SAFETY DATA SHEETS

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

Creation Date: Aug 10, 2017

Revision Date: Aug 10, 2017

1. Identification

1.1 GHS Product identifier

Product name	dibenzothiazol-2-yl disulfide

1.2 Other means of identification

Product number	-
Other names	Benzothiazole, 2,2 ‘-dithiobis-

1.3 Recommended use of the chemical and restrictions on use

Identified uses	For industry use only. Process regulators
Uses advised against	no data available

2. Hazard identification

2.1 Classification of the substance or mixture

Skin sensitization, Category 1

Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

2.2 GHS label elements, including precautionary statements

Pictogram(s)

Signal word	Warning
Hazard statement(s)	H317 May cause an allergic skin reaction
	H410 Very toxic to aquatic life with long lasting effects
Precautionary statement(s) Prevention	P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
	P272 Contaminated work clothing should not be allowed out of the workplace.
	P280 Wear protective gloves/protective clothing/eye protection/face protection.
	P273 Avoid release to the environment.
Response	P302+P352 IF ON SKIN: Wash with plenty of water/...
	P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
	P321 Specific treatment (see ... on this label).
	P362+P364 Take off contaminated clothing and wash it before reuse.
	P391 Collect spillage.
Storage	none
Disposal	P501 Dispose of contents/container to ...

2.3 Other hazards which do not result in classification

none

---

3. Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
dibenzothiazol-2-yl	dibenzothiazol-2-yl	120-78-5	none	100%

disulfide	disulfide			

4. First-aid measures

4.1 Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest.

In case of skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap.

In case of eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms/effects, acute and delayed

SYMPTOMS: Symptoms of exposure to this compound include skin and eye irritation. ACUTE/CHRONIC HAZARDS: This compound is a potential eye and skin irritant. When heated to decomposition it emits very toxic fumes of oxides of carbon, nitrogen and sulfur.

4.3 Indication of immediate medical attention and special treatment needed, if necessary

Absorption, Distribution and Excretion

To determine the metabolic disposition of (l4)C-2-mercaptobenzothiazole (MBT) and (14)C-2-mercaptobenzothiazole disulfide (MBTS) male and female rats were dosed topically. Topical doses were 36.1 ug/animal for (14)C-MBT and 33.6 ug/animal for (14)C-MBTS. Although more MBT passed through the skin than MBTS and although relative to rats, guinea pigs absorbed a greater percentage of the dose (33.4% compared to 16.1-17.5% of the MBT and 12.2% compared to 5.94-7.87% for MBTS) the disposition of radioactivity derived from the two

compounds was similar. Washing of the skin removed more of the radioactivity from guinea pigs than from rats. For both sexes of rats dosed iv with (14)C-MBT 0.602 mg/kg) or (14)C-MBTS 0.571 mg/kg) disposition of the compounds was similar. In 72 hr, 90.9-101% of the dose appeared in the urine and 3.79-15.1% in the feces. At this time a small portion of the administered radioactivity (1.52-1.96% of the dose) remained associated with erythrocytes. Oral dosing of rats for 14 days with unlabeled MBT (0.510 mg/kg/day) prior to a single dose of (14)C-MBT (0.503 mg/kg) or with unlabeled MBTS (0.521 mg/kg/day) prior to a single dose of (14)C-MBTS (0.730 mg/kg). For both sexes disposition of the compounds was similar. At 96 hr after dosing a small portion of the administered radioactivity (1.20-1.69% of the dose) remained associated with erythrocytes most of which was bound to the membranes. For both compounds and sexes 60.8-101% of the radioactivity administered appeared in the urine and 3.46-9.99% in the feces in 96 hr. At the time only trace amounts of radioactivity remained in tissues other than blood. Of these tissues thyroid contained the highest concentration. In the urine there was a detectable MBT or MBTS but there were two metabolites one of which was identified as a thioglucuronide derivative of MBT. The other was possibly a sulfonic acid derivative of MBT. In conclusion there were similarities in absorption, distribution, and metabolism of (14)C-MBT and (14)C-MBTS in rats and in guinea pigs, indicating that (14)C-MBTS was readily converted to (14)C-MBT.

5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Fires involving this material can be controlled with a dry chemical, carbon dioxide or Halon extinguisher. A water spray may also be used.

