

MANCOZEB

Indofil Industries Ltd

Chemwatch: 11996
 Version No: 7.1
 Safety Data Sheet

Chemwatch Hazard Alert Code: 2

Issue Date: 20/06/2022
 Print Date: 09/05/2024
 L.GHS.IND.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	MANCOZEB
Chemical Name	Not Available
Synonyms	C4-H6-Mn-N2-S4.C4-H6-N2-S4-Zn; ethylenebis(dithiocarbamic acid), manganese zinc complex, 8Cl; carbamic acid, ethylenebis(dithio-, manganese zinc complex (8Cl); dithiocarbamate derivative; Carmazine; Dithane M 45; Dithane M45; Dithane S 60; Dithane SPC; Dithane Ultra; F 2966; Fore; Green-diasen M; Karamate; Manzeb; Marzin; Manzin 80; Mancofol; Maneb-zinc; Manoseb; Manzate 200; Nemispor; Policar MZ; Policar S; Triziman D; Vondozeb; Zimanat; Zimaneb; Zimman-dithane
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains mancozeb)
Chemical formula	C4H6MnN2S4.C4H6N2S4Zn
Other means of identification	Not Available
CAS number	8018-01-7

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Fungicide. [-Intermediate -]
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Details of the manufacturer or supplier of the safety data sheet

Registered company name	Indofil Industries Ltd
Address	Kalpataru Square, 4th Floor, Kondivita Road, Off. Andheri Kurla Road, Andheri (E) Maharashtra, India. Mumbai 400 059 India
Telephone	1800-120-003-004
Fax	Not Available
Website	www.indofil.com
Email	customercare@indofil.com

Emergency telephone number

Association / Organisation	CHEMWATCH EMERGENCY RESPONSE (24/7)
Emergency telephone numbers	+918000403230
Other emergency telephone numbers	+61 3 9573 3188

Once connected and if the message is not in your preferred language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

Chemwatch Hazard Ratings

	Min	Max
Flammability	1	1
Toxicity	1	1
Body Contact	2	2
Reactivity	1	1
Chronic	2	2

0 = Minimum
 1 = Low
 2 = Moderate
 3 = High
 4 = Extreme

NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

Classification	Acute Toxicity (Oral) Category 5, Sensitisation (Skin) Category 1, Acute Toxicity (Inhalation) Category 5, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Reproductive Toxicity Category 2, Hazardous to the Aquatic Environment Acute Hazard Category 1
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H303	May be harmful if swallowed.
H317	May cause an allergic skin reaction.
H333	May be harmful if inhaled.
H335	May cause respiratory irritation.
H361	Suspected of damaging fertility or the unborn child.
H400	Very toxic to aquatic life.

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
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Precautionary statement(s) Response

P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.
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Precautionary statement(s) Storage

P405	Store locked up.
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Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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SECTION 3 Composition / information on ingredients**Substances**

CAS No	%[weight]	Name
8018-01-7	>85	<u>mancozeb</u>
Not Available		(coordination product of zinc complex and
Not Available		manganese ethylene bithiocarbamate)
Not Available		NOTE: decomposition of metabolic activity may
Not Available		result in production of
96-45-7		<u>ethylene thiourea</u>

Mixtures

See section above for composition of Substances

SECTION 4 First aid measures**Description of first aid measures**

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with fresh running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
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Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay.
Ingestion	<ul style="list-style-type: none"> ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

The principle metabolites found in the urine are ethylene thiourea (ETU) and ethylenebisisothiocyanate sulfide (EBIS).

Both dermal and oral toxicity of manganese salts is low because of limited solubility of manganese. No known permanent pulmonary sequelae develop after acute manganese exposure. Treatment is supportive.

[Ellenhorn and Barceloux: Medical Toxicology]

In clinical trials with miners exposed to manganese-containing dusts, L-dopa relieved extrapyramidal symptoms of both hypo kinetic and dystonic patients. For short periods of time symptoms could also be controlled with scopolamine and amphetamine. BAL and calcium EDTA prove ineffective.

[Gosselin et al: Clinical Toxicology of Commercial Products.]

Medical literature on human exposure to thiocarbamate derivatives is scarce.

