1. IDENTIFICATION OF SUBSTANCE / COMPANY INFORMATION

Chemical Name                     Tetraethyl thiruam Disulfide
Synonyms                          Dis(diethylthiocarbamoyl) disulfide, Disulfiram, Accelerator TETD
CAS #                             97-77-8
Formula                          C₁₀H₂₀N₂S₄
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>EC No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetraethylthiuram Disulfide</td>
<td>97-77-8</td>
<td>≥ 98</td>
<td>202-607-8</td>
</tr>
<tr>
<td>Ethoxylated Alcohols [-3mm-grs only]</td>
<td>68439-50-9</td>
<td>≤ 2</td>
<td></td>
</tr>
</tbody>
</table>

Symbol(s)                         Xi, N
Risk Phrase(s)                    R22, R36/37/38, R43, R50/53

3. HEALTH HAZARDS INFORMATION

EMERGENCY OVERVIEW

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

### Skin contact
May cause sensitization with skin contact. May cause skin defatting with prolonged exposure.

### 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 medical 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** | Remove contaminated clothing, wash skin with water, using soap if available. Remove contaminated clothing and launder before reuse. |
| **Eyes** | In case of contact, immediately flush eyes with plenty of water – eyelid should be held away from eyeball to ensure thorough rinsing. Seek medical attention if irritation persists. |

### Note to Physician
Provide symptomatic/supportive care as necessary. Treatment based on sound judgment of physician and individual reactions of patient. Observe for signs of respiratory distress.

## 5. FIRE AND EXPLOSION HAZARD MEASURES

| **Flammability** | Not determined |
| **Flash Point** | Not determined |
| **Flash Point Method** | Not determined |
| **DOT Category** | Not regulated |
| **Extinguishing Media** | Water spray, water mist, foam, dry chemical powder. Water jet is an unsuitable extinguishing method. |
| **Auto Ignition Temperature** | 240 – 280°C |
| **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 surface. Decomposition in fire may produce toxic gases. Do not allow runoff to enter waterways.

### Special Protective Equipment
Fire fighters should wear full protective clothing, including self-contained breathing equipment.

### Unusual Fire and Explosion Hazards
Toxic emissions may result if product is involved in a fire: hydrogen cyanide (HCN), sulphur dioxide (SO2), nitrous gases (NOx).
6. ACCIDENTAL RELEASE MEASURES

Procedures
Clothing suitable to avoid skin contact, local ventilation and dust mask recommended.

Clean up Methods
Sweep and place into a suitable container. Avoid generation of dust. Do not use water to remove spilled material.

7. HANDLING AND STORAGE

Handling
Avoid contact with skin. Do not breathe dust. Provide appropriate exhaust ventilation where dust particle form.

Storage
Store closed containers in a cool, dry, well-ventilated area.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls
Avoid dust generation. Ensure good ventilation and local exhaust of the working area as necessary to control any air contaminants to within their exposure limits. Adequate ventilation should be provided to keep dust concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with the applicable air pollution control regulations. Eliminate ignition sources.

<table>
<thead>
<tr>
<th>Exposure Limits</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetraethylthiuram Disulfide</td>
<td>2mg/m³ TWA</td>
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</tbody>
</table>

Respiratory
Appropriate respiratory protection shall be worn when applied engineering controls are not adequate to protect against inhalation exposure. Firefighting: Use a Positive Pressure Demand Full Face Self Contained Breathing Apparatus.

Eyes
Wear safety glasses or goggles to protect against exposure. Eye protection is not required during typical product use conditions.

Skin
Normal work coveralls. Launder contaminated clothing before reuse.

