

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

FORE* 80WP RAINSHIELD SPECIALTY FUNGICIDE

Effective Date: 1/28/04
Product Code: 88794
MSDS: 007774

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Fore* 80WP Rainshield Specialty Fungicide

COMPANY IDENTIFICATION:

Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. COMPOSITION/INFORMATION ON INGREDIENTS:

Mancozeb: [[1,2-ethanediybis[carbamo-dithioato]](2-)]manganese mixture with [[1,2-ethanediybis[carbomodithioato]](2-)]-zinc	CAS # 008018-01-7	80%
Balance, Total, Including:		20%
Calcium Lignosulfonate	CAS # 008061-52-7	
Ethylene Thiourea	CAS # 000096-45-7	
Hexamethylene Tetramine	CAS # 000100-97-0	

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Blue to green solid with a musty odor. May cause eye and skin irritation. LD₅₀ for skin absorption is >5000 mg/kg. Oral LD₅₀ is >8000 mg/kg. Inhalation LC₅₀ is >5.14 mg/L for 4 hours. Toxic to aquatic organisms.

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POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYES: May cause severe eye irritation with corneal injury.

SKIN: Prolonged contact may cause slight skin irritation with local redness. Skin contact may cause an allergic skin reaction in a small proportion of individuals. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD₅₀ for skin absorption in rabbits is >5000 mg/kg.

INGESTION: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. The oral LD₅₀ for rats is >8000 mg/kg.

INHALATION: Dust may cause irritation of the upper respiratory tract (nose and throat) and lungs. The LC₅₀ for rats is >5.14 mg/L for 4 hours.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: In animals, effects have been reported on the following organs: thyroid, liver, nervous system, and eyes.

CANCER INFORMATION: Has caused cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): Has caused birth defects in laboratory animals only at doses toxic to the mother.

REPRODUCTIVE EFFECTS: In animal studies, did not interfere with reproduction.

4. FIRST AID:

EYES: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist.

SKIN: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. Discard items, which cannot be decontaminated, including leather articles such as shoes, belts, and watchbands.

INGESTION: 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 the poison control center or doctor. Never give anything by mouth to an unconscious person.

INHALATION: Move person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: 295°F (146°C)
METHOD USED: TOC

FLAMMABLE LIMITS:
LFL: 0.16 oz/ft³ 160.18 g/M³
UFL: Not determined

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EXTINGUISHING MEDIA: When product is involved in a fire use carbon dioxide, dry chemical, water spray, or foam. Contain run-off. Use water spray to cool containers exposed to fire.

FIRE & EXPLOSION HAZARDS: Particulates can become airborne. Combustion generates toxic fumes including the following: hydrogen sulfide, sulfur oxides, and carbon oxides. The minimum ignition temperature of dust cloud is 590°F (310°C). The minimum ignition temperature of dust layer is 270°F (132°C). Dusts of sufficient concentrations can form explosive mixtures with air.

FIRE-FIGHTING EQUIPMENT: Wear positive pressure self-contained breathing apparatus with full protective clothing. Remain upwind. Avoid breathing smoke.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: Sweep up small spills and place in a suitable container for disposal. Wash thoroughly after handling. Contain large spills and report them to Dow AgroSciences at 800-992-5994.

Appropriate protective equipment must be worn when handling a spill of this material. If exposed to material during clean-up operations, remove all contaminated clothing promptly. Wash all exposed skin areas with soap and water immediately after exposure. Thoroughly launder clothing before reuse. Do not take clothing home to be laundered.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

HANDLING: Do not handle material near food, feed or drinking water. Avoid high concentrations of dust in air and accumulation of dust on equipment. An airborne dust of this material can create a dust explosion. When handling and processing this material local exhaust ventilation may be required to control dust and reduce exposure to vapors. To prevent dust explosions employ bonding and grounding for operations capable of generating static electricity. Protect all equipment from explosions by following the NFPA 68 & 69 guidelines.

STORAGE: Do not store this material near food, feed or drinking water. Store in a well-ventilated area. Store in a dry area. DO NOT ALLOW Mancozeb to become wet or overheated in storage; decomposition, impaired activity or fire may result. Material is combustible; do not ignite. Store bagged material only on pallets no more than 3 high. Provide access aisles for each 2 rows. Loose bags should not be stacked more than 2x2x2 meters. Dense packing of unvented stacks of bags may lead to product decomposition posing a fire hazard. Decomposition produces a foul odor. Check for hot containers and immediately remove to open areas for disposal. Keep container tightly closed when not in use.

OTHER: Completely empty bag into application equipment. Dispose empty bag in a sanitary landfill as allowed by state and local authorities.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

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

EXPOSURE GUIDELINE:

Mancozeb: Dow AgroSciences Industrial Hygiene Guide is 1 mg/M³, dermal sensitizer.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guideline.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

EYE/FACE PROTECTION: Use chemical goggles.

SKIN PROTECTION: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. If respiratory irritation is experienced, use a NIOSH approved air-purifying respirator for dust.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

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9. PHYSICAL AND CHEMICAL PROPERTIES:

BOILING POINT: Not applicable
MELTING POINT: 378-399°F (192-204°C)
VAPOR PRESSURE: Negligible
VAPOR DENSITY: Not applicable
SOLUBILITY IN WATER: Dispersible
SPECIFIC GRAVITY: 0.35 - 0.60 g/cc (bulk density)
APPEARANCE: Blue to green solid
ODOR: Musty
PERCENT VOLATILITY: 1% water
pH: Not applicable
VISCOSITY: Not applicable
EVAPORATION RATE: Not applicable

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Material is stable under normal storage conditions. Keep away from moisture, heat or flame.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Avoid contact with oxidizing agents and acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may yield the following: carbon disulfide and hydrogen sulfide.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

MUTAGENICITY: In-vitro genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING:

No relevant information found.