- ▶ Animal studies suggest that contact dermatitis and thyroid hyperplasia may occur following exposure.
- ▶ These compounds do not have the cholinergic properties of structurally related carbamate insecticides.
- ▶ The usual measures for gut and skin contamination are recommended for large doses.
- ▶ Some thiocarbamates are structurally similar to disulfiram and may cause the characteristically unpleasant alcohol type reactions lasting for several hours; they may respond to fluids, oxygen and analgesics. Dysrhythmias may occur and patients with serious reactions should have cardiac monitoring.
- ▶ Precautions should be taken to prohibit intake of alcohol for 10 days.
- ▶ Fats, oils and lipid solvents must not be consumed as they may enhance absorption.

As a general rule thiocarbamates can be absorbed by the skin, mucous membranes and respiratory and gastrointestinal tract. They are eliminated quickly via expired air and urine. Two major pathways exist for the metabolism of thiocarbamates in mammals. One is via sulfoxidation and conjugation with glutathione. The conjugation product is cleaved to the cysteine derivative which is further metabolised to a mercapturic acid compound. The second route involves oxidation of the sulfur to a sulfoxide which is oxidised to a sulfone, or hydroxylation to compounds which enter the carbon metabolic pool.

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Water spray or fog.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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Advice for firefighters

Fire Fighting	▶ Alert Fire Brigade and tell them location and nature of hazard.
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Fire/Explosion Hazard	<p>On combustion, emits toxic fumes of hydrogen sulfide, carbon disulfide.</p> <ul style="list-style-type: none"> ▶ Combustible solid which burns but propagates flame with difficulty; it is estimated that most organic dusts are combustible (circa 70%) - according to the circumstances under which the combustion process occurs, such materials may cause fires and / or dust explosions. <p>Combustion products include:</p> <p>carbon monoxide (CO) carbon dioxide (CO₂) nitrogen oxides (NO_x) sulfur oxides (SO_x) metal oxides</p> <p>other pyrolysis products typical of burning organic material.</p> <ul style="list-style-type: none"> ▶ Hot organic vapours or mist are capable of sudden spontaneous combustion when mixed with air even at temperatures below their published autoignition temperatures.
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SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Remove all ignition sources. <p>Environmental hazard - contain spillage.</p>
Major Spills	<p>Environmental hazard - contain spillage.</p> <p>Moderate hazard.</p>

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) ▶ Minimise airborne dust and eliminate all ignition sources.
Other information	<ul style="list-style-type: none"> ▶ Store in original containers.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Polyethylene or polypropylene container.
Storage incompatibility	<ul style="list-style-type: none"> ▶ Thiocarbamates and dithiocarbamates are incompatible with acids, peroxides, and acid halides. ▶ Avoid reaction with oxidising agents



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
India Permissible Levels of Certain Chemical Substances in Work Environment	mancozeb	Manganese dust and compounds (as Mn)	Not Available	Not Available	5 mg/m ³	Not Available

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Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
mancozeb	3 mg/m3	56 mg/m3	990 mg/m3
ethylene thiourea	0.085 mg/m3	0.94 mg/m3	110 mg/m3

Ingredient	Original IDLH	Revised IDLH
mancozeb	500 mg/m3	Not Available
ethylene thiourea	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
ethylene thiourea	E	≤ 0.01 mg/m ³

Notes: Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

MATERIAL DATA

A number of studies have shown that susceptibility to the effects of manganese at or about 1 - 5 mg/m3 (TWA) can lead to clinical manifestations of manganism or more commonly to the development of indicators of sub-clinical manganism (e.g. hand tremor, exaggerated reflexes, short-term memory deficits, poor psychomotor performance).


For mancozeb:

CEL TWA: 1 mg/m3 (compare WEEL TWA)

(CEL = Chemwatch Exposure Limit)

The maximum no-observable-effect-level (MNOEL) for thyroid toxicity in rats exposed to mancozeb by inhalation was 79 mg/m3.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard.
Individual protection measures, such as personal protective equipment	
Eye and face protection	▶ Safety glasses with side shields.
Skin protection	See Hand protection below
Hands/feet protection	NOTE: ▶ The material may produce skin sensitisation in predisposed individuals. The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.
Body protection	See Other protection below
Other protection	▶ Overalls.

