2-MERCAPTOBENZOTHIAZOLE

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
2-MERCAPTOBENZOTHIAZOLE

OTHER NAMES

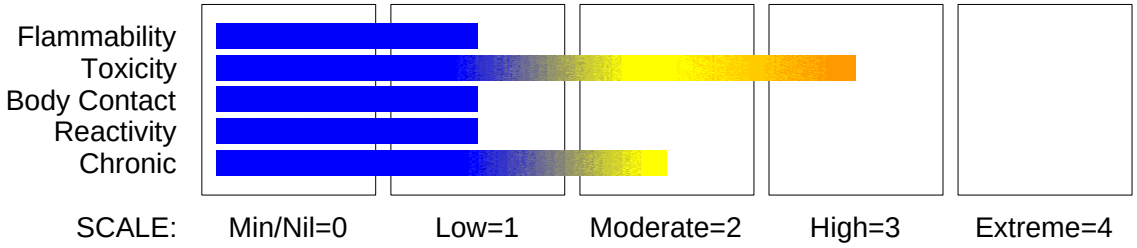
C7-H5-N-S2, C7-H5-N-S2, C6H4SC(SH)N, 2-benzothiazolinethione, 2-benzothiazolinethione, "2-benzothiazolyl mercaptan", "2-benzothiazolyl mercaptan", MBT, mercapto-2-benzothiazole, mercapto-2-benzothiazole, mercaptobenzothiazole, NCI-C56519, 2(3H)-benzothiazolethione, 2-benzothiazolethiol, 2-benzothiazolethiol, 2-MBT, 2-MBT, benzothiazole-2-thione, benzothiazole-2-thione, 2-benzothiazolethione, 2-benzothiazolethione,

PROPER SHIPPING NAME
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

PRODUCT USE
Used as an accelerator for rubber vulcanisation, a corrosion inhibitor in cutting oils, in petroleum products and an extreme pressure additive for grease. Antifungal agent. Also available as a low-dusting (less hazardous) form, coated with 2% process oil.

SUPPLIER
Company: S D FINE- CHEM LIMITED
Address:
315- 317, T.V. INDUSTRIAL ESTATE,
248, WORLI,
MUMBAI- 400030.INDIA.
technical@sdfine.com
Telephone: 91- 22- 24959898
Telephone: 91- 22- 24959899
Fax: 91- 22- 24937232

HAZARD RATINGS



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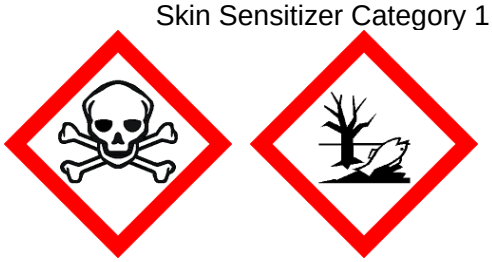
Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Oral) Category 3
Chronic Aquatic Hazard Category 1
Skin Sensitizer Category 1



EMERGENCY OVERVIEW

HAZARD

DANGER
Determined by using GHS criteria:
H301 H317 H410
Toxic if swallowed
May cause allergic skin reaction
Very toxic to aquatic life with long lasting effects

PRECAUTIONARY STATEMENTS

Prevention

Wash hands thoroughly after handling.
Avoid breathing dust/fume/gas/mist/vapours/spray.
Do not eat, drink or smoke when using this product.
Contaminated clothing should not be allowed out of the workplace.

Response

IF ON SKIN: Gently wash with plenty of soap and water.
If skin irritation or rash occurs, seek medical advice/attention.
Wash contaminated clothing before reuse.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Specific treatment: refer to Label or MSDS.

Storage

Store locked up.

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
2- mercaptobenzothiazole	149-30-4	> 98

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Section 4 - FIRST AID MEASURES

SWALLOWED

· For advice, contact a Poisons Information Centre or a doctor at once.
· Urgent hospital treatment is likely to be needed.
· 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.
· Transport to hospital or doctor without delay.