DEGRADATION & PERSISTENCE:

The photolysis half-life in soil is <2 days.

ECOTOXICOLOGY:

Material is very highly toxic to aquatic organisms on an acute basis (LC₅₀ or EC₅₀ is <1 mg/L in most sensitive species tested).
Acute LC₅₀ in rainbow trout (*Oncorhynchus mykiss*) is 2.2 ppm.
Acute LC₅₀ in channel catfish (*Ictalurus punctatus*) is 5.2 ppm.
Acute immobilization EC₅₀ in water flea (*Daphnia magna*) is 3.8 mg/L.
Acute LC₅₀ in bluegill (*Lepomis macrochirus*) is 2.04 mg/L.
Acute LC₅₀ in water flea (*Daphnia magna*) is 1.0 mg/L.
Growth inhibition EC₅₀ in green alga (*Selenastrum capricornutum*) is 0.063 mg/L.
Maximum acceptable toxicant concentration (MATC) in fish early life-stage study is 0.00316 mg/L.
Maximum acceptable toxicant concentration (MATC) in water flea (*Daphnia magna*) is 0.0094 mg/L.
Acute LC₅₀ in saltwater mysid (*Mysidopsis bahia*) is 0.067 mg/L.
Acute LC₅₀ in sheepshead minnow (*Cyprinodon variegatus*) is 1.5 mg/L.
Acute EC₅₀ for shell deposition inhibition in eastern oyster (*Crassostrea virginica*) is 2.01 mg/L.
Material is practically non-toxic to birds on a dietary basis (LC₅₀ is >5000 ppm).
Dietary LC₅₀ in mallard (*Anas platyrhynchos*) is >6400 ppm.
Dietary LC₅₀ in Japanese quail (*Coturnix coturnix japonica*) is approx. 42,000 ppm.
Material is practically non-toxic to birds on an acute basis (LD₅₀ is >2000 mg/kg).
Acute oral LD₅₀ in mallard (*Anas platyrhynchos*) is 6400 mg/kg.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: Do not contaminate food, feed, or water by storage or disposal. Wastes are toxic and classified as RCRA hazardous waste, hazardous waste number: U116 (ethylene thiourea) (40 CFR 261). Improper disposal of excess waste, spray mixture, or rinsate is a violation of federal law. Spray mixture or rinse water that cannot be used according to label instructions must be disposed of in accordance with applicable local, state or federal requirements. Contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA regional office for guidance.

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14. TRANSPORT INFORMATION:

U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

This material is not regulated for domestic surface transportation only when shipping in non-bulk packages.

FOR BULK PACKAGINGS AND SHIPMENTS BY VESSEL:

ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (MANCOZEB)/9/UN3077/PG III/MARINE POLLUTANT (MANCOZEB)

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following substances 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:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
Ethylene Thiourea	000096-45-7	<0.1%
Mancozeb	008018-01-7	80%
Generic Group Name for Mancozeb: Ethylenebisdithiocarbamic Acid (CAS # 000111-54-6)		

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

- An immediate health hazard
- A delayed health hazard

CALIFORNIA PROPOSITION 65: The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986:

This product contains trace levels of a component known to the state of California to cause cancer, birth defects, or other reproductive harm. The component is Ethylene thiourea (000096-45-7)

This product contains a component known to the state of California to cause cancer. The component is Mancozeb (008018-01-7)

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
Ethylene Thiourea	000096-45-7	NJ1 NJ2 NJ3 PA1 PA2 PA3
Hexamethylene Tetramine	000100-97-0	NJ3
Ethylenebisdithiocarbamic Acid	000111-54-6	NJ3 PA1 PA3

NJ1=New Jersey Special Health Hazard Substance (present at greater than or equal to 0.1%).
NJ2=New Jersey Environmental Hazardous Substance (present at greater than or equal to 1.0%).
NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).
PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).
PA2=Pennsylvania Special Hazardous Substance (present at greater than or equal to 0.01%).
PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

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

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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health 2
Flammability 1
Reactivity 0

**COMPREHENSIVE ENVIRONMENTAL RESPONSE
COMPENSATION AND LIABILITY ACT (CERCLA, or
SUPERFUND):** This product contains the following
substance(s) listed as "Hazardous Substances" under
CERCLA, which may require reporting of releases:

Chemical Name	CAS#	RQ	% in Product
Ethylene Thiourea	000096-45-7	10 lbs.	<0.1%
Mancozeb	008018-01-7	5000 lbs.	80%

Generic Group Name for Mancozeb:
Ethylenebisdithiocarbamic Acid (CAS # 000111-54-6)

RCRA Categorization:

U.S. EPA Hazardous Waste Number:
U114 (Ethylenebisdithiocarbamic Acid)

16. OTHER INFORMATION:

MSDS STATUS: Revised Trade Product Name
Reference: DR-0385-8604
Replaces MSDS Dated: 12/12/03
Document Code: D03-839-002
Replaces Document Code: D03-839-002

The Information Herein Is Given In Good Faith, But No
Warranty, Express or Implied, Is Made. Consult Dow
AgroSciences for Further Information.