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MATERIAL SAFETY DATA SHEET OF

PIRAM FORTE

1. IDENTIFICATION OF THE CHEMICAL PRODUCT AND COMPANY

Supplier: SHANGHAI MINGDOU AGROCHEMICAL CO., LTD

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Product name: PIRAM FORTE (THIRAM 80% WP)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formulation Type: Wettable powder

Active Ingredients: Thiram

Chemical Abstracts name: tetramethylthioperoxydicarbonic diamide

IUPAC name: tetramethylthiuram disulfide; bis(dimethylthiocarbamoyl) disulfide

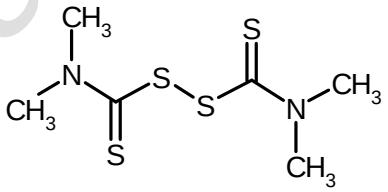
Chemical Family: dimethyldithiocarbamate

CAS NO. *137-26-8*

Molecular Formula: $C_6H_{12}N_2S_4$

Molecular Weight: 240.4

Structural Formula:



Composition:

INGREDIENT	CAS NO	PROPORTION
Thiram	*137-26-8*	80% Min
Inert ingredients	Not available	20% Max

Other ingredients determined not to be hazardous

3. HAZARDS INDENTIFICATION

Emergency overview: Caution! May be irritating to respiratory system, skin and eyes. May cause skin sensitization. May be harmful if inhaled, swallowed, or absorbed through skin.

Routes of entry: Inhalation, ingestion, contact with skin and eyes.

Health hazards:

Eye contact: May be irritating to eyes.

Skin contact: May cause irritation and possibly sensitization.

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).

Environmental hazards: Very toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

General: Have the product container, label or Material Safety Data Sheet with you when going for treatment. Tell the person contacted the complete product name, and the type and amount of exposure. Describe any symptoms and follow the advice given.

Skin contact: Wash skin with soap and water. Remove contaminated clothing. Wash clothing before re-use. Obtain medical attention if irritation persists.

Eye contact: Immediately flush eyes with water and continue washing for at least 15 minutes. Obtain medical attention.

Ingestion: If patient is fully conscious, give two glasses of water. Induce vomiting. Obtain medical attention immediately. Do not give milk, oily products, fat or alcohol. Do not give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air. Give artificial respiration if not breathing. Obtain medical attention.

Note to physician: No specific antidote. Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flash point: Not application.

Flammable limits:

LFL: Not determined.

UFL: Not determined.

Autoignition temperature: Not determined.

Hazardous combustion products: Decomposition products are toxic. Very high concentrations of this product suspended in air may present an explosion hazard.

Extinguishing media: Large fires—alcohol-type foam or universal-type foams. Small fires—CO_2, dry chemical, water spray.

Media to be avoided: Water jets.

Fire-fighting instructions: Evacuate area of all non emergency personnel. 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.

Protective equipment for firefighters: Firefighters should wear full emergency equipment and NIOSH approved positive pressure self-contained breathing apparatus.

6. ACCIDENT RELEASE MEASURES

Personal precautions: Wear suitable protective equipment., Avoid contact with eyes and skin.

Environmental precautions: Prevent from entering sewer system, surface water or soil.

Method for cleaning up: 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. Avoid dust formation. Observe government regulations.

7. HANDLING AND STORAGE

Handling: Read the label before use. Do not get in eyes, on skin, on clothing. Do not swallow. Avoid dispersion of dust to reduce fire and explosion potential. Do not eat, drink or smoke when handling.

Storage: Store in the closed, original container in a cool, well-ventilated area. Do not store for prolonged periods in direct sunlight. Store in a locked room or place away from children, animals, flood, feedstuffs, seed and fertilizers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits:

Thiram:

5 mg/m^3 TWA-PEL

1 mg/m^3 TWA-TLV

Engineering controls: Apply local exhaust ventilation at points of dust generation.

Personal protective equipment (PPE):

Respiratory protection: In the absence of engineering controls sufficient to maintain airborne concentrations below recommended occupational exposure limit values, appropriate respiratory protection should be utilized. The determination of appropriate respiratory protection is best performed, on a case by

case basis, taking into consideration the exposure conditions of the particular operation. Use an approved full-face air-purifying respirator. For emergency and other conditions where the exposure limit may be greatly exceeded, use an approved positive-pressure self-contained breathing apparatus. The respirator manufacturer should be consulted to ensure that the air-purifying cartridges utilized will provide adequate protection for the exposure conditions and period of wear concerned.

Hand protection: Chemical resistant protective gloves.

Eye protection: Safety glasses with side shields.

Skin protection: Wear protective clothing, such as long sleeves to minimize skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Powder.

Odor: Characteristic.

Solubility in water: Disperses in water.

Wetting time: ≤60s

Suspensibility: ≥65%

Wet sieve test (residue on 75μm sieve): ≤ 2%

10. STABILITY AND REACTIVITY

Chemical stability: Stable under normal conditions.

Conditions to avoid: Excessive heat.

Hazardous decomposition: 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.

Incompatible materials: Acids, oxidizers, copper.

Hazardous reactions: Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

The following information is for the active ingredient, Thiram.

Acute toxicity:

Oral: LD_{50} for rats 2600, mice 1500-2000 mg/kg.

