

Product Name: Dithane M45 Fungicide**Issue Date:** 2012/05/08**Print Date:** 02 May 2019

Dow AgroSciences India Pvt. Ltd. encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Identification of the substance/preparation and of the company/undertaking**Product Name**

Dithane M45 Fungicide

Identified uses

Plant Protection Product

COMPANY IDENTIFICATION

Dow AgroSciences India Pvt. Ltd.
A Subsidiary of The Dow Chemical Company
1st Floor, Block B, 02, Godrej IT Park
Pirojshanangar, L.B.S. Marg
Chembur
Mumbai, MA 400 079
India

Customer Information Number:

91-22-55985700

SDSQuestion@dow.com**EMERGENCY TELEPHONE NUMBER****24-Hour Emergency Contact:**

91-2356-272046

Local Emergency Contact:

91 22 67978600

2. Composition/information on ingredients

Component	Amount	Classification:	CAS #	EC #
Mancozeb	75.0 %	Repr. 3: R63; R43; N: R50	8018-01-7	616-995-5
Sodium lignosulfonate	>= 10.0 - <= 20.0 %	Not classified.	8061-51-6	Polymer
Methenamine; hexamethylenetetramine	<= 5.0 %	F: R11; R43	100-97-0	202-905-8
Diisopropylnaphthalene Sulfonic Acid, Sodium Salt	<= 5.0 %	Xn: R20/22; Xi: R36/37	1322-93-6	215-343-3

See Section 16 for full text of R-phrases.

3. Hazards Identification

Possible risk of harm to the unborn child.
Highly flammable.
May cause sensitization by skin contact.
Very toxic to aquatic organisms.

4. First-aid measures

Description of first aid measures

General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice.

Skin Contact: Take off contaminated clothing. Wash skin with soap and plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Wash clothing before reuse. Shoes and other leather items which cannot be decontaminated should be disposed of properly.

Eye Contact: Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. Call a poison control center or doctor for treatment advice.

Ingestion: No emergency medical treatment necessary.

Most important symptoms and effects, both acute and delayed

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed

May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data Sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

Repeated excessive exposure may aggravate preexisting lung disease.

5. Fire Fighting Measures

Suitable extinguishing media

Water. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers.

Special hazards arising from the substance or mixture

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Sulfur oxides. Hydrogen sulfide. Carbon monoxide. Carbon dioxide. Nitrogen oxides.

Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Do not permit dust to accumulate. When suspended in air dust can pose an explosion hazard. Minimize ignition sources. If dust layers are exposed to elevated temperatures, spontaneous combustion may occur.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Consider feasibility of a controlled burn to minimize environment damage. Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Soak thoroughly with water

to cool and prevent re-ignition. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Hand held dry chemical or carbon dioxide extinguishers may be used for small fires. Dust explosion hazard may result from forceful application of fire extinguishing agents. Move container from fire area if this is possible without hazard. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Refer to Section 7, Handling, for additional precautionary measures. Keep upwind of spill. Spilled material may cause a slipping hazard. Ventilate area of leak or spill. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Spills or discharge to natural waterways is likely to kill aquatic organisms.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling

General Handling: Keep out of reach of children. Keep away from heat, sparks and flame. Do not swallow. Avoid breathing dust or mist. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated contact with skin. Use with adequate ventilation. Wash thoroughly after handling. Keep container closed. Good housekeeping and controlling of dusts are necessary for safe handling of product. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage

Store in a dry place. Store in original container. Do not store near food, foodstuffs, drugs or potable water supplies.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Mancozeb	IN OEL	CEILING Dust. as Mn	5 mg/m ³

AIHA WEEL	TWA Total	1 mg/m3	D-SEN
	dust. as		
	ethylenebisdi		
	thiocarbamat		
	e		

RECOMMENDATIONS IN THIS SECTION ARE FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS. APPLICATORS AND HANDLERS SHOULD SEE THE PRODUCT LABEL FOR PROPER PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING. A D-SEN notation following the exposure guideline refers to the potential to produce dermal sensitization, as confirmed by human or animal data.

Personal Protection

Eye/Face Protection: Use safety glasses (with side shields). Safety glasses (with side shields) should be consistent with EN 166 or equivalent.

Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Hand protection: Use chemical resistant gloves classified under Standard EN374: Protective gloves against chemicals and micro-organisms. Polyvinyl chloride ("PVC" or "vinyl"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). When prolonged or frequently repeated contact may occur, a glove is recommended to prevent contact with the solid material. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. Use the following CE approved air-purifying respirator: Organic vapor cartridge with a particulate pre-filter, type AP2.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Appearance

Physical State	Granules.
Color	Yellow to brown
Odor	Sulfur-like
Odor Threshold	No test data available
pH	Not applicable
Melting Point	Decomposes
Freezing Point	Not applicable
Boiling Point (760 mmHg)	Not applicable.
Flash Point - Closed Cup	Not applicable
Evaporation Rate (Butyl Acetate = 1)	Not applicable
Flammable Limits In Air	Lower: Not applicable Upper: Not applicable
Vapor Pressure	Not applicable
Vapor Density (air = 1)	Not applicable
Specific Gravity (H₂O = 1)	Not applicable
Solubility in water (by weight)	Not applicable

Partition coefficient, n-octanol/water (log Pow)	No data available for this product. See Section 12 for individual component data.
Autoignition Temperature	Not applicable
Decomposition Temperature	No test data available
Dynamic Viscosity	Not applicable
Kinematic Viscosity	Not applicable
Explosive properties	no data available
Oxidizing properties	no data available
Bulk Density	0.0006 kg/m ³

10. Stability and Reactivity

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Unstable at elevated temperatures.

Possibility of hazardous reactions

Polymerization will not occur.

Conditions to Avoid: Active ingredient decomposes at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Avoid static discharge.

Incompatible Materials: Avoid contact with: Acids. Oxidizers.

Hazardous decomposition products

Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Hydrogen sulfide. Sulfur oxides. Toxic gases are released during decomposition.

11. Toxicological Information

Acute Toxicity

Ingestion

Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

As product: Single dose oral LD50 has not been determined. Based on information for component(s): Estimated. LD50, rat > 5,000 mg/kg

Aspiration hazard

Based on physical properties, not likely to be an aspiration hazard.

Dermal

Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product: The dermal LD50 has not been determined. Based on information for component(s): Estimated. LD50, rabbit > 5,000 mg/kg

Inhalation

Prolonged excessive exposure to dust may cause adverse effects. Dust may cause irritation of the upper respiratory tract (nose and throat) and lungs.

As product: The LC50 has not been determined.

Eye damage/eye irritation

May cause slight eye irritation. Corneal injury is unlikely. May cause pain disproportionate to the level of irritation to eye tissues.

Skin corrosion/irritation

Prolonged contact may cause slight skin irritation with local redness.

Sensitization

Skin

For the active ingredient(s): Has caused allergic skin reactions when tested in guinea pigs. For the minor component(s): Has caused allergic skin reactions in humans.

Respiratory

No relevant data found.

Repeated Dose Toxicity

For the active ingredient(s): In animals, effects have been reported on the following organs: Liver. Thyroid.

Chronic Toxicity and Carcinogenicity

For the active ingredient(s): Has caused cancer at high doses in laboratory rats.

Developmental Toxicity

For the active ingredient(s): Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Reproductive Toxicity

For the active ingredient(s): In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

Genetic Toxicology

For the active ingredient(s): In vitro genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

12. Ecological Information

ToxicityData for Component: **Mancozeb**

Material is very toxic to aquatic organisms (LC50/EC50/IC50 below 1 mg/L in the most sensitive species). Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg).

Fish Acute & Prolonged Toxicity

LC50, *Oncorhynchus mykiss* (rainbow trout), 96 h: 0.088 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, *Daphnia magna* (Water flea), 48 h: 0.073 mg/l

Aquatic Plant Toxicity

EyC50, *Scenedesmus capricornutum* (fresh water algae), 120 h: 0.044 mg/l

Toxicity to Above Ground Organisms

oral LD50, *Colinus virginianus* (Bobwhite quail): > 3200 mg/kg bodyweight.

oral LD50, *Apis mellifera* (bees): > 100 ug/bee

contact LD50, *Apis mellifera* (bees): > 100 ug/bee

Toxicity to Soil Dwelling Organisms

LC50, *Eisenia fetida* (earthworms), 14 d: > 299 mg/kg

Data for Component: **Sodium lignosulfonate**

Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).

Fish Acute & Prolonged Toxicity

LC50, *Oncorhynchus mykiss* (rainbow trout), 96 h: > 100 mg/l

Aquatic Invertebrate Acute Toxicity

For this family of materials: LC50, *Daphnia magna* (Water flea), static test, 48 h, immobilization: > 100 mg/l

Data for Component: **Methenamine; hexamethylenetetramine**

Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).

