

MATERIAL SAFETY DATA SHEET



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

GAVEL* 75DF FUNGICIDE

Date: 6/1/01
Product Code: 90856

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: Gavel* 75DF Fungicide

COMPANY IDENTIFICATION:
Dow AgroSciences
9330 Zionsville Road
Indianapolis, IN 46268

EMERGENCY TELEPHONE NUMBER:
800-992-5994

2. COMPOSITION/INFORMATION ON INGREDIENTS

No		CAS REG NO	WEIGHT (%)
1	Zoxamide	156052-68-5	8-9
2	Mancozeb	8018-01-7	67-70
3	Sodium lignosulfonate	8061-51-6	21-25
4	Related reaction products	None	
5	Anionic surfactant blend	Undisclosed	

3. HAZARDS IDENTIFICATION

Primary Routes of Exposure

Inhalation
Eye Contact
Skin Contact

Inhalation

Inhalation of dust can cause the following: irritation of nose, throat, and lungs

Eye Contact

Direct contact with material can cause the following: moderate irritation

Skin Contact

Prolonged or repeated skin contact can cause the following: slight skin irritation - skin sensitization in susceptible individuals

Delayed Effects

Delayed effects are not expected with use of GAVEL 75DF Fungicide as recommended. Toxic effects, such as liver or thyroid effects, birth defects and neurotoxicity, which were observed in animal studies (See Section 11) conducted at doses above anticipated exposure levels under normal conditions of manufacture and use, may occur during overexposure situations.

4. FIRST AID MEASURES

Inhalation

Move subject to fresh air.

Eye Contact

Flush eyes with water. Consult a physician if irritation persists.

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Skin Contact

Remove contaminated clothing. Wash affected skin areas thoroughly with soap and water. Consult a physician if irritation persists. Wash contaminated clothing thoroughly before reuse. Do not take clothing home to be laundered.

Ingestion

If swallowed, give 2 glasses of water to drink. Never give anything by mouth to an unconscious person. Consult a physician.

Note to Physician

If swallowed, careful evacuation of the stomach is advisable.

5. FIRE FIGHTING MEASURES

Flash Point	Not Applicable
Auto-ignition Temperature	No Data
Lower Explosive Limit	Not Applicable
Upper Explosive Limit	Not Applicable

Unusual Hazards

Pesticide particulates can become airborne.

Combustion generates toxic fumes of the following: nitrogen oxides - hydrogen chloride - hydrogen sulfide - sulfur oxides - carbon oxides

Extinguishing Agents

Use the following extinguishing media when fighting fires involving this material: carbon dioxide - dry chemical - water spray - foam

Personal Protective Equipment

Wear self-contained breathing apparatus (pressure-demand NIOSH approved or equivalent) and full protective gear.

Special Procedures

Remain upwind. Avoid breathing smoke. Use water spray to cool containers exposed to fire. Contain run-off.

6. ACCIDENTAL RELEASE MEASURES

Personal Protection

Appropriate protective equipment must be worn when handling a spill of this material. See SECTION 8, Exposure Controls/Personal Protection, for recommendations. If exposed to material during clean-up operations, see SECTION 4, First Aid Measures, for actions to follow. 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.

Procedures

Transfer spilled material to suitable containers for recovery or disposal. Keep dust to a minimum. Keep spectators away. Avoid breathing dust. CAUTION: Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

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7. HANDLING AND STORAGE

Storage Conditions

Do not store this material near food, feed or drinking water. Keep container tightly closed when not in use. Store in a well ventilated area. Store in a dry area. DO NOT allow 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.

Handling Procedures

Do not handle material near food, feed or drinking water. This material is a potential skin sensitizer. See SECTION 8, Exposure Controls/Personal Protection, prior to handling.

