICATION:

Proper Shipping Name:	Aerosols
Hazard Class:	2.1
UN Number:	UN 1950
Packing Group:	None

IATA CLASSIFICATION:

Proper Shipping Name:	Aerosols, flammable
Hazard Class:	2.1
UN Number:	UN 1950
Packing Group:	None

ADR CLASSIFICATION:

Proper Shipping Name:	Aerosols
Hazard Class:	2.1
UN Number:	UN 1950
Packing Group:	None

IMDG CLASSIFICATION:

Proper Shipping Name:	Aerosols
Hazard Class:	2
UN Number:	UN 1950
Packing Group:	None

SECTION 15. REGULATORY INFORMATION

WHMIS CLASSIFICATIONS:

This product has been classified in accordance with the hazard criteria on the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations. The final packaged product is not subject to WHMIS classification. The following classification applies to the bulk formulation handled in the workplace.

Controlled Product Class:	B2: Flammable Liquid D1B: Toxic D2B: Toxic

TSCA LISTING

CHEMICAL NAME	TSCA
Ethyl Alcohol	Listed
Diethyltoluamide (DEET)	Listed
Propane	Listed
Isobutane	Listed

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).

DEPARTMENT ISSUING MSDS:

Global Safety and Environmental Affairs
Occupational and Environmental Toxicology
Schering-Plough Corporation
1095 Morris Avenue
Union, NJ 07083 USA

SCHERING-PLOUGH MSDS HELPLINE:

(800) 770-8878 (US and Canada)
(908) 629-3657 (Worldwide)
Monday to Friday, 9am to 5pm (US Eastern Time)

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