Fish Acute & Prolonged Toxicity

LC50, *Pimephales promelas* (fathead minnow), flow-through test, 96 h: 49,800 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, *Daphnia magna* (Water flea), static test, 48 h: 36,000 mg/l

Persistence and DegradabilityData for Component: **Mancozeb**

Degradation is expected in the soil environment within days to weeks. Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however,

|| these results do not necessarily mean that the material is not biodegradable under environmental conditions.

Stability in Water (1/2-life):

|| 17 h; pH 7

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
2.1237E-10 cm ³ /s	0.05 d	Estimated.

Data for Component: **Sodium lignosulfonate**

|| No relevant information found.

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
1.089E-10 cm ³ /s	0.098 d	Estimated.

Data for Component: **Methenamine; hexamethylenetetramine**

|| Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
54 - 97 %	28 d	OECD 301C Test	Not applicable

Bioaccumulative potential

Data for Component: **Mancozeb**

|| **Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

|| **Partition coefficient, n-octanol/water (log Pow):** 1.33 Estimated.

|| **Bioconcentration Factor (BCF):** 2.1 - 3.1; Estimated.

Data for Component: **Sodium lignosulfonate**

|| **Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

|| **Partition coefficient, n-octanol/water (log Pow):** -3.45 Estimated.

|| **Bioconcentration Factor (BCF):** 3.2; Fish

Data for Component: **Methenamine; hexamethylenetetramine**

|| **Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

|| **Partition coefficient, n-octanol/water (log Pow):** -4.15 Estimated.

Mobility in soil

Data for Component: **Mancozeb**

|| **Mobility in soil:** Potential for mobility in soil is low (Koc between 500 and 2000).

|| **Partition coefficient, soil organic carbon/water (Koc):** 1,000 Estimated.

|| **Henry's Law Constant (H):** < 5.9E-04 Pa*m³/mole.

Data for Component: **Sodium lignosulfonate**

|| **Mobility in soil:** Expected to be relatively immobile in soil (Koc > 5000).

|| **Partition coefficient, soil organic carbon/water (Koc):** > 99,999 Estimated.

|| **Henry's Law Constant (H):** 9.43E-25 atm*m³/mole; 25 °C Estimated.

Data for Component: **Methenamine; hexamethylenetetramine**

|| **Mobility in soil:** Potential for mobility in soil is very high (Koc between 0 and 50).

|| **Partition coefficient, soil organic carbon/water (Koc):** < 1 Estimated.

|| **Henry's Law Constant (H):** 5.36E-10 atm*m³/mole; 25 °C Estimated.

13. Disposal Considerations

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.

14. Transport Information

ROAD & RAIL

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Technical Name: MANCOZEB

Hazard Class: CLASS 9 **ID Number:** UN3077 **Packing Group:** PG III

Classification: M7

Hazard identification No: 90

Environmental Hazard: Yes

OCEAN

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Technical Name: MANCOZEB

Hazard Class: CLASS 9 **ID Number:** UN3077 **Packing Group:** PG III

EMS Number: F-A,S-F

Marine pollutant.: Yes

AIR

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Technical Name: MANCOZEB

Hazard Class: CLASS 9 **ID Number:** UN3077 **Packing Group:** PG III

Cargo Packing Instruction: 956

Passenger Packing Instruction: 956

Environmental Hazard: Yes

INLAND WATERWAYS

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Technical Name: MANCOZEB

Hazard Class: CLASS 9 **ID Number:** UN3077 **Packing Group:** PG III

Classification: M7

Hazard identification No: 90

Environmental Hazard: Yes

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

Classification and User Label Information

Hazard Symbol:

- F - Highly flammable.
- Repr. 3 - Toxic for reproduction - category 3.
- Xi - Irritant
- N - Dangerous for the environment.

Risk Phrases :

- R63 - Possible risk of harm to the unborn child.
- R11 - Highly flammable.

R43 - May cause sensitization by skin contact.

R50 - Very toxic to aquatic organisms.

Safety Phrases :

S36/37 - Wear suitable protective clothing and gloves.

S61 - Avoid release to the environment. Refer to special instructions/Safety data sheets.

Contains: Mancozeb
Methenamine; hexamethylenetetramine

16. Other Information

Risk-phrases in the Composition section

R11 Highly flammable.
R20/22 Harmful by inhalation and if swallowed.
R36/37 Irritating to eyes and respiratory system.
R43 May cause sensitization by skin contact.
R50 Very toxic to aquatic organisms.
R63 Possible risk of harm to the unborn child.

Revision

Identification Number: 75397 / 4068 / Issue Date 2012/05/08 / Version: 2.0

DAS Code: GF-895

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation

Dow AgroSciences India Pvt. Ltd. urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided 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 between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.