Respiratory protection

Type -P Filter of sufficient capacity.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3 Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory

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protection program.

- Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Yellow powder with a musty odour.		
Physical state	Divided Solid	Relative density (Water = 1)	0.35-0.50 (Bulk)
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	132 (layer)
pH (as supplied)	Not Applicable	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	192-204 (decomp)	Viscosity (cSt)	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	146 (open)	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	0.13 mg/m ³	Volatile Component (%vol)	1 (water)
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Miscible	pH as a solution (1%)	Not Applicable
Vapour density (Air = 1)	11.4	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▶ Unstable in the presence of incompatible materials.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation.</p> <p>512manco</p> <p>Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.</p> <p>Manganese fume is toxic and produces nervous system effects characterised by tiredness.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p>
Ingestion	<p>Accidental ingestion of the material may be damaging to the health of the individual.</p> <p>Mancozeb toxicity is increased when mancozeb is ingested or inhaled concurrently with ethanol</p> <p>Lethal doses of some thiocarbamates have produced muscle weakness and ascending paralysis progressing to respiratory paralysis and death in animals.</p> <p>The acute toxicity of thiocarbamates is generally low.</p> <p>Poisonings rarely occur after oral administration of manganese salts as they are generally poorly absorbed from the gut (generally less than 4%) and seems to be dependent, in part, on levels of dietary iron and may increase following the consumption of alcohol.</p>

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Skin Contact	<p>The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models).</p> <p>Mancozeb is a strong skin sensitiser in guinea pigs.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Application of 0.1g of ground mancozeb into the conjunctival sac of the rabbit eye produces substantial to severe eye irritation.</p>
Chronic	<p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.</p> <p>Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals.</p> <p>Exposure to the material may cause concerns for humans owing to possible developmental toxic effects, generally on the basis that results in appropriate animal studies provide strong suspicion of developmental toxicity in the absence of signs of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not a secondary non-specific consequence of other toxic effects.</p> <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Limited evidence shows that inhalation of the material is capable of inducing a sensitisation reaction in a significant number of individuals at a greater frequency than would be expected from the response of a normal population.</p> <p>Exposure to the material may cause concerns for human fertility, on the basis that similar materials provide some evidence of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects, but which are not a secondary non-specific consequence of other toxic effects.</p> <p>Male rats exposed to nose-only airborne dusts of mancozeb, 5 days/week for 13 weeks showed significant reductions in weight gain and terminal body weight at 326 mg/m3 (respirable particle size 144 mg/m3 - the mass median diameter of the exposure aerosol was 4.4 micrometers).</p> <p>Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung.</p> <p>Repeated or prolonged exposure may also damage the liver and may cause a decrease in the heart rate.</p> <p>Some thiocarbamates have an effect on sperm morphology and therefore reproduction.</p> <p>A case has been reported of a female kitchen worker who developed urticaria on her wrists after wearing a certain brand of gloves containing zinc diethyldithiocarbamate (ZDC).</p>

	TOXICITY	IRRITATION
mancozeb	<p>dermal (rat) LD50: >2000 mg/kg^[1]</p> <p>Oral (Rat) LD50: >2000 mg/kg^[1]</p>	<p>Eye: no adverse effect observed (not irritating)^[1]</p> <p>Skin: no adverse effect observed (not irritating)^[1]</p>
ethylene thiourea	<p>Oral (Rat) LD50: 710 mg/kg^[2]</p>	<p>Eye (rabbit): 500 mg/24h - mild</p>
Legend:	<p>1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances</p>	

