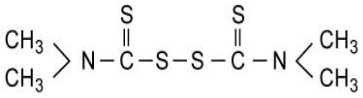
SunBoss Chemicals Corp.

Technical Data Sheet

TMTD



Tetramethyl thiuram disulfide

CAS Number: 137-26-8

Molecular weight: 240.41

Molecular formula: $C_6H_{12}N_2S_4$

PRODUCT INFORMATION

PRODUCT SPECIFICATIONS		GRANULES	OIL POWDER	POWDER
Appearance		White granules	White oil powder	White powder
Melting Point	°C min	142.0	142.0	142.0
Loss on drying	% max	0.40	0.40	0.40
Ash	% max	0.30	0.40	0.40
Residue on sieve (63µm)	% max	-	0.50	0.50
Residue on sieve (150µm)	% max	-	0.10	0.10
Oil content	%	-	1.0-2.0	-
Typical properties				
Density	g/cm³	1.29		
Packaging				
Bag		25kg (55 lbs)		
Pallet		500kg or 600kg (1102 lbs or 1323 lbs)		

FUNCTION

TMTD can be used as a single accelerator, as a secondary accelerator or as a sulphur donor in most sulphur-cured elastomers.

APPLICATIONS AND PROPERTIES

- TMTD is scorchy and produces fast cure rates.
- Produces an excellent vulcanization plateau, with good heat aging and compression set resistance in sulphurless and EV cure systems.
- Good colour retention is obtained in non-black vulcanization.
- A valuable secondary accelerator of EPDM.
- May be used as a retarder in the vulcanization of polychloroprene rubber with ETU.
- May be used as a bactericide and pesticide.
- TMTD has no odour and is non poisonous.
- May be irritating to the skin and respiratory tract.
- TMTD is soluble in chloroform, acetone and benzene.
- Almost insoluble in carbon tetrachloride and ethyl alcohol and insoluble in water or gasoline.
- 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.

STORAGE

Material should be stored in a tightly closed container in a cool, dry, well ventilated area. The maximum recommended storage life is 2 years when stored under normal conditions.

HANDLING PRECAUTIONS

For detailed information on toxicological properties and handling precautions, please refer to the current Safety Data Sheet. This information is available by request from **SunBoss Chemicals Corp.**

[Revised: November 6, 2014 by kk]

SunBoss Chemicals Corp.

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Safety Data Sheet

TMTD

1. IDENTIFICATION OF SUBSTANCE / COMPANY INFORMATION

Chemical Name	Tetramethyl thiuram disulfide
Synonyms	Accelerator TMTD, THIURAD, THIRAM,Bis(dimethyldithiocarbamoy) disulfide
CAS #	137-26-8
Formula	$C_6H_{12}N_2S_4$
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

Component	CAS - No	Weight %	UN No.
Tetramethylthiuram Disulfide	137-26-8	> 97	205-286-2
Ethoxylated Alcohols [-3mm-grs ONLY]	68439-50-9	≤ 2	500-213-3
White Mineral Oil (powder only)	8042-47-5	1 - 2	232-455-8
	Symbol(s)	**Risk Phrase(s)**	
	Xn, N	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	ACGIH (TWA)	OSHA (TWA)
Tetramethyl thiruam Disulfide	1 mg/m^3 (total dust)	5 mg/m^3 (8H OEL)
White Mineral Oil	5 mg/m^3	5 mg/m^3



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	$C_6H_{12}N_2S_4$

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 LD 50 (mg/kg)	1080 mg/kg - Rat
Acute Dermal LD 50 (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

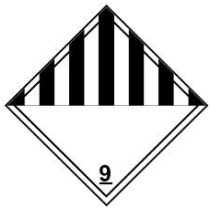
Acute Fish Toxicity	96Hr LC50 Rainbow Trout 0.13 mg/l 96Hr LC50 Bluegill Sunfish 0.13 mg/l 96Hr LC50 Guppy 0.27 mg/l
Acute Crustacean Toxicity	48Hr LC50 Daphnia Magna 0.21 mg/l
Octonal/Water Coefficient	1.82 log P
Chemical Fate Information	Hydrolysis Half-life: 9.5 hrs @ pH 3.5 108 hrs @ pH 5.7 1123 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

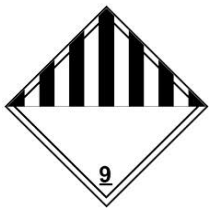
DOT



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

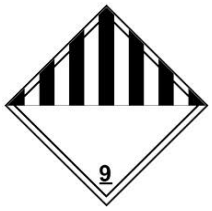
Note: The (RQ) for this product is 10 lbs. Any package containing 10 lbs or more, must be labelled, marked and shipped as hazardous material. Single packages under 10 lbs are considered non-hazardous for transport.

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

D2A VERY TOXIC MATERIALS; D2B TOXIC MATERIALS/Materials Causing Other Toxic Effects

NPRI Not Listed [Canada]

16. HAZARD RATING SYSTEM

NFPA Rating (Scale 0-4)

0 - Minimal Hazard
1 - Slight Hazard
2 - Moderate Hazard
3 - Serious Hazard
4 - Severe Hazard

HEALTH	**2**
FIRE	**1**
REACTIVITY	**0**

HMIS Classification (Scale 0-4)

0 - Minimal Hazard
1 - Slight Hazard
2 - Moderate Hazard
3 - Serious Hazard
4 - Severe Hazard

HEALTH	**2**
FIRE	**1**
REACTIVITY	**0**

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: Internal 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)

18. REVISION DATE

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