EYE

If this product comes in contact with the eyes:
· 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.
· If pain persists or recurs seek medical attention.
· Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin contact occurs:
· 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.

INHALED

· If dust is inhaled, remove from contaminated area.
· Encourage patient to blow nose to ensure clear passage of breathing.
· If irritation or discomfort persists seek medical attention.

NOTES TO PHYSICIAN

90% of a subcutaneous dose was recovered in the urine as the glucuronide or sulfate conjugates and 9% appeared unchanged during a 6-hour post-injection period. [Monsanto]

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

· Foam.
· Dry chemical powder.
· BCF (where regulations permit).
· Carbon dioxide.
· Water spray or fog - Large fires only.

FIRE FIGHTING

Alert Fire Brigade and tell them location and nature of hazard.
· Wear full body protective clothing with breathing apparatus.
· Prevent, by any means available, spillage from entering drains or water courses.
Use water delivered as a fine spray to control the fire and cool adjacent area.

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Cool fire exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.
DO NOT approach containers suspected to be hot.

FIRE/EXPLOSION HAZARD
· Solid which exhibits difficult combustion or is difficult to ignite.
· Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
· Dry dust can also be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
· Build-up of electrostatic charge may be prevented by bonding and grounding.
· Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.
· All movable parts coming in contact with this material should have a speed of less than 1-metre/sec.
Combustion products include:.
carbon monoxide (CO), nitrogen oxides (NOx) and sulfur oxides (SOx).

FIRE INCOMPATIBILITY
Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Personal Protective Equipment
Breathing apparatus.
Gas tight chemical resistant suit.
Limit exposure duration to 1 BA set 30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS
Clean up all spills immediately.
Wear impervious gloves and safety glasses.
Avoid contact with skin and eyes.
Use dry clean up procedures and avoid generating dust.
Sweep up.
Place in suitable containers for disposal.

MAJOR SPILLS
Clear area of personnel and move upwind.
Alert Fire Brigade and tell them location and nature of hazard.
Control personal contact by using protective equipment.
Prevent, by any means available, spillage from entering drains or water courses.
Shut off all possible sources of ignition and increase ventilation.
Stop leak if safe to do so.
Use dry clean up procedures and avoid generating dust.
Collect recoverable product into labelled containers for recycling.
Collect residues and seal in labelled drums for disposal.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)
The maximum airborne concentration below which it is believed that nearly all individuals could be exposed

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for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:
2-mercaptobenzothiazole 500 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:
2-mercaptobenzothiazole 40 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:
2-mercaptobenzothiazole 6 mg/m³

The threshold concentration below which most people will experience no appreciable risk of health effects:
2-mercaptobenzothiazole 2 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

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SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

X	X	+	X	X	+

+: May be stored together
O: May be stored together with specific preventions
X: Must not be stored together

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of exposure occurs.
· Use in a well-ventilated area.
· Avoid contact with moisture.
· Avoid contact with incompatible materials.
· When handling, DO NOT eat, drink or smoke.
· Keep containers securely sealed when not in use.
· Avoid physical damage to containers.
· Always wash hands with soap and water after handling.
· Work clothes should be laundered separately. Launder contaminated clothing before re -use.
· Use good occupational work practice.
· Observe manufacturer's storing and handling recommendations.
· Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

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SUITABLE CONTAINER

Packaging as recommended by manufacturer.
· Check that containers are clearly labelled.
Multi-ply woven plastic or paper bag with sealed plastic liner
NOTE: Bags should be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
Polylined drum.

STORAGE INCOMPATIBILITY

Avoid reaction with oxidising agents.
Contact with acids produces toxic fumes.
(eg hydrogen sulfide and carbon disulfide).
Carbon disulfide will be released in acid media, or in buffered systems below pH 8. In a closed system, complete decomposition could produce carbon disulfide concentrations at or above the lower explosion limit (LEL =1 10,000 ppm).

