

MATERIAL SAFETY DATA SHEET

(According to 93/112/EC)

RUBATOR DTMT

| 1. PRODUCT IDENTIFICATION | | |
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| Company: GENERAL QUÍMICA S.A. Address: 01213 COMUNIÓN-LANTARÓN ÁLAVA Tel. # 945 332 145 Fax # 945 332 888 | Commercial name: RUBATOR DTMT Chemical name: Tetramethylthiuram disulphide. | |
| | Synonyms: Thiram, bis (dimethylthiocarbamoyl) disulfide, tetramethylthioperoxydicarbonic diamide. | |
| | Molecular formula: C ₆ H ₁₂ S ₄ N ₂ | CAS # 137-26-8 |
| Instituto Nacional de Toxicología: Emergency telephone: (91) 562 04 20 | EC (EINECS) # 205-286-2 | Annex I (Dir. 67/548EEC) # 006-005-00-4 |

| 2. COMPOSITION | | | |
|---|---------|---|--------|
| General composition: Tetramethylthiuram disulphide with a degree of purity over 96%. | | | |
| Dangerous components: | Range % | Classification | |
| | | R | S |
| Tetramethylthiuram disulphide | 96% | Mut. Cat. 3; R68 Xn; R20/22 Xi; R36/37 R43 | S36/37 |

| 3. HAZARD IDENTIFICATION | |
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| PHYSICAL / CHEMICAL | TOXICITY/SYMPTOMS |
| The product may decompose in acid media. | Inhalation: Inhalation of dust may cause irritation of the respiratory tract, mucous membranes. Ingestion/aspiration: Ingestion causes nausea, vomiting and diarrhoea. Paralysis may be developed. Contact skin/eyes: Skin contact may cause erythema, urticaria and allergic eczema in sensitive individuals. Prolonged contact with eyes may cause irritation, tearing and sensitivity to light. General toxic effects: The product is harmful by inhalation and ingestion. Irritating to respiratory system and eyes. Contact with skin may cause sensitization. Possible risks of irreversible effects. |
| When heated it emits toxic and irritant fumes (SO _x , NO _x). | |
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4. FIRST AID

Inhalation: Remove the affected person to fresh air. If breathing is difficult give oxygen. Keep the affected person quiet and maintain normal body temperature. Call for medical attention.

Ingestion/aspiration: If the affected person is conscious have drink water and induce vomiting. Gastric lavage is recommended. Treatment thereafter is symptomatic; avoid fats and oil, which enhance absorption; ethyl alcohol is rigorously prohibited for at least 10 days. Inform doctor if patient has drunk alcohol within 48 hours. Effects may be delayed, keep the affected person under observation.

Contact skin/eyes: In case of contact with product, wash skin with plenty of water and soap. In contact with eyes, hold eyelids open and immediately flush with plenty of water for at least 15 minutes. Remove and isolate contaminated clothing and shoes. Call medical attention.

General measures: Call for medical attention.

5. FIRE-FIGHTING MEASURES

Extinguishing agents: Dry chemicals, foam, CO₂, water spray.

Non suitable extinguishing agents: Water applied directly may disperse the material.

Combustion products: CO₂, H₂O; CO (in defect of oxygen), SO_x, NO_x.

Special measures: Apply cooling water to sides of containers exposed to flames until well after fire is out. Move containers from fire area if you can do it without risk. For massive fire in cargo area, use unmanned hose holder or monitor nozzles to avoid risks. If the fire is impossible to control, withdraw from area and let fire burn. Use water spray to reduce vapours. Consult and follow existing emergency standard procedures.

Special hazards: The product itself does not burn or burns with difficulty. The product may burn emitting toxic and irritating fumes. Container may explode violently in heat of fire.

Protective equipment: Heat-resistant suit and gloves. Self-contained breathing apparatus in presence of high concentrations of vapours or fumes.

6. ACCIDENTAL RELEASE MEASURES

Precautions for the environment: Avoid dispersion. Isolate discharged material and keep material out of water sources.

Personal precautions: Keep unnecessary people away; isolate hazard area and deny entry. Avoid dust inhalation and contact with the product. Ventilate closed spaces before entering.

Cleanup methods: Remove the spilled product.
Small spillages: With clean shovel place material into clean, dry container.
Large spillages: Cover powder spill with plastic sheet to minimize spreading and remove the material as in small spills.

Personal protection: Wear suitable chemical protective clothing, gloves and full-face protective mask with filter in presence of powder.