Other

Completely empty bag into application equipment. Dispose empty bag in a sanitary landfill or by incineration as allowed by state and local authorities. Avoid inhalation of smoke if incinerated.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limit Information

No		CAS REG NO	WEIGHT (%)
1	Zoxamide	156052-68-5	8-9
2	Mancozeb	8018-01-7	67-70
3	Sodium lignosulfonate	8061-51-6	21-25
4	Related reaction products	None	
5	Anionic surfactant blend	Undisclosed	

Comp. No.	Units	Dow AgroSciences		OSHA		ACGIH	
		TWA	STEL	TWA	STEL	TWA	STEL
1	mg/m3	3 a	None	None	None	None	None
2	mg/m3	1	None	None	None	None	None
3		None	None	None	None	None	None
4		None	None	None	None	None	None
5		None	None	None	None	None	None

a Respirable Fraction

End users must follow label instructions when using this product.

Respiratory Protection

A respiratory protection program meeting OSHA 1910.134 and ANSI Z88.2 requirements or equivalent must be followed whenever workplace conditions warrant a respirator's use. None required if airborne concentrations are maintained below the exposure limit listed in 'Exposure Limit Information'.

Up to 10 times the exposure limit: Wear a properly fitted NIOSH approved (or equivalent) half-mask, air-purifying respirator.

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Up to 50 times the exposure limit: Wear a properly fitted NIOSH approved (or equivalent) full-face piece, air-purifying respirator, OR full-face piece, airline respirator in the pressure demand mode.

Above 50 times the exposure limit or Unknown: Wear a properly fitted NIOSH approved (or equivalent) self-contained breathing apparatus in the pressure demand mode, OR full-face piece, airline respirator in the pressure demand mode with emergency escape provision.

Air-purifying respirators should be equipped with NIOSH approved (or equivalent) organic vapor cartridges and N100 filters. If oil mist is present, use R100 or P100 filters.

Eye Protection

Use chemical splash goggles (ANSI Z87.1 or approved equivalent). Eye protection worn must be compatible with respiratory protection system employed.

Hand Protection

Chemical-resistant gloves should be worn whenever this material is handled. The glove(s) listed below may provide protection against permeation: Polyvinyl chloride-coated glove or other chemical-resistant rubber-coated glove. Gloves should be removed and replaced immediately if there is any indication of degradation or chemical breakthrough. Rinse and remove gloves immediately after use. Wash hands with soap and water.

Other Protection

Use chemically resistant apron or other impervious clothing to avoid prolonged or repeated skin contact.

Engineering Controls (Ventilation)

Use local exhaust ventilation with a minimum capture velocity of 150 ft/min. (0.75 m/sec.) at the point of dust or mist evolution. Refer to the current edition of Industrial Ventilation: A Manual of Recommended Practice published by the American Conference of Governmental Industrial Hygienists for information on the design, installation, use, and maintenance of exhaust systems.

Other Protective Equipment

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color	Light brown
State	Microgranules
Odor Characteristic	Sulfur odor
pH	6.5 to 7.5
Viscosity	Not Applicable
Specific Gravity (Water = 1)	0.5 to 0.65 g/ml Bulk Density
Vapor Density (Air = 1)	Not Applicable
Vapor Pressure	Negligible
Melting Point	Not Applicable--Decomposes
Boiling Point	Not Applicable
Solubility in Water	Dispersible
Percent Volatility	< 3% Water
Evaporation Rate (BAc = 1)	Not Applicable

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10. STABILITY AND REACTIVITY

Instability

This material is considered stable. However, keep away from moisture, heat or flame.

Hazardous Decomposition Products

Thermal decomposition may yield the following: hydrogen chloride - carbon disulfide - hydrogen sulfide

Hazardous Polymerization

Product will not undergo polymerization.

Incompatibility

Avoid contact with the following: acids - oxidizing agents

11. TOXICOLOGICAL INFORMATION

Acute Data

Toxicity data for a compositionally similar material are listed below.