STORAGE REQUIREMENTS

· Keep dry.
· Store in original containers.
· Keep containers securely sealed.
· No smoking, naked lights or ignition sources.
· Store in a cool, dry, well-ventilated area.
· Store away from incompatible materials.
· Protect containers against physical damage.
· Check regularly for leaks.
· Observe manufacturer's storing and handling recommendations.
Store away from foodstuff containers.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

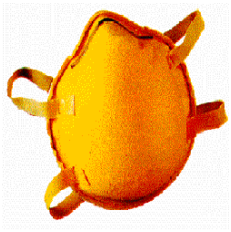
• 2- mercaptobenzothiazole: CAS:149- 30- 4 CAS:112242- 83- 8 CAS:4464- 58- 8 CAS:12640- 90- 3 CAS:55199- 93- 4 CAS:119170- 41- 1 CAS:81605- 65- 4

MATERIAL DATA

Odour Threshold Value; 2ppm, 12 mg/m3

PERSONAL PROTECTION






EYE

· Safety glasses with side shields.
· Chemical goggles.
· Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or

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restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET
Rubber gloves.
Impervious gloves.
Safety footwear.

OTHER
Overalls.
· Impervious apron.
· Barrier cream.
· Eyewash unit.
Equipment should be kept clean and in working-order.

RESPIRATOR

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

* - Negative pressure demand ** - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
For further information consult your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS
General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25- 0.5 m/s (50- 100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5- 1 m/s (100- 200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1- 2.5 m/s (200- 500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high	2.5- 10 m/s (500- 2000 f/min.)

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initial velocity into zone of very high rapid air motion).

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Pale yellow crystals or fine powder with disagreeable odour.
Practically insoluble in water. Partially soluble in alcohol, ether, acetone, benzene, carbon tetrachloride and naphtha. Moderately soluble in glacial acetic acid. Soluble in alkalies and alkaline carbonate solutions.

PHYSICAL PROPERTIES

Solid.
Does not mix with water.
Sinks in water.

Molecular Weight: 167.25	Boiling Range (°C): Not available.
Melting Range (°C): 180.2- 181.7	Specific Gravity (water=1): 1.42- 1.5
Solubility in water (g/L): Immiscible	pH (as supplied): Not applicable
pH (1% solution): Not applicable.	Vapour Pressure (kPa): Negligible @ 25
Volatile Component (%vol): Negligible	Evaporation Rate: Not applicable
Relative Vapour Density (air=1): Not applicable	Flash Point (°C): 252 (Open Cup)
Lower Explosive Limit (%): Not available.	Upper Explosive Limit (%): Not available.
Autoignition Temp (°C): 465	Decomposition Temp (°C): > 260
State: Divided solid	Viscosity: Not available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Presence of incompatible materials.
Product is considered stable under normal handling conditions.
Hazardous polymerisation will not occur.

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Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.

EYE
Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
The dust may produce eye discomfort causing transient smarting, blinking.

SKIN
The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
Open cuts, abraded or irritated skin should not be exposed to this material.

INHALED
The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
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.

CHRONIC HEALTH EFFECTS
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.
Principal routes of exposure are by accidental skin and eye contact and inhalation of generated dusts.
When administered by gavage as daily oral doses of 100 mg/kg to two strains of mice from 7 to 28 days of age followed by dietary administration of this dosage for the remainder of the study (18 months) or by single subcutaneous injection of 215 mg/kg or 1000 mg/kg at 28 days of age there was an increase in reticular cell sarcomas at the sites of injection in one strain of mice dosed subcutaneously at 215 mg/kg or daily in the diet.
Two strains of mice given the material at a dosage of 464 mg/kg by subcutaneous injection on days 6 through 15 of gestation showed an increased incidence of foetal malformations at maternally toxic doses.
When administered by gavage at 200 mg/kg to rats on days 4 and 11 of gestation there was an increased level of fatalities in foetuses. No evidence of teratogenic activity or embryolethality was reported in another study when the substance was administered at a dose of 200 mg/kg in corn oil by intraperitoneal injection on days 1 through 15 of gestation.
No mutagenic effects were demonstrated in the L5178Y TK mouse lymphoma mutation assay and in microbial mutagenicity assays (either with or without mammalian microsomal activation). A further study showed one