Dermal: LD_{50} for rabbits >2000 mg/kg

Inhalation: LC_{50} for rats 4.42 mg/l air.

Irritant properties:

Skin: Slight skin irritant.

Eye: Moderate eye irritant.

Allergenic and sensitizing effects: Skin sensitizer (Guinea pig).

Chronic toxicity/Carcinogenicity: When administered to mice at the highest dose possible, thiram was not carcinogenic. Dietary levels as high as 125 mg/kg/day for 2 years did not cause tumors in rats. These data indicate that thiram is not carcinogenic.

Genetic effects/Mutagenicity: Thiram has been found to be mutagenic in some test organisms but not in others. Thus, the evidence is inconclusive.

Reproductive effects: Very high oral doses of approximately 1200 mg/kg/day thiram to mice on days 6 to 17 of pregnancy caused resorption of embryos and retarded fetal development. In another study, doses of 132 mg/kg/day for 13 weeks produced infertility in male mice, while doses of 96 mg/kg/day for 14 days delayed the estrous cycle in females. The feeding of 50 mg/kg/day thiram from day 16 of pregnancy to 21 days after birth caused reduced growth and survival of the pups. Pups that were transferred to untreated dams at birth remained healthy, while pups transferred from untreated to treated dams showed toxic effects. These data suggest that reproductive effects occur at high doses not likely to be experienced by humans.

Teratogenic effects: Cleft palate, wavy ribs, and curved long leg bones were observed in the offspring of mice that ingested very high thiram doses of 1200 mg/kg/day on days 6 to 17 of pregnancy. Maternal doses of 125 mg/kg/day thiram were teratogenic in hamsters, causing incomplete formation of the skull and spine, fused ribs, abnormalities of the legs, heart, great vessels, and kidneys. Developmental toxicity was observed in a three-generation study of rats fed 5.0 mg/kg/day. These data suggest that high doses are required to cause teratatogenic effects.

12. ECOLOGICAL INFORMATION

The following information is for the active ingredient, Thiram.

Ecotoxicity:

Birds	Acute oral LD_{50}: for male ring-necked pheasants 673, mallard ducks >2800, starlings >100, redwing blackbirds >100 mg/kg.
	Dietary LC_{50} (5 days): for ring-necked pheasants >5000, mallard ducks >5000, bobwhite quail >3950, Japanese quail >5000 ppm.
Fish	LC_{50} (96 h): for bluegill sunfish 0.0445, rainbow trout 0.128 mg/l.
Daphnia	EC_{50} (48 h): 0.21 mg/l.
Algae	EC_{50}: 0.065 mg/l.
Bees	LD_{50} (oral): >2000 μg/bee (80% formulation)
	LD_{50} (contact): 73.7 μg/bee (75% formulation).
Earthworm:	LC_{50} (14 days): 540 mg/kg soil

Persistence and degradability: Thiram is of low to moderate persistence. Because it is only slightly soluble in water (30 mg/L) and has a strong tendency to adsorb to soil particles, thiram is not expected to contaminate groundwater. The soil half-life for thiram is reported as 15 days. Thiram degrades more rapidly in acidic soils and in soils high in organic matter. In a humus sandy soil, at pH 3.5, thiram decomposed after 4 to 5 weeks, while at pH 7.0, thiram decomposed after 14 to 15 weeks. Thiram persisted for over 2 months in sandy soils, but disappeared within 1 week from a compost soil. The major metabolites of thiram in the soil are copper dimethyldithiocarbamate, dithiocarbamate, dimethylamine, and carbon disulfide. In soil, thiram will be degraded by microbial action or by hydrolysis under acidic conditions. Thiram will not volatilize from wet or dry soil surfaces. In water, thiram is rapidly broken down by hydrolysis and photodegradation, especially under acidic conditions. Thiram may adsorb to suspended particles or to sediment.

Bioaccumulative potential: BCF (Bio-concentration factor): 6, low potential.

Mobility in soil: Thiram is nearly immobile in clay soils or in soils high in organic matter.

13. DISPOSAL CONSIDERATION

Do not dispose of undiluted chemicals on site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush, or puncture and bury empty containers in a local authority landfill. If no landfill is available, bury the containers below 500 mm in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots. Empty containers and product should not be burnt.

14. TRANSPORT INFORMATION

UN Number: 3077

UN Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Thiram)

Transport hazard class: 9

Packing group: III

Marine pollutant: Yes

15. REGULATORY INFORMATION

Hazard symbols:

Xn Harmful

Xi Irritant

N Dangerous for the environment

Risk phrases:

R20/22 Harmful by inhalation and if swallowed.

R36/37 Irritating to eyes and respiratory system.

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:

S2 Keep out of the reach of children

S26 In case of contact with eyes, rinse immediately with plenty of water and seed medical advice.

S36/37 Wear suitable protective clothing and gloves.

S45 In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).

S60 This material and its container must be disposed of as hazardous waste.

S61 Avoid release to the environment. Refer to special instructions/safety data sheet

16. OTHER INFORMATION

This MSDS summarizes our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this MSDS and consider the information in the context of the how the product will be handled and used in the workplace including in conjunction with other products.

If clarification or further information is needed to ensure that an appropriate risk assessment can be made the user should contact the company.

END OF MSDS