

MATERIAL SAFETY DATA SHEET

For Emergencies Involving a Spill, Leak, Fire,
Exposure or Accident Contact:
CHEMTREC (800) 424-9300

Taminco, Inc.

1950 Lake Park Drive
Smyrna, Georgia 30080
For Product Information:
(800) 426-3820

SECTION: 1 IDENTIFICATION

Defiant[®] Turf Fungicide and Animal Repellent

Tetramethylthiuram Disulfide
(syn: Thiram, TMTD, Bis [Dimethylthiocarbamyl] Disulfide)

EPA REG NO.: 45728-21

HMIS HAZARD RATINGS

Health 2
Flammability 1
Reactivity 0
0=Least; 1=Slight
2=Moderate; 3=High
4=Extreme

SECTION 2: PRODUCT COMPONENTS

INGREDIENTS	CAS NO.	WT. %
Tetramethylthiuram disulfide (active ingredient)	137-26-8	75
Inert Ingredients	Proprietary	25

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is slightly brown granules with a caramel odor. It is not defined as flammable or combustible but will burn under fire conditions.

CAUTION! Harmful if swallowed, inhaled or absorbed through the skin. May cause systemic poisoning with symptoms of nausea, vomiting, tremor, numbness, weakness and death. May cause eye, skin or respiratory irritation. May cause allergic skin reaction. May be absorbed through the skin and cause toxic effects. Inhalation of dust may cause mucous membrane and respiratory irritation. Do not get in eyes, on skin or on clothing. Avoid inhaling spray mist. Prolonged or frequently repeated skin contact may cause allergic reaction in some individuals. The consumption of alcoholic beverages increases the toxic effects of Thiram.

SECTION 4: EMERGENCY and FIRST AID PROCEDURES

INGESTION: Call a poison control center or doctor immediately for treatment advice. If conscious, have the person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

SKIN CONTACT: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

EYE CONTACT: Hold eye 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 eye. Call a poison control center or doctor for treatment advice.

INHALATION: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for treatment advice.

NOTE: Tetramethylthiuram Disulfide is the methyl analog of antabuse. Consumption of small amounts of alcohol and acute or chronic tetramethylthiuram disulfide exposure will cause similar effects as antabuse. These include palpitations, nausea, vomiting, headaches, shortness of breath.

SECTION 5: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: Not applicable

METHOD: Not applicable

FLAMMABLE LIMITS: (vol. % in air) 30 g/m³ as dust at 270°C

AUTOIGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Not defined as flammable or combustible. Product may support combustion under fire condition. Use carbon dioxide, dry chemicals, foam, water or water fog.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate area of all non emergency personnel. Firefighters should wear full emergency equipment and NIOSH approved positive pressure self-contained breathing apparatus. Fight fire from upwind and cool exposed intact containers and structures with water spray or stream at maximum range. Decontaminate all protective equipment after use, prevent skin contact. This product is toxic to fish. Contain all water run-off with diking.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Decomposition products are toxic. Very high concentrations of this product suspended in air may present an explosion hazard.

SECTION 6: ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Wear appropriate protective clothing as described in Section 8 to prevent eye and skin contact and appropriate respirator to prevent overexposure. Isolate area and keep out unprotected persons. Stop leak at source. Carefully sweep up dry spilled material and collect into labeled containers for proper disposal. If liquid, dike and absorb with inert material. This material is toxic to fish. Prevent run-off to storm sewers and ditches leading to natural waterways. Report spill as required by local and federal regulations.