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equivocal positive finding in one Salmonella strain in one assay.
No evidence of genotoxic activity was found in either the CHO/HGPRT cell point mutation or BALB/C3t3 cell transformation assays. A micronucleus assay performed in CD-1 mice at a dose level of 300 mg/kg did not produce evidence of clastogenic activity. A weak positive response occurred at highly cytotoxic doses in the L5178Y TK mouse lymphoma assay. [Monsanto]

TOXICITY AND IRRITATION

TOXICITY
Oral (rat) LD50: 100 mg/kg
Dermal (rabbit) LD50: >7940 mg/kg slight Irritant

IRRITATION
Eye (rabbit): (FHSA) 3.2/110.0 *

Skin (rabbit): (FHSA) 0.0/8.0 *
non-irritant
* [Monsanto]

Tumorigenic

Section 12 - ECOLOGICAL INFORMATION

Marine Pollutant:Not Determined
Fish LC50 (96hr.) (mg/l): 2 (48hr)

Information on the environmental impact of dithiocarbamates with respect to persistence and bioaccumulation in different species and food chains is limited. Available information suggests that these compounds are degraded in the presence of moisture, oxygen, etc. to form a number of compounds, some of which are toxicologically important.

Soil organisms are capable of metabolising dithiocarbamates; breakdown products appear to affect enzyme activities, respiration and nitrification at dose levels of the order of 10 mg/kg dry soil or more.

Generally dithiocarbamates have an LC50 of less than 1 mg/l for invertebrates (Daphnia) and between 1 and 4 mg/l for algae (Chlorella). The acute toxicity in fish is higher. The sac fry and early fry stages of rainbow trout have a higher sensitivity than other early life stages and embryotoxic and teratogenic effects have been induced by certain dithiocarbamates. Bioaccumulation, however, is low (bioconcentration factor <100). Several dithiocarbamates have been shown to affect testicular development and function and to cause nerve fibre degeneration in domestic fowl. General information on the influence of dithiocarbamates on honey-bees is not generally available.

Section 13 - DISPOSAL CONSIDERATIONS

Recycle wherever possible.
Consult manufacturer for recycling options.
Consult State Land Waste Management Authority for disposal.
Incinerate residue at an approved site.
Puncture containers to prevent re-use.
Bury empty containers at an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION

continued...

Labels Required: MISCELLANEOUS
HAZCHEM: 2X

UNDG:

Dangerous Goods Class:	9	Subrisk:	None
UN Number:	3077	Packing Group:	III

Shipping Name:ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Air Transport IATA:

ICAO/IATA Class:	9	ICAO/IATA Subrisk:	None
UN/ID Number:	3077	Packing Group:	III
ERG Code:	9L		

Shipping name:ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Maritime Transport IMDG:

IMDG Class:	9	IMDG Subrisk:	None
UN Number:	3077	Packing Group:	III
EMS Number:	F- A, S- F	Marine Pollutant:	Not Determined

Shipping name:ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Section 15 - REGULATORY INFORMATION

REGULATIONS

2-mercaptobenzothiazole (CAS: 149-30-4) is found on the following regulatory lists;
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals

No data available for 2-mercaptobenzothiazole as CAS: 112242-83-8, CAS: 4464-58-8, CAS: 12640-90-3, CAS: 55199-93-4, CAS: 119170-41-1, CAS: 81605-65-4.

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
2- mercaptobenzothiazole	149- 30- 4, 112242- 83 - 8, 4464- 58- 8, 12640- 90- 3, 55199- 93- 4, 119170- 41- 1, 81605- 65- 4

The above information is believed to be accurate and represent the best information

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currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue date: 17-07-2018