Safety Data Sheet

TMTD

1. IDENTIFICATION OF SUBSTANCE / COMPANY INFORMATION

Chemical Name: Tetramethyl thiuram disulfide
Synonyms: Accelerator TMTD, THIURAD, THIRAM, Bis(dimethyldithiocarbamoyl) disulfide
CAS #: 137-26-8
Formula: C_{6}H_{12}N_{2}S_{4}
Chemical Family: Accelerator
Supplier: SunBoss Chemicals Corp.
Address: 8-110 West Beaver Creek Road, Richmond Hill, ON L4B 1J9
Telephone: 905-707-3433
Fax: 905-707-7393

Emergency Information: After normal hours call Chemtrec at 1-800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS - No</th>
<th>Weight %</th>
<th>UN No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetramethylthiuram Disulfide</td>
<td>137-26-8</td>
<td>&gt; 97</td>
<td>205-286-2</td>
</tr>
<tr>
<td>Ethoxylated Alcohols [-3mm-grs ONLY]</td>
<td>68439-50-9</td>
<td>≤ 2</td>
<td>500-213-3</td>
</tr>
<tr>
<td>White Mineral Oil (powder only)</td>
<td>8042-47-5</td>
<td>1 - 2</td>
<td>232-455-8</td>
</tr>
</tbody>
</table>

Symbol(s): Xn, N
Risk Phrase(s): R20/22, R36/37/38, R48/22, R51/53

3. HEALTH HAZARDS INFORMATION

EMERGENCY OVERVIEW

Signal Word: WARNING!
Harmful by inhalation and if swallowed!
Inhalation and ingestion may cause alcohol intolerance (Antabuse Effect).
Irritating to eyes, respiratory system and skin.
Harmful: danger of serious damage to health by prolonged exposure if swallowed.
Toxic to aquatic organisms may cause long-term adverse effects in the aquatic environment.

Potential Health Effects
Inhalation: Exposure to dust particles generated from this material may cause irritation of the respiratory tract. Inhalation may cause alcohol intolerance.
Ingestion May cause alcohol intolerance (Antabuse Effect). May cause headache, dizziness, nausea, vomiting and gastrointestinal irritation.

Skin contact May cause an allergic skin reaction. May be absorbed through the skin and produce effects similar to those caused by inhalation and/or ingestion.

Eye Contact Causes mild eye irritation. Signs/symptoms can include redness, swelling, pain and tearing.

4. EMERGENCY FIRST AID PROCEDURES

Inhalation Remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get immediate attention.

Ingestion If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

Skin Immediately flush skin with plenty of water and soap for at least 15 minutes and get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes Immediately flush with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Note to Physician Treat symptomatically. Exposure by ingestion, inhalation or skin absorption may cause alcohol intolerance (Antabuse Effect).

5. FIRE AND EXPLOSION HAZARD MEASURES

Flammability Not determined

Flash Point 280°F / 138°C

Flash Point Method Pensky-Martens Open Cup

DOT Category RQ, UN 3077, Environmentally Hazardous Substance, Solid, N.O.S., (Tetramethylthiruam Disulfide), 9, III

Extinguishing Media Use water fog, carbon dioxide, foam or dry chemical.

Auto Ignition Temperature Not determined

Flammable Limits Not determined

Special Fire Fighting Procedures Fight fire from a safe distance and from a protected location. Use water spray to cool fire exposed surfaces. Decomposition in fire may produce toxic gases. Do not allow runoff to enter waterways.

Special Protective Equipment Full protective clothing and approved self-contained breathing apparatus required for fire-fighting personnel

Unusual Fire and Explosion Hazards Toxic emissions may result if product is involved in a fire.
6. ACCIDENTAL RELEASE MEASURES

Procedures
Isolate the area. Turn off/remove all potential sources of ignition. Work only with non-sparking tools and equipment. Wear gloves.

Clean up Methods
Scoop up and remove solids. Place spilled material in a closable container for hazardous waste disposal. Do NOT spread spilled product with water.

7. HANDLING AND STORAGE

Handling
Avoid contact with eyes, skin and clothing. Avoid generation of breathing dust. Wash thoroughly with soap and water after handling. Wash hands before eating, drinking, chewing of gum, using tobacco or using the toilet. Reclose containers of unused product. Keep containers tightly closed when not in use. Do not reuse this container.

Storage
Store closed containers in a cool, dry, well-ventilated area. Store away from strong oxidizing materials. Avoid exposure to direct sunlight.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls
Avoid dust generation. Ensure good ventilation and local exhaustion of the working area as necessary to control any air contaminants to within their exposure limits. Eliminate ignition sources.

