



MERCK

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: **GRENADE ER**

SYNONYM(S): GRENADE ER
GRENADE ER PREMISE INSECTICIDE

MSDS NUMBER: SP000876

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

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

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

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
Off-white
Aromatic odor Petroleum odor Solvent odor
Very toxic by inhalation.
Harmful if swallowed.
Irritating to eyes, skin, or respiratory system.
May be an aspiration hazard if ingested.
May cause effects to:
nervous system
gastrointestinal tract
Very toxic to fish and aquatic organisms.
May cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS:

Grenade ER product is composed of microcapsules of lambda cyhalothrin suspended in water. The microcapsules also contain a solvent.

Grenade ER is toxic by inhalation, harmful if swallowed, irritating to skin, eyes, and respiratory system, and is very toxic to aquatic organisms with possible long term effects in the aquatic environment.

Lambda cyhalothrin is a pyrethroid insecticide. Cases of severe pyrethroid poisoning in humans are rare. However, workers who handle or apply large quantities of pyrethroids report the following effects: burning, pricking, tickling, or tingling of the skin, skin irritation, numbness, feeling hot or cold, red eyes, coughing and sneezing.

LISTED CARCINOGENS

No carcinogens or potential carcinogens listed by OSHA, IARC, NTP or ACGIH are present in concentrations >0.1% in this mixture.

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
Lambda Cyhalothrin	91465-08-6	9.7
1,2,4-Trimethylbenzene	95-63-6	90-100

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. Administer artificial respiration if breathing has ceased. IMMEDIATELY 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.

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SECTION 4. FIRST AID MEASURES

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:	Vomiting is contraindicated due to the possibility of aspiration pneumonia.

SECTION 5. FIRE FIGHTING MEASURES

FLAMMABILITY DATA:

Flash Point: >100 deg C (>212 deg F) Method: SETA Flash

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.

UNSUITABLE EXTINGUISHING MEDIA:

Do not use solid stream of water.

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.

ENVIRONMENTAL PRECAUTIONS:

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

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. 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:

Keep away from products with strong odors. Keep in an area suitable for pesticide storage. Do not store near food, feed, or within the reach of children or pets. Store in a cool, dry, well ventilated area. Do not store near heat or open flame. Avoid physical damage.

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:	<p>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.</p> <p>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.</p>

EXPOSURE LIMIT VALUES

INGREDIENT	CAS NUMBER	ACGIH TLV (TWA)	OSHA PEL (TWA)
1,2,4-Trimethylbenzene	95-63-6	25 ppm	

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:	Off-white
ODOR:	Aromatic odor Petroleum odor Solvent odor
BOILING POINT / RANGE:	>100 deg C (>212 deg F)
VAPOR PRESSURE:	1.5 x 10 ⁻⁹ mmHg at 20 deg C (Lambda cyhalothrin tech.)
SPECIFIC GRAVITY:	1.036 @ 20 deg C
SOLUBILITY:	
Water:	Dispersible

See Section 5 for flammability/explosivity information.

SECTION 10. STABILITY AND REACTIVITY

STABILITY/ REACTIVITY:

Stable under normal conditions.

INCOMPATIBLE MATERIALS / CONDITIONS TO AVOID:

None known.

HAZARDOUS DECOMPOSITION PRODUCTS / REACTIONS:

Carbon oxides (COx). Nitrogen oxides (NOx). Ammonia. Hydrogen cyanide (prussic acid).

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SECTION 11. TOXICOLOGICAL INFORMATION

The information presented below is for this material unless otherwise indicated.

ACUTE TOXICITY DATA

INHALATION:

The 4-hr LC50 for Grenade ER in the rat is greater than 4.62 mg/l. This material is considered moderately toxic by inhalation. At high concentrations, vapors or aerosols of the solvent can produce respiratory and central nervous system depression, headache, dizziness, and nausea.

Lambda Cyhalothrin: Inhalation LC50 (4hr): 0.06 mg/L (3.26 ppm) (rat)

Clinical effects observed included red nasal discharge, chromodacryorrhea, subdued or agitated behavior, hunched posture, piloerection, abnormal respiratory noise, tiptoe gait, and reduced righting reflex.

SKIN:

Grenade ER is moderately irritating in rabbit dermal irritation studies and was classified as a mild skin sensitizer. Skin exposures may cause a skin sensation called paresthesia which is usually described as tingling, itching, burning, prickling, glowing, flushing, numbness or a chapped feeling. Symptoms usually occur around the face (mouth and eyes) but may involve the arms or hands. Symptoms may develop shortly after exposure or can be delayed up to four hours and can persist between 2 and 30 hours following contact. There is no evidence of any long-term or cumulative effects on the skin. The effect may result from transferring the material to the face from contaminated gloves and hands. The dermal LD50 was above 2000 mg/kg in rats. Systemically toxic concentrations of this product will probably not be absorbed through human skin.