SECTION 7: HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Protect containers from physical damage. Store in a cool, dry area preferably locked and out of reach of children and animals. Not for the use or storage in or around the home. Protect from excessive heat. Store in original container only. Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Do not get in eyes, on skin or on clothing. Avoid inhaling spray mists. Use only with adequate ventilation and appropriate protective equipment. Carefully open containers. Immediately remove and launder contaminated clothing before re-use. Wash thoroughly after handling and before eating, drinking, chewing gum, using tobacco products or using toilet facilities. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove personal protective equipment (PPE) immediately after handling product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Do not apply this product in such a manner as to directly or thorough drift expose workers or other persons. Only protected handlers may be in the area during application. For any requirements specific to your state, province or Tribe, consult the agency responsible for pesticide regulation. Use this product only in accordance with its labeling and the Worker Protection Standard, 40CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification and emergency assistance. Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 24 hours. PPE required for early entry to treated areas that is permitted under the Worker Protection Standard is described in Section 8 of this MSDS.

Do not enter or allow other to enter treated areas until sprays have dried. Do not apply this product through any type of irrigation system.

OTHER PRECAUTIONS: Keep containers tightly closed. Empty containers retain product residues and are hazardous. Follow all MSDS precautions in handling empty containers. This product is toxic to fish. Do not apply directly to water or areas where surface water is present to intertidal areas below the mean high water mark. Do not contaminate water by cleaning of equipment or disposing of equipment washwaters. Drift or runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Apply this product only as specified on the product label.

SECTION 8: EXPOSURE CONTROLS and PERSONAL PROTECTION

RESPIRATORY PROTECTION: Use a properly fit-tested NIOSH approved full-facepiece respirator with pesticide cartridge or half-face respirator with non-venting chemical goggles recommended for applicators and other handlers and when performing any operation where exposure to Defiant is likely. Selection of respiratory protection depends on the contaminant type, form and concentration. Select in accordance with OSHA 1910.134 and good Industrial Hygiene practice.

ENGINEERING CONTROLS: When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard for agricultural pesticides [40CFR 170.240(d)], the handler PPE requirements may be reduced or modified as specified in the Worker Protection Standard.

PROTECTIVE CLOTHING: Applicators and other handlers must wear rubber or other chemical resistant, waterproof gloves and goggles or faceshield, chemical resistant headgear, long sleeved shirt and long pants and shoes plus socks. Early entry to treated areas that is permitted under the Worker Protection Standard requires the wearing of coveralls, rubber or other chemical resistant, waterproof gloves and shoes plus socks. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove personal protective equipment (PPE) immediately after handling product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

EYE PROTECTION: Non-venting chemical safety goggles are recommended if full face-piece respirator is not worn.

Note: Discard clothing and other absorbent materials that have been drenched or heavily contaminated with the concentrate. Do not reuse them. Follow the manufacturer's instructions for cleaning and maintaining Personal Protective Equipment (PPE). If no specific instructions for decontamination are available, use detergent and hot water. Keep and wash (launder) PPE separately from other laundry. Wash PPE after each day's use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT (@760 mmHg): Not applicable
VAPOR PRESSURE (@ 20 c mm Hg): Not applicable
VISCOSITY: Not applicable
EVAPORATION RATE: Not applicable
COEFFICIENT of WATER/OIL: 1.73

FREEZING POINT @ 760 mmHG): Not applicable
SPECIFIC GRAVITY (H2O=1): 0.6 kg/l
VAPOR DENSITY (Air=1): Not applicable
SOLUBILITY IN WATER: Dispersable
pH: Not available

APPEARANCE AND ODOR: Slightly brown granules with a caramel odor.

SECTION 10 STABILITY and REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID: Excessive heat.

INCOMPATIBILITY: Acids, oxidizers, copper.

HAZARDOUS DECOMPOSITION PRODUCTS: Decomposed by excessive heat and acids. Heating to decomposition generates carbon disulfide and oxides of carbon, nitrogen and sulfur. Acid decomposition may evolve carbon disulfide and hydrogen sulfide.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

EYE CONTACT: May cause irritation based on a study in rabbits.

SKIN CONTACT: May cause irritation and possibly sensitization. Animal studies indicate that this product is a moderate sensitizer. Limited toxicity by skin absorption based on a proprietary study Dermal LD50 (rat) - > 2 g/kg.

