



**MATERIAL SAFETY DATA SHEET**

Dithane\* M-45

62719-387

**Effective Date:** 5-3-04

**Comments:**

Attached is a revised Material Safety Data Sheet.

\*Trademark of Dow AgroSciences LLC

# MATERIAL SAFETY DATA SHEET



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

## DITHANE\* M-45 FUNGICIDE

Effective Date: 5/3/04  
Product Code: 91510  
MSDS: 7799

### 1. PRODUCT AND COMPANY IDENTIFICATION:

**PRODUCT:** Dithane M-45 Fungicide

#### COMPANY IDENTIFICATION:

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

### 2. COMPOSITION/INFORMATION ON INGREDIENTS:

Mancozeb: [[1,2-ethanediy]bis[carbamo-dithioato]](2-)]manganese mixture with [[1,2-ethanediy]bis[carbamo-dithioato]](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

Yellow powdered solid with a musty odor. May cause eye and skin irritation. Toxic to aquatic organisms.

**EMERGENCY PHONE NUMBER:** 800-992-5994

### 4. FIRST AID:

**EYES:** Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several minutes. If effects occur, consult a physician, preferably 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) (Mancozeb)  
**METHOD USED:** TOC

#### FLAMMABLE LIMITS:

LFL: 0.16 oz/ft<sup>3</sup> 160.18 g/M<sup>3</sup>  
UFL: Not determined

**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.

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### 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 material 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 or as allowed by state and local authorities.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

#### EXPOSURE GUIDELINE:

Mancozeb: Dow AgroSciences Industrial Hygiene Guide is 1 mg/M<sup>3</sup>, dermal sensitizer. AIHA WEEL is 1 mg/M<sup>3</sup>, 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 safety glasses.

**SKIN PROTECTION:** Use gloves chemically resistant to this material.

**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.

### 9. PHYSICAL AND CHEMICAL PROPERTIES:

**BOILING POINT:** Not applicable

**MELTING POINT:** Not applicable (decomposes)

**VAPOR PRESSURE:** Negligible

**VAPOR DENSITY:** Not applicable

**SOLUBILITY IN WATER:** Dispersible

**SPECIFIC GRAVITY:** 0.35 - 0.50 g/cc (bulk density)

**APPEARANCE:** Yellow powdered 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.

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### 11. TOXICOLOGICAL INFORMATION:

**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 slight eye irritation.

**SKIN:** Brief 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 LD<sub>50</sub> 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 LD<sub>50</sub> for rats is >5000 mg/kg.

**INHALATION:** Mist may cause irritation of the upper respiratory tract (nose and throat) and lungs.

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

**CANCER INFORMATION:** Mancozeb has caused cancer in laboratory animals.

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

**REPRODUCTIVE EFFECTS:** Mancozeb, in animal studies, did not interfere with reproduction.

**MUTAGENICITY:** For mancozeb, 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:

Based largely or completely on information for Mancozeb.

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

### ECOTOXICOLOGY:

Based largely or completely on information for Mancozeb.

Material is very highly toxic to aquatic organisms on an acute basis (LC<sub>50</sub> or EC<sub>50</sub> is <1 mg/L in most sensitive species tested).

Acute LC<sub>50</sub> in rainbow trout (*Oncorhynchus mykiss*) is 2.2 ppm.

Acute LC<sub>50</sub> in channel catfish (*Ictalurus punctatus*) is 5.2 ppm.

Acute immobilization EC<sub>50</sub> in water flea (*Daphnia magna*) is 3.8 mg/L.

Acute LC<sub>50</sub> in bluegill (*Lepomis macrochirus*) is 2.04 mg/L.

Acute LC<sub>50</sub> in water flea (*Daphnia magna*) is 1.0 mg/L.

Growth inhibition EC<sub>50</sub> 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 LC<sub>50</sub> in saltwater mysid (*Mysidopsis bahia*) is 0.067 mg/L.

Acute LC<sub>50</sub> in sheepshead minnow (*Cyprinodon variegatus*) is 1.5 mg/L.

Acute EC<sub>50</sub> 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 (LC<sub>50</sub> is >5000 ppm).

Dietary LC<sub>50</sub> in mallard (*Anas platyrhynchos*) is >6400 ppm.

Dietary LC<sub>50</sub> in Japanese quail (*Coturnix coturnix japonica*) is approx. 42,000 ppm.

Material is practically non-toxic to birds on an acute basis (LD<sub>50</sub> is >2000 mg/kg).

Acute oral LD<sub>50</sub> in mallard (*Anas platyrhynchos*) is 6400 mg/kg.

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### 13. DISPOSAL CONSIDERATIONS:

**DISPOSAL METHOD:** If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

### 14. TRANSPORT INFORMATION:

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

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

**FOR BULK PACKAGES 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)

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**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.

### 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.	85-90%
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:** Moved to DAS format  
Reference: DR-0381-6099  
Replaces MSDS Dated: 6/1/01

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