MANCOZEB	<p>ADI: 0.006 mg/kg/day NOEL: 0.6 mg/kg/day</p> <p>The following information refers to contact allergens as a group and may not be specific to this product.</p> <p>Asthma-like symptoms may continue for months or even years after exposure to the material ends.</p> <p>For mancozeb:</p> <p>Toxicological Effects:</p> <p>Acute toxicity: Mancozeb is practically nontoxic via the oral route with reported oral LD50 of greater than 5000 mg/kg to greater than 11,200 mg/kg in rats .</p> <p>For ethylenebisdithiocarbamates (EBDCs):</p> <p>Acute toxicity: In spray or dust forms, the EBDCs are moderately irritating to the skin and to respiratory mucous membranes.</p>
ETHYLENE THIOUREA	<p>*[Akzo Chemie]</p> <p>For ethylene thiourea:</p> <p>Ethylene thiourea was administered repeatedly by oral gavage to male and female Crj:CD(SD)IGS rats at dose levels of 0, 1, 6, and 30 mg/kg for 28 days, and its toxicity was examined.</p> <p>Changes attributable to the test substance were apparent in clinical signs, body weights, food consumption, blood chemistry, organ weights and necropsy findings, and on histopathological examination of both sexes of the 6 and 30 mg/kg groups.</p> <p>On observation of clinical signs, abnormal fur (loss of gloss) was noted consistently in both sexes of the 30 mg/kg group.</p> <p>The substance is classified by IARC as Group 3:</p> <p>NOT classifiable as to its carcinogenicity to humans.</p> <p>Evidence of carcinogenicity may be inadequate or limited in animal testing.</p> <p>Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).</p>

Acute Toxicity	✓	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✓
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✓

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Respiratory or Skin sensitisation	✓	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

	Endpoint	Test Duration (hr)	Species	Value	Source
mancozeb	NOEC(ECx)	72h	Fish	<0.001mg/L	4
	EC50	96h	Algae or other aquatic plants	0.54mg/l	4
	EC50	72h	Algae or other aquatic plants	7.8mg/l	4
	EC50	48h	Crustacea	0.073mg/L	2
	LC50	96h	Fish	0.074mg/L	2
ethylene thiourea	BCF	1008h	Fish	<0.2-0.3	7
	EC10(ECx)	72h	Fish	2.043mg/L	4
	EC50	72h	Algae or other aquatic plants	18-29mg/L	4
	EC50	96h	Algae or other aquatic plants	6600mg/L	4
	EC50	48h	Crustacea	19.6-38.5mg/L	4
	LC50	96h	Fish	>502mg/L	4
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

Very toxic to aquatic organisms.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark.

For mancozeb

Environmental fate;

Breakdown of Chemical in Soil and Groundwater: Because mancozeb is practically insoluble in water it is unlikely to infiltrate groundwater.

For ethylenebisdithiocarbamates (EBDCs):

Environmental fate:

The EBDCs are generally unstable in the presence of moisture, oxygen, and in biological systems .

For ethylene thiourea (ETU)

Half-life (hr) air : 205

Half-life (hr) soil : 168

BCF : 2.3

Bioaccumulation : unlikely

Degradation Biological: significant

processes Abiotic: slow hydrolysis, R_{xn} OH⁺

Environmental fate:

ETU is a major degradation product of widely used ethylenebisdithiocarbamate (EBDC) fungicides.

for thiocarbamates:

Environmental fate: Thiocarbamates are volatile and will therefore evaporate from soil.

for dithiocarbamates:

Environmental fate:

Dithiocarbamates with hydrophilic groups form water-soluble, heavy-metal complexes, while some of the dithiocarbamate metal complexes used as fungicides are insoluble in water but soluble in non-polar solvents.

For manganese and its compounds:

Environmental fate:

It has been established that while lower organisms (e.g., plankton, aquatic plants, and some fish) can significantly bioconcentrate manganese, higher organisms (including humans) tend to maintain manganese homeostasis.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ethylene thiourea	LOW (Half-life = 56 days)	LOW (Half-life = 0.2 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
ethylene thiourea	LOW (BCF = 1.8)

Mobility in soil

Continued...

Ingredient	Mobility
ethylene thiourea	LOW (Log KOC = 6.511)



SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. Legislation addressing waste disposal requirements may differ by country, state and/ or territory. ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ Recycle wherever possible.
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SECTION 14 Transport information

Labels Required

	
Marine Pollutant	

Land transport (UN)

14.1. UN number or ID number	3077	
14.2. UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains mancozeb)	
14.3. Transport hazard class(es)	Class	9
	Subsidiary Hazard	Not Applicable
14.4. Packing group	III	
14.5. Environmental hazard	Environmentally hazardous	
14.6. Special precautions for user	Special provisions	274; 331; 335; 375
	Limited quantity	5 kg

Air transport (ICAO-IATA / DGR)