Exposure Limits

<table>
<thead>
<tr>
<th>Substance</th>
<th>ACGIH (TWA)</th>
<th>OSHA (TWA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetramethyl thirum Disulfide</td>
<td>1 mg/m³ (total dust)</td>
<td>5 mg/m³ (8H OEL)</td>
</tr>
<tr>
<td>White Mineral Oil</td>
<td>5 mg/m³</td>
<td>5 mg/m³</td>
</tr>
</tbody>
</table>

Respiratory
Use in a well-ventilated area. Use approved NIOSH respiratory protection if TLV exceeded or if overexposure is likely. Appropriate respiratory protection shall be worn when applied engineering controls are not adequate to protect against inhalation exposure.

Eyes
Wear safety glasses or goggles to protect against exposure.

Skin
Normal work coveralls. Launder contaminated clothing before reuse.

Gloves
Use gloves as a standard industrial handling procedure. Appropriate chemical resistant gloves should be worn.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
White powder or granules

Odour
Very slight

Specific Gravity
143 kg/m³ @ 20°C
Density: 1.29 g/cm³

Bulk Density: 1425 kg/m³ @ 20°C

Solubility in water: INSOLUBLE

pH: Not applicable

Other Solubility: Soluble in chloroform, acetone and benzene - slightly soluble in carbon tetrachloride and ethyl alcohol

Boiling point: Not determined

Melting Point: 142°C min

Molecular Weight: 240.41

Molecular Formula: C₆H₁₂N₂S₄

10. STABILITY AND REACTIVITY

Chemical Stability: This material is stable when stored at room temperature in closed, original container. Stable under normal conditions of handling, use and transportation.

Conditions to avoid: Keep away from heat, sparks, flame and exposure to heat and humidity.

Incompatibility: Avoid contact with acidic, basic or oxidizing agents.

Hazardous Polymerization: Will not occur

Hazardous Decomposition Products: Carbon monoxide, Oxides of nitrogen and sulphur.

Additional Guidelines: None

11. TOXICOLOGICAL INFORMATION

Acute oral LD₅₀ (mg/kg): 1080 mg/kg - Rat

Acute Dermal LD₅₀ (mg/kg): >7940 mg/kg - Rabbit

Acute Inhalation LC₅₀ (mg/l): 500 mg/m³ - Rat

Principle routes of Exposure: Dermal - skin. Inhalation.

Ingestion: May cause alcohol intolerance (Antabuse Effect). May cause headache, dizziness, nausea, vomiting and gastrointestinal irritation.

Skin contact: May cause an allergic skin reaction. May be absorbed through the skin and product effects similar to those caused by inhalation and/or ingestion.

Inhalation: Exposure to dust particles generated from this material may cause irritation of the respiratory tract. Inhalation may cause alcohol intolerance.

Eye Contact: Causes mild eye irritation. Signs/symptoms can include redness, swelling, pain and tearing.
Aggravated Conditions
Alcohol consumption problems. Dermal ailments.

Carcinogenicity
Both negative and positive results have been found in standard tests using bacteria. Negative, positive and equivocal results in have been found in standard in vitro and in vivo tests using animals, animal and bacterial cells. This product or one of its ingredients present at 0.1% or more, is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC or OSHA.

Primary Irritation Effect
Practically non-irritating to skin and eyes. Probable skin sensitizer.

Genotoxicity
Both positive and negative effects have been reported in standard tests using animals and animal cells.

Reproductive/Developmental Toxicity
Animal studies have shown some adverse effects - low birth weight of pups, maternal toxicity - on female animals. Chronic animal studies have shown this material to cause reproductive effects, blood effects and organ weight changes. Some animal studies have shown adverse effects on fetal development.

12. ECOLOGICAL INFORMATION

Acute Fish Toxicity
96Hr LC50 Rainbow Trout 0.13 mg/l
96Hr LC50 Bluegill Sunfish 0.13 mg/l
96Hr LC50 Guppy 0.27 mg/l

Acute Crustacean Toxicity
48Hr LC50 Daphnia Magna 0.21 mg/l

Octonal/Water Coefficient
1.82 log P

Chemical Fate Information
Hydrolysis Half-life: 9.5 hrs @ pH 3.5 108 hrs @ pH 5.7 1123 hrs @ pH 7.0 3316 hrs @ pH 8.0

Other Information
Tests indicate this material will not bio-accumulate or persist in the environment.

13. DISPOSAL CONSIDERATIONS

Waste Disposal
This product, if disposed as received, is a listed hazardous waste. Bury in a licensed landfill or burn in an approved incinerator according to federal, state and local regulations. Treatment, storage, reuse and disposal of the waste material must conform to all applicable federal, state and local laws and regulations.