Lambda Cyhalothrin (92.6% purity): Dermal LD50: 632 - 696 mg/kg (rat)

Mortality was observed within 2 to 3 days. Clinical effects observed included decreased activity, tiptoe gait, splayed gait, loss of stability, dehydration, urinary incontinence, piloerection, and an upward curvature of the spine.

Lambda Cyhalothrin was not irritating to rabbit skin.

EYE:

Grenade ER is mildly irritating in rabbit eye irritation studies. A similar degree of irritation will probably occur after human eye contact.

Lambda Cyhalothrin produced moderate irritation in rabbit eyes.

ORAL:

The acute oral LD50 of Grenade ER in rats is above 5000 mg/kg to males and females. This material is classified as very low toxicity by ingestion. In humans, severe gastrointestinal disturbance is associated with ingestion of the hydrocarbon solvent. Ingestion of excessive quantities can also induce signs of central nervous system depression (e.g., dizziness, drowsiness, loss of coordination, and fatigue). Small amounts of the hydrocarbon solvent, if aspirated into the lungs during ingestion or subsequent vomiting, may induce severe lung congestion resulting in labored breathing, coma, and death.

Lambda Cyhalothrin: Oral LD50: 54 - 100 mg/kg (rat)

Mortality was observed between the days 1 to 3. Clinical effects noted at doses of 11.3 mg/kg and higher included ataxia, decreased activity, splayed gait, upward curvature of the spine, urinary incontinence, piloerection, salivation, dehydration, or ungroomed appearance.

No clinical or hematological effects were observed in six human volunteers given a single oral dose of 5 mg of lambda cyhalothrin (equivalent to 0.05 to 0.07 mg/kg).

DERMAL AND RESPIRATORY SENSITIZATION:

Lambda Cyhalothrin was not a skin sensitizer in guinea pigs. Lambda Cyhalothrin produced equivocal results in a dermal sensitization study in guinea pigs.

REPEAT DOSE TOXICITY DATA

SUBCHRONIC / CHRONIC TOXICITY:

Lambda Cyhalothrin: Subacute (5-days) to chronic (1-year) oral studies were conducted in mice, rats, rabbits, and dogs. Dosages varied with species ranging from 0.5 to 25 mg/kg/day. Decreased body weight and food consumption, and neurological signs associated with pyrethroid toxicity (e.g. ataxia, unsteady or abnormal gait, and hyperexcitability) were observed. [NOEL: 5 mg/kg/day (rats) and 0.5 mg/kg/day (dogs)]

MUTAGENICITY / GENOTOXICITY:

Lambda Cyhalothrin: Negative in in vitro chromosome aberration assays in human lymphocytes and human HELA cells, in an in vitro mouse lymphoma TK+/- forward gene mutation assay, in an in vivo bone marrow cytogenetic assay in mice, and in Ames assays.

CARCINOGENICITY:

Lambda Cyhalothrin: No carcinogenic effects were noted in chronic feeding studies in rats and mice.

SECTION 12. ECOLOGICAL INFORMATION

The data listed below are for product ingredients except where noted otherwise.

ECOTOXICITY DATA

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INGREDIENT ECOTOXICITY

Grenade ER is extremely toxic to aquatic organisms.

Lambda Cyhalothrin: 48-hr EC50 (daphnid): 0.04 - 0.76 mg/L
 Lambda Cyhalothrin: 96-hr LC50 (rainbow trout): 0.24 - 11.2 mg/L

ENVIRONMENTAL DATA

There are no environmental data available for this product or its components.

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

Consult current regulatory guidelines for the appropriate transportation classification and labeling of this material. Refer to site-specific procedures and requirements for additional guidance.

DOT CLASSIFICATION:

Non-regulated per 49 CFR 171.4(c) for ground shipment. Shipment by ground under DOT is non-regulated, however, may be shipped per the hazard classification below to facilitate multi-modal transport involving ICAO or IMO.

IATA/ICAO CLASSIFICATION:

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

ADR CLASSIFICATION:

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

IMDG/IMO CLASSIFICATION:

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

SECTION 15. REGULATORY INFORMATION**TSCA LISTING**

INGREDIENT	TSCA
1,2,4-Trimethylbenzene	X

Substances not included in the table above are TSCA exempt or not regulated under TSCA.

U.S. STATE REGULATIONS

INGREDIENT	California Proposition 65	CARTK	NJRTK	CTRTRK	MARTK
1,2,4-Trimethylbenzene		X	2716		X

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INGREDIENT	PARTK	MNRTK	MIRTK	RIRTK
1,2,4-Trimethylbenzene	X	X		X

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

X: Listed on applicable state hazardous substance or right-to-know lists.

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:

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SIGNIFICANT CHANGES (US SUBFORMAT):

Conversion