Oral LD50 - rat: >5000 mg/kg

Dermal LD50 - rat: >5000 mg/kg

Skin Irritation - rabbit:

Slightly irritating (US Classification)

Non-irritating (EEC Classification)

Eye Irritation - rabbit:

not irritating (EEC Classification)

moderately irritating (US Classification)

Inhalation LC50 4 hr, aerosol exposure - rat: >5.1 mg/L

Subchronic/Chronic Data

Repeated oral exposure at high doses of Zoxamide Technical to laboratory animals produced liver effects. The overall no-observed adverse effect level (NOAEL) from long-term animal feeding studies with Zoxamide Technical is 48 mg/kg/day. Repeated dermal exposure to laboratory animals produced no effects at doses up to and including 1000 mg/kg/day. Repeated oral exposure at high doses of mancozeb to laboratory animals produced thyroid, liver and blood toxicity, hind leg paralysis and related neurotoxic effects including retinal degeneration. The overall no-observed adverse effect level (NOAEL) from long-term animal feeding studies with mancozeb is 5 mg/kg/day. Repeated dermal exposure to laboratory animals produced no effects at doses up to and including 1000 mg/kg/day. Mancozeb's thyroid, liver and blood toxicity are due to its metabolism in small amounts to ethylenethiourea (ETU), which also produces these same effects. The overall no-observed adverse effect level from long-term animal feeding studies with ETU is 0.39 mg/kg/day.

Carcinogenicity Data

The following data pertains to studies conducted with the technical material, RH-117,281 Tech 92% min active ingredient: No evidence of carcinogenicity was observed in long-term studies with mice and rats. A two-year feeding study of mancozeb in rats produced an increased incidence of thyroid tumors at 750 ppm (29 mg/kg/day). No evidence of carcinogenicity was observed in long-term studies with mice. Two-year feeding studies of ETU produced an increased incidence of thyroid and pituitary tumors in rats at 83 ppm (4 mg/kg/day) and higher levels, and an increased incidence of thyroid, pituitary and liver tumors in mice at dietary concentrations of 330 ppm (56 mg/kg/day) and higher levels.

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Information on the mechanism of the observed thyroid and pituitary tumors establishes a threshold for the thyroid and pituitary tumors and indicates that none of these tumor types are relevant to humans at likely exposure levels.

Mutagenicity Data

The weight of the evidence of collective data from scientifically appropriate studies indicate Zoxamide Technical is non-mutagenic. The weight of the evidence of collective data from scientifically appropriate studies indicate that mancozeb and ETU are non-mutagenic.

Reproductive/Teratology Data

No evidence of reproductive or developmental toxicity was observed in developmental toxicity studies with Zoxamide Technical in rats and rabbits nor a two-generation reproduction study in rats. Exposure to levels of mancozeb high enough to cause maternal toxicity produced developmental effects in rats, including malformations. No developmental toxicity was observed in rats below adult toxic levels; the NOAEL for maternal toxicity was 32 mg/kg/day, and the NOAEL for developmental toxicity was 128 mg/kg/day. No developmental effects were observed in rabbits; the NOAEL for maternal toxicity was 30 mg/kg/day, and the NOAEL for developmental toxicity in rabbits was >80 mg/kg/day (highest dose tested). Exposure to thyroid-inhibiting levels of ETU produced malformations in rats and hamsters, and embryofetotoxicity in mice and rabbits. There was no evidence of developmental toxicity in guinea pigs or cats. The overall NOAEL in developmental toxicity studies with ETU is 5 mg/kg/day. No reproductive effects were seen below exposure levels high enough to produce non-reproductive toxic effects in two-generation reproduction studies of mancozeb or ETU in rats.

Sensitization Data

Skin sensitization - guinea pig: Sensitizer

Other Toxicity Data

An acceptable Daily Intake (ADI) 0.5 mg/kg/day has been recommended for Zoxamide. The toxicological effects described above are observed only at doses of Zoxamide which greatly exceed human exposure under normal and recommended conditions of use. These effects are not expected under normal and recommended conditions of use. The World Health Organization (WHO) has established an Acceptable Daily Intake (ADI) for mancozeb at 0.05 mg/kg/day, and for the ethylenebisdithiocarbamates as a group at 0.03 mg/kg/day. The ADI for ETU is 0.004 mg/kg/day.

The toxicological effects described above are observed only at doses of mancozeb and ETU, which greatly exceed human exposure under normal and recommended conditions of use. These effects are not expected under normal and recommended conditions of use.