7. HANDLING AND STORAGE

Handling:

General precautions: Do not smoke, drink, or eat during handling. Wear appropriate chemical protective clothing to avoid direct contact with the product. Eliminate all sources of ignition from handling areas. Avoid sparks or flames in hazard areas. Do not handle damaged containers unless wearing appropriate protective equipment. Good personal hygiene procedures must be practised.

Specific conditions: Good local exhaust ventilation. Protective mask with filter in presence of powder.

Uses: Accelerator for rubber vulcanization.

Storage:

Temperature and decomposition products: When heated it emits irritant toxic fumes.

Dangerous reactions: Hydrolysis in presence of acids.

Storage conditions: Properly labelled and sealed containers, placed in cool and well ventilated areas. Keep away from food and drink. Fire-fighting measures in storage areas.

Incompatible materials: Strong oxidizers and acids and mineral oils.

8. PERSONAL PROTECTION/EXPOSURE CONTROLS

Personal protection:

Respiratory protection: Full-face protective mask with filter in powdery ambient.

Eye protection: Safety goggles or face-shield where product or liquid containing product may contact the eyes.

Skin protection: Rubber gloves and appropriate chemical protective clothing in emergency procedures.

Other protective equipment: Showers and eye-washers in working area.

General precautions: Avoid long-term exposure, even to small quantities. Alcohol enhance toxic effects of the product (do not consume alcohol on a day when the product is used).

Specific hygiene measures: Washing/Showering facilities with a non-solvent based skin cleaner; hot water and soap must be provided and used. Overalls should be changed frequently and dry cleaned. Grossly contaminated clothing should be changed immediately. The condition of gloves should be checked before use, for signs of internal contamination. Use skin reconditioning cream after work.

Exposure controls:

TLV (ACGIH): TWA 1 mg/m³, A4 (Not classifiable as a human carcinogen).

PEL (OSHA): TWA 5 mg/m³

9. PHYSICAL AND CHEMICAL PROPERTIES

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| Appearance: Powder | pH: NP |
| Colour: White | Odour: |
| Boiling point: | Melting point: 145 °C |
| Flash point: 89 °C | Autoignition temperature: |
| Explosive properties: NP | Oxidizing properties: NP |
| Vapour pressure: NP | Density: 1.29 g/cm ³ at 20 °C |
| Surface tension: NP | Critical temperature: |
| Water solubility: Insoluble (30 mg/l) | Solubility: Ether, benzene, alcohol, acetone, chloroform, S ₂ C. |
| Other data: Molecular weight: 240.44 g/mol | |

10. STABILITY AND REACTIVITY

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| Stability: Stable at room temperature and under ordinary conditions of humidity or ventilation. Some deterioration occurs on prolonged exposure to air, heat or moisture. | Conditions to avoid: Humidity, flames or prolonged exposure to air. |
| Materials to avoid: Strong oxidants, acids and mineral oil. Mixture with copper products may produce black deposit on vegetation. Non-corrosive in dry state. | |
| Hazardous decomposition/combustion products: Decomposition products: When the product decomposes it emits toxic and irritating fumes. Combustion products: CO ₂ , H ₂ O; CO (in defect of oxygen), SO _x , NO _x . | |
| Polymerization risk: NP | Conditions to avoid: NP |

11. TOXICOLOGICAL INFORMATION

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| Routes of exposure: Contact with skin, eyes and inhalation. Ingestion is easy to prevent and not frequent, if it occurs, it may be dangerous. |
| Acute and chronic effects: The product is harmful by inhalation and ingestion. Irritating to respiratory system and eyes. Contact with skin may cause sensitization. Possible risks of irreversible effects. LC ₅₀ >4.42 mg/l/4H (inhalation-rat) / LD ₅₀ : 2600 mg/Kg (oral-rat) |
| Carcinogenicity: <u>IARC classification:</u> Group 3 (Not classifiable as to its carcinogenicity to humans) |
| Reproductive toxicity: There are data available that indicate that the product may cause adverse effects for reproduction. However from data cannot be to conclude that this chemical is toxic for reproduction of humans. TDL ₁ : 1200 mg/Kg (oral-rat): effects on fertility (post-implantation mortality) and fetus (fetotoxicity). |
| Medical conditions which increase hazard to exposure: Respiratory deficiencies and dermatological problems. |

12. ECOLOGICAL INFORMATION

Pollutant potential:

Persistence and degradability: Primary release of the product to the environment appears to be from its use as a fungicide. Persistence in soil depends on variables such as pH, soil type and concentrations of the product. It persists in soils for periods ranging from 2 days to more than 32 weeks. If released to soil, it will degrade by decomposition under acidic conditions possibly to dimethyldithiocarbamate. The product is degraded by microorganisms. In the atmosphere, vapour phase thiram may react with photochemically generated hydroxyl radicals.