INHALATION: Dust may cause mucous membrane and respiratory irritation with coughing, choking and labored breathing.

INGESTION: May cause systemic poisoning with symptoms of weakness, nausea, vomiting, diarrhea, confusion, dizziness, delirium, tremor, hallucinations, ataxia, ascending paralysis, hypothermia and peripheral neuropathy (pain, numbness and weakness of the extremities). Respiratory paralysis and death may occur.

OTHER TOXIC EFFECTS: An antabuse-like reaction with flushing, sweating, headache, weakness and hypotension may occur when ethyl alcohol (alcoholic beverages) is ingested following exposure to this material.

CARCINOGENICITY: This product is not listed as a carcinogen or suspect carcinogen by NTP, IARC or OSHA.

CHRONIC EFFECTS of OVEREXPOSURE: Thiram has been found to be mutagenic in some test systems and to cause adverse reproductive effects in laboratory animals.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory and skin diseases may be at increased risk from exposure to this material.

TOXICOLOGY DATA:

	<u>LD50</u>	<u>LC50</u>
Thiram	2.4 g/kg oral rat * >5 gm/kg dermal rat >2 gm/kg dermal rabbit *	4.42 mg/L/4 hr rat *

* UCB Proprietary Study

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity Values for Thiram: LC50 Salmo (trout) 0.13 mg/L

LC50 Xenopus Laevis (amphibian) stage 47 0.017 ppm/24 hr

LD50 Redwing Blackbird oral >100 mg/kg

SECTION 13: DISPOSAL INFORMATION

WASTE DISPOSAL METHOD: Dispose in accordance with all local, state/provincial and federal regulations.

Pesticide wastes are toxic. Open dumping is prohibited. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

Completely empty container into application equipment. Do not reuse empty container. Then dispose of empty container in a sanitary landfill or by incineration or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

SECTION 14: TRANSPORTATION INFORMATION

DOT SHIPPING NAME: Environmentally Hazardous Substance, Solid, n.o.s. (Thiram), 9, UN3077, PG III, RQ
DOT HAZARD CLASSIFICATION: Class 9 (Miscellaneous Hazardous Material)
DOT LABELS REQUIRED (49CFR 172.101): Class 9
UN NUMBER: UN3077
REPORTABLE QUANTITY: 13.3 lbs. (6.0 kg) for product

SECTION 15: REGULATORY INFORMATION

OSHA HAZARD CLASSIFICATION: Irritant, toxic, target organ effect, sensitizer
EPA SARA 311 HAZARD CLASSIFICATION: Acute health, chronic health
SARA TITLE 111 SECTION 313 INFORMATION: The following components are regulated under SARA Title 313

COMPONENT	CAS#	WT%
Thiram	137-26-8	75

CERCLA HAZARDOUS SUBSTANCE (40CFR116): Thiram
REPORTABLE QUANTITY: 10 lbs (4.54 kg). Product RQ = 13.3 lbs. (6.0 kg)

SECTION 15: REGULATORY INFORMATION (continued)

STATE R-T-K COMPOSITION INFORMATION

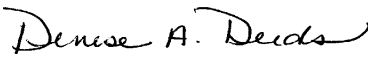
COMPONENT	CAS #	WT%	PA	MA
Thiram	137-26-8	75%	Y	Y

CALIFORNIA PROPOSITION 65 INFORMATION: This product contains no California Proposition 65 regulated chemicals.

WHMIS CLASSIFICATION: Toxic material causing other toxic effects (Class D-Subdivision 2, Subdivision B)

SECTION 16: OTHER INFORMATION

DISCLAIMER: The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Taminco makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards and regulations.

Approved By:  **Dated:** 06/10/04
Denese A. Deeds, CIH
IH&SC, Inc.

MSDS updated on 02/20/04 Revised Header, Section 2, 3, 4, 7, 8, 13.
MSDS updated on 06/10/04 Section 1: EPA Registration Number