Gloves
Use gloves as a standard industrial handling procedure. All cleanable impervious glove types are acceptable.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Light yellow powder, crystal powder or granules

Odour
Slightly amine

Specific Gravity
Not determined
Density 1.29 g/cm³
Bulk Density 340-380 kg/m³
Solubility in water INSOLUBLE
pH Not applicable
Other Solubility Soluble in benzene, acetone, chloroform and CS₂
Boiling point Not relevant
Melting Point 66°C min
Molecular Weight 296.5
Molecular Formula C₁₀H₂₀N₂S₄

10. STABILITY AND REACTIVITY

Chemical Stability Stable under recommended storage and handling conditions.
Conditions to avoid No specific recommendations
Incompatibility Oxidizing agents. Strong acids.
Hazardous Polymerization Will not occur
Hazardous Decomposition Products Carbon Monoxide, Oxides of nitrogen and sulphur.
Additional Guidelines During the vulcanization process, traces of carcinogenic N-nitrosamines may be formed from decomposition products (amines) in the presence of nitrosating agents.

11. TOXICOLOGICAL INFORMATION

Acute oral LD₅₀ (mg/kg) 1,850 mg/kg – Rat
                      1,990 mg/kg - Mouse
Acute Dermal LD₅₀ (mg/kg) Not determined
Acute Inhalation LC₅₀ (mg/l) Not determined
Principle routes of Exposure Dermal – skin, eye
Ingestion Danger of serious damage to health by prolonged exposure if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Skin contact May cause sensitization with skin contact. May cause skin defatting with prolonged exposure.
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

Carcinogenicity Negative in standard tests using bacteria and/or yeast 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. NOTE: May react with nitrosating agents during rubber vulcanization to form nitrosamines. Some nitrosamines are suspect human carcinogens.

Primary Irritation Effect Practically non irritating

Genotoxicity Ames test: not mutagenic.

Reproductive/Developmental Toxicity No evidence of teratogenicity in animal studies using rats, mice and/or hamsters.

12. ECOLOGICAL INFORMATION

Acute Fish Toxicity 96h-LC50 (Poecilia reticulata): 0.91-0.32 mg/l.
96h-LC50 (Poecilia reticulata): 1.32 mg/l (Lit.)

Acute Crustacean Toxicity 48Hr LC50 Daphnia Magna = 0.12 mg/l.

Octonal/Water Coefficient 3.88 log P

Chemical Fate Information Not determined

Other Information Highly toxic to fish and aquatic invertebrates.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Recycle where possible. Incinerate according to local regulation. Do not discharge into the drains/surface water/groundwater.

Contaminated Packaging If empty container retains product residues, all label precautions must be observed. Store away from ignition sources. Transport with all closures in place. Dispose of the container according to national and local regulations.

14. TRANSPORT INFORMATION

DOT Not Regulated

IATA

![UN 3077]

UN/ID No. UN 3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (Tetraethyl thiuram Disulfide)

Class 9
Packing Group III
Marine Pollutant: Yes
Note: Subject to special marking requirement (IATA 7.1.6.3)

IMDG

UN/ID No.: UN 3077
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., (Tetraethyl thiuram Disulfide)
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: 202-607-8
Classification based on: TESTS

IRRITANT (Xi) DANGEROUS FOR THE ENVIRONMENT (N)

CLASSIFIED ACCORDING TO DIRECTIVE 199/45/EC

Risk Phrases:
R22 – Harmful if swallowed.
R36/37/38 – Irritating to eyes, respiratory system and skin.
R43 – May cause sensitization by skin contact.
R50/53 – Very toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

Safety Phrases:
S22 – Do not breathe dust.
S24 – Avoid contact with skin.
S36/37/39 – Wear suitable protective clothing, gloves, eye, and face protection.

FDA Status 21 CFR
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 determined.
SARA 311/312 Hazard Categories Immediate Delayed
SARA 313 Chemical Not determined.
RCRA Status Not a RCRA waste

Canadian Regulations
WHMIS Hazard Class

D2B TOXIC MATERIALS/Material Causing Other Toxic Effects

NPRI Not Listed

16. HAZARD RATING SYSTEM

NFPA Rating (Scale 0-4)

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FIRE</th>
<th>REACTIVITY</th>
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<td>0 - Minimal Hazard</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 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
17. REVISION DATE

Revision number: 5
Date of Issue: September 9, 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