14.1. UN number	3077	
14.2. UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (contains mancozeb)	
14.3. Transport hazard class(es)	ICAO/IATA Class	9
	ICAO / IATA Subsidiary Hazard	Not Applicable
	ERG Code	9L
14.4. Packing group	III	
14.5. Environmental hazard	Environmentally hazardous	
14.6. Special precautions for user	Special provisions	A97 A158 A179 A197 A215
	Cargo Only Packing Instructions	956
	Cargo Only Maximum Qty / Pack	400 kg
	Passenger and Cargo Packing Instructions	956
	Passenger and Cargo Maximum Qty / Pack	400 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Y956
	Passenger and Cargo Limited Maximum Qty / Pack	30 kg G

Sea transport (IMDG-Code / GGVSee)

14.1. UN number	3077
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14.2. UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains mancozeb)	
14.3. Transport hazard class(es)	IMDG Class	9
	IMDG Subsidiary Hazard	Not Applicable
14.4. Packing group	III	
14.5 Environmental hazard	Marine Pollutant	
14.6. Special precautions for user	EMS Number	F-A , S-F
	Special provisions	274 335 966 967 969
	Limited Quantities	5 kg

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
mancozeb	Not Available
ethylene thiourea	Not Available

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
mancozeb	Not Available
ethylene thiourea	Not Available

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****mancozeb is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List
 India Permissible Levels of Certain Chemical Substances in Work Environment

ethylene thiourea is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List
 International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

Additional Regulatory Information

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	No (mancozeb)
Canada - NDSL	No (mancozeb; ethylene thiourea)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (mancozeb)
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	No (mancozeb)
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory

National Inventory	Status
	No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	20/06/2022
Initial Date	03/09/2006

SDS Version Summary

Version	Date of Update	Sections Updated
6.1	27/06/2017	Toxicological information - Chronic Health, Hazards identification - Classification
7.1	20/06/2022	Expiration. Review and Update

Other information

Ingredients with multiple cas numbers

Name	CAS No
ethylene thiourea	96-45-7, 96-46-8, 12261-94-8, 26856-29-1, 71836-04-9, 90613-75-5, 875479-38-2

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment.

Definitions and abbreviations

- ▶ PC—TWA: Permissible Concentration-Time Weighted Average
- ▶ PC—STEL: Permissible Concentration-Short Term Exposure Limit
- ▶ IARC: International Agency for Research on Cancer
- ▶ ACGIH: American Conference of Governmental Industrial Hygienists
- ▶ STEL: Short Term Exposure Limit
- ▶ TEEL: Temporary Emergency Exposure Limit,
- ▶ IDLH: Immediately Dangerous to Life or Health Concentrations
- ▶ ES: Exposure Standard
- ▶ OSF: Odour Safety Factor
- ▶ NOAEL: No Observed Adverse Effect Level
- ▶ LOAEL: Lowest Observed Adverse Effect Level
- ▶ TLV: Threshold Limit Value
- ▶ LOD: Limit Of Detection
- ▶ OTV: Odour Threshold Value
- ▶ BCF: BioConcentration Factors ▶
- BEI: Biological Exposure Index ▶
- DNEL: Derived No-Effect Level
- ▶ PNEC: Predicted no-effect concentration

- ▶ AIIC: Australian Inventory of Industrial Chemicals
- ▶ DSL: Domestic Substances List
- ▶ NDSL: Non-Domestic Substances List
- ▶ IECSC: Inventory of Existing Chemical Substance in China
- ▶ EINECS: European INventory of Existing Commercial chemical Substances
- ▶ ELINCS: European List of Notified Chemical Substances
- ▶ NLP: No-Longer Polymers
- ▶ ENCS: Existing and New Chemical Substances Inventory
- ▶ KECI: Korea Existing Chemicals Inventory
- ▶ NZIoC: New Zealand Inventory of Chemicals
- ▶ PICCS: Philippine Inventory of Chemicals and Chemical Substances
- ▶ TSCA: Toxic Substances Control Act
- ▶ TCSI: Taiwan Chemical Substance Inventory
- ▶ INSQ: Inventario Nacional de Sustancias Químicas
- ▶ NCI: National Chemical Inventory
- ▶ FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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