Mobility/bioaccumulative potential: Thiram is relatively immobile in loamy sand, peat moss and black clay. It strongly adsorbs to soil and does not volatilize from wet or dry soil surfaces. Bioconcentration in aquatic organisms is not significant.

Ecotoxicological effects: Harmful to aquatic life in very low concentrations.

LC₅₀: 210 Tg/l/48h (*Daphnia magna*)

LC₅₀: 1 mg/l/96h (*Chlorella pyrenoidosa*)

13. DISPOSAL CONSIDERATIONS

Disposal methods (surplus): By dissolving in a flammable solvent and atomizing in a suitable combustion chamber equipped with an appropriate effluent gas cleaning device.

Waste: Industrial processes or other uses.

Disposal: Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Handling: Labelled and sealed containers. Minimize contact with skin.

EC provisions: Companies which recover, dispose, store, transport or handle waste should comply with Dir. 91/156/EEC on waste or other local, national or community provisions.

14. TRANSPORT INFORMATION

Special precautions: Stable at room temperature and during transport. Transport in properly sealed and labelled containers.

Additional information:

UN number: 3077

Hazard identification number: 90

Proper shipping name: ENVIROMENTALLY

HAZARDOUS SUBSTANCE, SOLID, N.O.S.

ADR / RID: Class 9. Classification code: M7. Packaging group: III

IATA-DGR: Class 9. Packaging group: III

IMDG: Class 9. Packaging group: III.

15. REGULATORY INFORMATION

CLASSIFICATION

Mut. Cat. 3; R68

Xn; R20/22

Xi; R36/37

R43

LABELLING

Symbols: Xn

Phrases R:

R20/22: Harmful by inhalation and if swallowed.

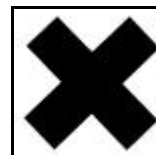
R36/37: Irritating to eyes and respiratory system.

R 68: Possible risks of irreversible effects.

R43: May cause sensitization by skin contact.

Phrases S:

S36/37: Wear suitable protective clothing and gloves.



Other regulations: This product is listed in TSCA Chemical Inventory (EPA). This product is according to French legislation, BGA (Germany) and FDA (USA) used in the manufacture of rubber intended to come into contact with foodstuffs.

16. OTHER INFORMATION

Data bases consulted:

EINECS: European Inventory of Existing Commercial Substances.
RTECS: US Dept. of Health & Human Services.
HSDB: US National Library of Medicine.
CHRIS: US Dept. of Transportation.

Legislation consulted:

Dir. 67/548/EEC of dangerous substances (including amendments and adaptations in force)
Dir. 88/379/EEC of dangerous preparations (including amendments and adaptations in force)
Dir. 91/689/EEC dangerous waste; Dir. 91/156/EEC waste management
Royal Decree 363/95: Regulation about notification of new substances and classification, packaging and labelling of dangerous substances.
European Agreement concerning the international carriage of dangerous goods by road (ADR).
Regulation on the international transport of dangerous goods on the railway. (RID)
International maritime code of dangerous goods. (IMDG)
International Civil Aviation Organization (ICAO) and International Air Transport Association (IATA) regulation pertaining to air shipment.

GLOSSARY:

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| CAS: Chemical Abstract Service | STEL: Short-term Exposure Limit |
| IARC: International Agency for Research on Cancer | IDLH: Immediately Dangerous to Life and Health |
| TLV: Threshold Limit Value | LD ₅₀ : Lethal Dose (Medium) |
| PEL: Permitted Exposure Level | LC ₅₀ : Lethal Concentration (Medium) |
| REL: Recommended Exposure Level | EC ₅₀ : Effective Concentration (Medium) |
| TWA: Time Weighted Average | TCL ₀ : Toxic Concentration Lower |
| | NP: Not pertinent |

The information given in this document has been compiled based on the best existing information sources, latest available knowledge and according to the current requirements on classification, packaging and labelling of hazardous substances. It does not imply the information is exhaustive or accurate in all cases. It is the user's responsibility to evaluate if the information contained in this Material Safety Data Sheet satisfies him/herself to the application of the information and/or the recommendations given for his/her own use.