

**MATERIAL SAFETY DATA SHEET****SECTION 1: PRODUCT AND COMPANY IDENTIFICATION****Product Name: THIRAM TECHNICAL**

Minimum 98.5% Phyto Grade Tetramethylthiuram Disulfide
(syn: Thiram, TMTD, Bis [Dimethylthiocarbamy] Disulfide)

Product Use: Fungicide**EPA Reg. No.** 45728-1

Company: Taminco, Inc.
3350 Riverwood Pkwy Suite 1900
Atlanta, Georgia 30339

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

For Product Information: (800) 223-3258

SECTION 2: HAZARDS IDENTIFICATION

This product is a creamy white powder with no odor.

EMERGENCY OVERVIEW:**WARNING!**

Causes eye irritation.

May be harmful if swallowed, inhaled or absorbed through the skin.

May cause skin and respiratory tract irritation.

May cause allergic skin reaction.

May cause damage to blood, liver and kidneys based on animal studies.

Not defined as flammable or combustible but will burn under fire conditions. Very high concentrations of dust in the air may present a dust explosion hazard. Do not get in eyes, on skin or on clothing. May cause systemic poisoning with symptoms of nausea, vomiting, tremor, numbness, weakness and death. Use with adequate ventilation. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse. Consumption of alcoholic beverages increases the toxic effects of Thiram.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS	CAS NO.	WT.%
Tetramethylthiuram disulfide (active ingredient)	137-26-8	98.5
Inert Ingredients	Proprietary	1.5

SECTION 4: FIRST AID MEASURES

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 eyes open and rinse thoroughly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing the 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, dyspnea.

SECTION 5: FIRE FIGHTING MEASURES

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. Not for use or storage around the home. Protect from excess heat. Store in original container only. Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Prevent eye and skin contact. Do not breathe dusts, mists or aerosols. Use only with adequate ventilation and appropriate protective equipment. Carefully open containers. Immediately remove and launder contaminated clothing before re-use. Wash hands before eating, drinking, smoking 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.

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. Do not apply where run-off is likely to occur. Do not contaminate water when disposing of equipment washwaters. Apply this product only as specified on the product label.

SECTION 8: EXPOSURE CONTROLS and PERSONAL PROTECTION

INGREDIENTS	CAS NO.	EXPOSURE LIMITS
Tetramethylthiuram disulfide (active ingredient)	137-26-8	5 mg/m ³ TWA-PEL 0.05 mg/m ³ (IFV)TWA-TLV (IFV=inhalable fraction + vapor)
Inert Ingredients	Proprietary	15 mg/m ³ PEL-TWA (total dust) 2 mg/m ³ TLV-TWA (respirable dust)

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. 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: Use with appropriate local or general exhaust to maintain exposures below exposure limits.

PROTECTIVE CLOTHING: Rubber or other impervious gloves are required. Impervious apron, boots and other clothing are recommended if needed to prevent contact or if splashing is possible.

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

APPEARANCE AND ODOR: Creamy white powder. No odor.

BOILING POINT (@760 mmHg): Decomposes

VAPOR PRESSURE (@ 20 c mm Hg): Negligible

VOLATILE: 0%

EVAPORATION RATE: Not applicable

COEFFICIENT of WATER/OIL: Not available

FLASH POINT: Not applicable

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

MELTING POINT @ 760 mmHg): 135°C/275°F (minimum)

SPECIFIC GRAVITY (H₂O=1): Bulk density - 0.350 g/cc

VAPOR DENSITY (Air=1): Not applicable

SOLUBILITY IN WATER: Partially (30 mg/liter at room temp)

pH: 6.5% (4% aqueous suspension)

METHOD: Not applicable

AUTOIGNITION TEMPERATURE: Not available

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. May be slightly absorbed through the skin based on animal studies.

INHALATION: Dust may cause mucous membrane and respiratory irritation with coughing, sneezing, 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 ACGIH, NTP, IARC or OSHA.

CHRONIC EFFECTS of OVEREXPOSURE: Prolonged exposure may cause raised, reddened and itching of the skin, dermatitis and thyroid gland enlargement. Thiram has been shown to cause irritation to the stomach lining, blood changes (decreased red blood cells and hemoglobin concentration) and liver and kidney damage in tests with laboratory animals. 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	2.6 g/kg oral rat >5 gm/kg dermal rat >2 gm/kg dermal rabbit *	4.42 mg/L/4 hr rat *

* Taminco Proprietary Study

SECTION 12: ECOLOGICAL INFORMATION

ENVIRONMENTAL PRECAUTIONS: This product is toxic to fish. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water by cleaning of equipment or disposal 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 this label.

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. Improper disposal of excess pesticide, spray mixtures 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 Environmental Control Agency or the 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, by incineration or by other procedures approved by state/provincial and local authorities. If burned, stay out of smoke.

This product is a hazardous waste in the United States, RCRA Waste Code U244.

Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

SECTION 14: TRANSPORTATION INFORMATION

DOT SHIPPING DESCRIPTION: UN3077, Environmentally Hazardous Substance, Solid, N.O.S. (Thiram), 9, PG III, RQ

DOT HAZARD CLASSIFICATION: Class 9 (Miscellaneous Hazardous Material)

DOT LABELS REQUIRED (49CFR 172.101): Class 9

UN NUMBER: UN3077

REPORTABLE QUANTITY: 10 lbs (4.54 kg.)

SECTION 15: REGULATORY INFORMATION

OSHA HAZARD CLASSIFICATION: Irritant, 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	98.5

CERCLA HAZARDOUS SUBSTANCE (40CFR116): Thiram

REPORTABLE QUANTITY: 10 lbs (4.54 kg). Product RQ = 10.2 lbs (4.64 kg)

EPA TSCA INVENTORY STATUS: All chemical components are listed on TSCA inventory

STATE R-T-K COMPOSITION INFORMATION

COMPONENT	CAS #	WT%	PA	NJ
Thiram	137-26-8	98.5	Y	Y

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

CANADIAN ENVIRONMENTAL PROTECTION ACT: All chemical components are listed on the Canadian Domestic Substances List.

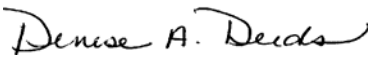
WHMIS CLASSIFICATION: Toxic material causing other toxic effects (Class D-Subdivision 2, Subdivision B)

This MSDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the MSDS contains all of the information required by the CPR.

SECTION 16: OTHER INFORMATION

HMIS HAZARD RATINGS: Health 2 Flammability 1 Reactivity 0
0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe

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, Inc. 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:** 06/27/08
Denese A. Deeds, CIH
IH&SC, Inc.

MSDS updated on 05/08/95	Revised to ANSI Standard Format
MSDS updated on 04/14/00	Revised Sections 2, 6, 7, 11, 13, 14, 15, and 16
MSDS updated on 02/20/04	Revised Header, Sections 2,3,4,7,8,11, 12 and 13
MSDS updated on 07/07/06	Revised Section 11 (toxicological data)
MSDS updated on 02/11/08	Header: Updated address and phone number
MSDS updated on 06/30/08	Section 1, 2, 3, 4 format changes, 8 updated exposure limits, 11 added chronic toxicity data