5.2 Specific hazards arising from the chemical

This chemical is combustible.

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal. Sweep up and shovel. Keep in suitable, closed containers for disposal.

---

7. Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

MATERIALS WHICH ARE TOXIC AS STORED OR WHICH CAN DECOMPOSE INTO TOXIC COMPONENTS...SHOULD BE STORED IN A COOL WELL VENTILATED PLACE, OUT OF THE DIRECT RAYS OF THE SUN, AWAY FROM AREAS OF HIGH FIRE HAZARD, AND SHOULD BE PERIODICALLY INSPECTED. INCOMPATIBLE MATERIALS SHOULD BE ISOLATED...

---

8. Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

8.2 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash

hands before breaks and at the end of workday.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique(without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

Wear dust mask when handling large quantities.

Thermal hazards

no data available

---

9. Physical and chemical properties

Physical state	yellow amorphous powder
Colour	PALE YELLOW NEEDLES FROM BENZENE
Odour	ODORLESS
Melting point/ freezing point	-108°C(lit.)
Boiling point or initial boiling point and boiling range	65°C(lit.)
Flammability	Combustible.
Lower and upper explosion limit / flammability limit	no data available
Flash point	-15°C(lit.)

Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	less than 0.1 mg/mL at 21.11°C
Partition coefficient n-octanol/water (log value)	4.5
Vapour pressure	0mmHg at 25°C
Density and/or relative density	1.5
Relative vapour density	no data available
Particle characteristics	no data available

10. Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

2,2'-DITHIOBISBENZOTHIAZOLE is incompatible with strong oxidizers. .

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

no data available

10.6 Hazardous decomposition products

WHEN HEATED TO DECOMPOSITION, SUCH MATERIALS CAN EVOLVE HIGHLY TOXIC FUMES CONTAINING SO(X). /SULFUR COMPD/

11. Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: no data available
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

no data available

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12. Ecological information

12.1 Toxicity

- Toxicity to fish: no data available
- Toxicity to daphnia and other aquatic invertebrates: no data available

- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

In an aerobic closed bottle screening study using activated sludge and soil inoculum, 2,2'-dibenzothiazyl disulfide had a 2 week theoretical BOD of 0.8%(1).

12.3 Bioaccumulative potential

Using a flow-through test system, 6-week BCFs for 2,2'-dibenzothiazyl disulfide of 1.0-7.2 and 1.4-51 were measured for concentrations of 0.2 mg/L and 0.02 mg/L, respectively, for carp(1). These experimental BCF values suggest that bioconcentration in aquatic organisms is not expected to be an important fate process(SRC).

12.4 Mobility in soil

Using a structure estimation method based on molecular connectivity indexes, the Koc for 2,2'-dibenzothiazyl disulfide can be estimated to be about 755,000(1). The Koc for 2,2'-dibenzothiazyl disulfide can be estimated to be about 10,960 based on an estimated water solubility of 0.187 mg/L at 25°C and a regression derived equation(2). According to a suggested classification scheme(3), these estimated Koc values suggest that 2,2'-dibenzothiazyl disulfide is immobile in soil.

12.5 Other adverse effects

no data available

---

13. Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it

unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

14. Transport information

14.1 UN Number

ADR/RID: UN3077 IMDG: UN3077 IATA: UN3077

14.2 UN Proper Shipping Name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
IATA: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

14.3 Transport hazard class(es)

ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packing group, if applicable

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: yes IMDG: yes IATA: yes

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

no data available

15. Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
dibenzothiazol-2-yl disulfide	dibenzothiazol-2-yl disulfide	120-78-5	none

European Inventory of Existing Commercial Chemical Substances (EINECS)	Listed.
EC Inventory	Listed.
United States Toxic Substances Control Act (TSCA) Inventory	Listed.
China Catalog of Hazardous chemicals 2015	Not Listed.
New Zealand Inventory of Chemicals (NZIoC)	Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	Listed.
Vietnam National Chemical Inventory	Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)	Listed.

16. Other information

Information on revision

Creation Date	Aug 10, 2017
Revision Date	Aug 10, 2017

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
- HSDB - Hazardous Substances Data Bank, website:

https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

- IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
- ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
- Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
- ECHA - European Chemicals Agency, website: https://echa.europa.eu/