12. ECOLOGICAL INFORMATION

Environmental data for component 1:
Octanol water partition, Kow = 5782
Bioconcentration factor, BCF = 95-136

Biodegradation:
Aerobic soil half-life = 2-10 days
Hydrolysis half-life = 15.7 days (pH 7)
Water sediment half-life = 6.1 days
Koc = 815-1671
Soil mobility is low

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Environmental data for component 2:
Octanol water partition, $K_{ow} = 21$

Biodegradation:
Aerobic soil half-life = 2 Hr.
Hydrolysis half-life = 5.8-55 Hr. (pH 7)
Water sediment half-life = 10-21 Hr.
 $K_{oc} = 363-20,726$
Soil mobility is medium to immobile.

Environmental Toxicity

Honeybee, Oral LD50: > 153 $\mu\text{g}/\text{bee}$
Honeybee, Contact LD50: > 200 $\mu\text{g}/\text{bee}$
Algae (*Selenastrum capricornutum*), 96 Hour EC50: 31 $\mu\text{g}/\text{l}$
Daphnia magna, 48 Hour EC50: 3.3 mg/l
Rainbow trout (*Oncorhynchus mykiss*), 96 Hour LC50: 1.9 mg/l
Mallard duck, 10 day LD50: > 6400 mg/kg; ²
Mallard duck, 5 Day LC50: > 5250 ppm; ¹
Bobwhite quail, LD50: > 2000 mg/kg; ¹

Footnote 1: Data is for component 1.
Footnote 2: Data is for component 2.

Based on the above ecological data, this material is safe for the environment when used as recommended.

13. DISPOSAL CONSIDERATIONS

Procedure

For disposal, incinerate this material at a facility that complies with local, state, and federal regulations.

14. TRANSPORT INFORMATION

US DOT Hazard Class NON-REGULATED
This classification is used when shipping in non-bulk packages for domestic surface transportation only.
Exceptions in CFR 49 Parts 171-177 may apply. Consult CFR 49 Parts 171-177 to determine appropriate classification when shipping in bulk packages or when shipping by air or ocean.

15. REGULATORY INFORMATION

Workplace Classification

This product is considered hazardous under the OSHA Hazard Communication Standard (29 CFR 1910.1200).
This product is subject to regulation under the Canadian Pest Control Products Act (P.C.P. Act). Therefore, this product is excluded from the supplier labeling and material safety data sheet requirements as specified in Section 12 of the Hazardous Products Act.

SARA TITLE 3: Section 311/312 Categorizations (40 CFR 370)

This product is a hazardous chemical under 29 CFR 1910.1200, and is categorized as a delayed health hazard.

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SARA TITLE 3: Section 313 Information (40 CFR 372)

This product contains a chemical, which is listed in Section 313 at or above de minimis concentrations. The following listed chemicals are present: (Quantity present is found elsewhere on this MSDS.)

- Mancozeb (8018-01-7) as manganese/zinc compound
- Mancozeb (8018-01-7) as ethylenebisdithiocarbamic acid, salts and esters

CERCLA Information (40 CFR 302.4)

This material is regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304. This material is or contains chemical(s) listed in 40 CFR Table 302.4 or non-designated RCRA ICR substance(s). (Non-designated ICR substances apply to materials that will not be reused.) The Reportable Quantity(s) (RQ) are listed below. Releases in excess of its reportable quantity must be reported to the National Response Center (1-800-424-8802) and to the appropriate state and local emergency response organizations.

Ethylenebisdithiocarbamic acid, salts & esters (111-54-6) 5000 lbs. as Mancozeb (8018-01-7)

Waste Classification

When a decision is made to discard this material as supplied, it does not meet RCRA's characteristic definition of ignitability, corrosivity, or reactivity, and is not listed in 40 CFR 261.33. The toxicity characteristic (TC), however, has not been evaluated by the Toxicity Characteristic Leaching Procedure (TCLP).

United States

This product is subject to regulation under the US Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and is therefore exempt from U.S. Toxic Substances Control Act (TSCA) Inventory listing requirements.

California (Proposition 65)

This product contains a component or components known to the state of California to cause cancer and birth defects or other reproductive harm: Ethylene thiourea (96-45-7). This product contains a component or components known to the state of California to cause cancer: Mancozeb (8018-01-7)

16. OTHER INFORMATION

MSDS STATUS: New

Document Code: D03-878-001

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