Contaminated Packaging
This bag may contain residue of a hazardous material. Some authorities may regulate such containers as hazardous waste. Dispose of container according to national or local regulations.
14. TRANSPORT INFORMATION

DOT

UN/IN No. 3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (Tetramethy lthiruam Disulfide)
Hazard Class 9
Packing Group III
Reportable Quantity (RQ) 10 lbs
Note: The (RQ) for this product is 10 lbs. Any package containing 10 lbs or more, must be labelled, marked and shipped as hazardous material. Single packages under 10 lbs are considered non-hazardous for transport.

IATA

UN/IN No. 3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (Tetramethy lthiruam Disulfide)
Hazard Class 9
Packing Group III
Special Markings Symbol (fish and tree)
Note: EFFECTIVE 01/01/2009: Subject to ICAO/IATA ENVIRONMENTALLY HAZARDOUS SUBSTANCE marking requirement [IATA 7.1.6.3] Passengers: Packaging instruction 911 (No restricted quantity by package), Cargo: Packaging instruction 911 (No restricted quantity by package)

IMDG

UN/IN No. 3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (Tetramethy lthiruam Disulfide)
Hazard Class 9
Packing Group III
Marine Pollutant Yes
Special Markings: Symbol (fish and tree)

TDG (Canada) See DOT
15. REGULATORY INFORMATION

LABELLING ACCORDING TO DIR 67/548 EEC

EC Number: 205-286-2
Classification based on: TESTS

HARMFUL (Xn)  DANGEROUS FOR THE ENVIRONMENT (N)

CLASSIFIED ACCORDING TO DIRECTIVE 199/45/EC

Risk Phrases:
- R20/22 - Harmful by inhalation and if swallowed.
- R36/37/38 – Irritating to skin, eyes and respiratory system.
- R48/22 – Harmful: danger of serious damage to health by prolonged exposure if swallowed.
- R50/53 – Very toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

Safety Phrases:
- S24/25 – Avoid contact with skin and eyes.
- S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S36/37 – Wear suitable protective clothing and gloves.
- S60 – This material and its container must be disposed of as a hazardous waste.
- S61 – Avoid release to the environment. Refer to Special Instructions/Safety Data Sheet.

FDA Status 21 CFR
TMTD is regulated for use under the following sections of FDA 21 CFR:
- 175.105 - Components of adhesives.
- 177.2600 - Rubber articles intended for repeated use in food contact.

TSCA
Listed

Canadian DSL
Listed

EINECS/ELINCS
Listed

US Regulations
SARA Section 302
Not Applicable/None

SARA 311/312 Hazard Categories
Immediate Delayed

SARA 313 Chemical
Listed as “Thiram”

RCRA Status
RCRA Hazardous Waste U244 (Reportable Quantity is 10 lbs (40 CFR 302))

Canadian Regulations

WHMIS Hazard Class
16. HAZARD RATING SYSTEM

NFPA Rating (Scale 0-4)

<table>
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<th>REACTIVITY</th>
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<td>0</td>
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<td>3</td>
<td>0</td>
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HMIS Classification (Scale 0-4)

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17. OTHER INFORMATION

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. SunBoss Chemicals Corp. extends no warranty and assumes no responsibility for the accuracy or sufficiency of the content and expressly disclaims all liability for reliance thereon. This material safety data sheet provides guidelines for the safe handling of this product; it does not and cannot advise on all possible situations, therefore, your specific use of this product should be evaluated to determine if additional precautions are required. It is the responsibility of the user to comply with all Federal, State and local laws and regulations. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

Abbreviations and Acronyms

ACGIH: American Conference of Governmental Industrial Hygienists Inc.
CAS: Chemical Abstracts Service (Division of American Chemical Society)
DOT: Department of Transportation (USA)
EINECS: European Inventory of Existing Commercial Chemical Substances
HMIS: Hazardous Materials Identification System (USA)
IARC: International Agency for Research on Cancer
IATA: International Air Transport Association
IMDG: International Marine Code for Dangerous Goods
LD50: Lethal Dose Medium
LC50: Lethal Concentration Medium
EC50: Effective Concentration Medium
NIOSH: National Institute for Occupational Safety and Health
NFPA: National Fire Protection Association (USA)
NPRI: National Pollutant Release Inventory (Canada)
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration (USA)
TDG: Transportation of Dangerous Goods (Canada)
TLV: Threshold Limit Value
TWA: Time Weighted Average
WHMIS: Workplace Hazardous Materials Information Systems (Canada)
Revision number: 5
Date of Issue: September 3, 2014
Changes: Number and format of headings changed; Updates to Sections 1: Identification of Substance - EC information added; 2: Health Hazards Information; 8: Specific Personal Protection Equipment - pictograms added; 14: Transport information - pictograms added; 15: Regulatory information - EC information added; 16: Hazard Rating System - table added; 17: Abbreviations and Acronyms added