

Chemical Safety Data Sheet MSDS / SDS

Bis(tributyltin) oxide

Revision Date:2023-05-27 Revision Number:1

SECTION 1: Identification of the substance/mixture and of the company/undertaking**Product identifier**

Product name : Bis(tributyltin) oxide
CBnumber : CB2114291
CAS : 56-35-9
EINECS Number : 200-268-0
Synonyms : TBTO,TBOT

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

Relevant identified uses : For R&D use only. Not for medicinal, household or other use.
Uses advised against : none

Company Identification

Company : Chemicalbook
Address : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing
Telephone : 400-158-6606

SECTION 2: Hazards identification**Classification of the substance or mixture**

Acute toxicity - Category 3, Oral
Acute toxicity - Category 4, Dermal
Skin irritation, Category 2
Eye irritation, Category 2
Reproductive toxicity, Category 1B
Specific target organ toxicity – repeated exposure, Category 1
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

Label elements**Pictogram(s)**

☐☐

Signal word : Danger

Hazard statement(s)

H301 Toxic if swallowed

H311 Toxic in contact with skin
H315 Causes skin irritation
H319 Causes serious eye irritation
H360 May damage fertility or the unborn child
H372 Causes damage to organs through prolonged or repeated exposure
H400 Very toxic to aquatic life
H410 Very toxic to aquatic life with long lasting effects

Precautionary statement(s)

P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P309 IF exposed or if you feel unwell:
P310 Immediately call a POISON CENTER or doctor/physician.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Prevention

P264 Wash ... thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P203 Obtain, read and follow all safety instructions before use.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P273 Avoid release to the environment.

Response

P301+P316 IF SWALLOWED: Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P330 Rinse mouth.
P302+P352 IF ON SKIN: Wash with plenty of water/...
P317 Get medical help.
P362+P364 Take off contaminated clothing and wash it before reuse.
P332+P317 If skin irritation occurs: Get medical help.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P318 IF exposed or concerned, get medical advice.
P319 Get medical help if you feel unwell.
P391 Collect spillage.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards

no data available

SECTION 3: Composition/information on ingredients

Substance

Product name	: Bis(tributyltin) oxide
Synonyms	: TBTO, TBOT
CAS	: 56-35-9
EC number	: 200-268-0
MF	: C ₂₄ H ₅₄ OSn ₂
MW	: 596.1

SECTION 4: First aid measures

Description of first aid measures

If inhaled

Fresh air, rest. Half-upright position. Refer for medical attention.

Following skin contact

Rinse and then wash skin with water and soap. Refer for medical attention .

Following eye contact

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

Following ingestion

Give one or two glasses of water to drink. Refer for medical attention .

Most important symptoms and effects, both acute and delayed

ACUTE/CHRONIC HAZARDS: This material is toxic by ingestion and inhalation and is a skin and eye irritant. (NTP, 1992)

Indication of any immediate medical attention and special treatment needed

Absorption, Distribution and Excretion

The calculated half-time for elimination of TBTO residues in mice is 29 days.

SECTION 5: Firefighting measures

Extinguishing media

Provision to contain effluent from fire extinguishing.

Specific Hazards Arising from the Chemical

This chemical is probably combustible. (NTP, 1992)

Advice for firefighters

In case of fire in the surroundings, use appropriate extinguishing media.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Carefully collect remainder. Then store and dispose of according to local regulations. Do NOT wash away into sewer.

Environmental precautions

Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Carefully collect remainder. Then store and dispose of according to local regulations. Do NOT wash away into sewer.

Methods and materials for containment and cleaning up

Do NOT wash away into sewer. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

Conditions for safe storage, including any incompatibilities

Well closed. Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access. NO open flames.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

Component	Bis(tributyltin) oxide			
CAS No.	56-35-9			
	Limit value - Eight hours		Limit value - Short term	
	ppm	mg/m³	ppm	mg/m³
Denmark	0,002	0,05	0,004	0,1
Germany (AGS)	0,0018 (1)	0,009 (1)	0,0018 (1)(2)	0,009 (1)(2)
Germany (DFG)	0,0021	0,05	0,0021	0,05
Switzerland	0,0021	0,05	0,0021	0,05
United Kingdom	?	0,1	?	0,2
	Remarks			
Germany (AGS)	(1) Inhalable fraction and vapour (2) 15 minutes average value			

Biological limit values

no data available

Exposure controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

Individual protection measures

Eye/face protection

Wear safety spectacles, face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties

Information on basic physicochemical properties

Physical state	liquid
Colour	colorless
Odour	Weak odor
Melting point/freezing point	-45°C
Boiling point or initial boiling point and boiling range	180°C/2mmHg(lit.)
Flammability	Combustible.
Lower and upper explosion limit/flammability limit	no data available
Flash point	190°C
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	4.8 Centistokes at 25 deg C
Solubility	Chloroform (Soluble), Methanol (Slightly)
Partition coefficient n-octanol/water	log Kow= 3.84
Vapour pressure	<0.01 mm Hg (25 °C)
Density and/or relative density	1.170
Relative vapour density	1.170
Particle characteristics	no data available

SECTION 10: Stability and reactivity

Reactivity

Decomposes on burning. This produces toxic fumes.

Chemical stability

no data available

Possibility of hazardous reactions

Combustible. BIS(TRIBUTYLTIN) OXIDE may react vigorously with oxidizing agents and with reducing agents.

Conditions to avoid

no data available

Incompatible materials

no data available

Hazardous decomposition products

When heated to decomposition it emits acrid and irritating fumes.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Rat oral 194 mg/kg
- 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

WEIGHT OF EVIDENCE CHARACTERIZATION: Classification -- D, not classifiable as to human carcinogenicity. Basis -- There are no data in humans concerning development of cancer following exposure to tributyltin oxide (TBTO). Cancer bioassays following oral exposure have been conducted in rats and mice. The bioassay in rats shows increases in benign pituitary tumors, pheochromocytomas, and parathyroid tumors at the highest doses tested. The significance of these tumors, which normally occur in this strain of rat with variable incidence, is unclear. The bioassay in mice showed no increase in tumors at any site. There are no structure-activity relationships suggesting that TBTO might be a carcinogen. Because of the questionable data from the bioassay in rats, EPA assigns TBTO to category D or to the "cannot be determined" category. HUMAN CARCINOGENICITY DATA: none

Reproductive toxicity

no data available

STOT-single exposure

The substance is irritating to the eyes and skin. Inhalation of the aerosol may cause lung oedema. See Notes. The substance may cause effects on the thymus. This may result in depression of the immune function.

STOT-repeated exposure

no data available

Aspiration hazard

A harmful contamination of the air can be reached on evaporation of this substance at 20°C on spraying.

SECTION 12: Ecological information

Toxicity

- Toxicity to fish: LC50 *Pimephales promelas* (fathead minnow) 2.7 ug/l/96 hr (confidence limit 2.4 - 3.0 mg/l), flow-through bioassay with measured concentrations, 24.0 deg C, dissolved oxygen 7.5 mg/l, hardness 51.5 mg/l calcium carbonate, alkalinity 41.1 mg/l calcium carbonate, and pH 7.5.
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

Persistence and degradability

Tributyltin degraded with a half-life of 20 weeks in Toronto Harbor (Canada) water in the dark at 20 deg C; dibutyltin, monobutyltin and inorganic tin was detected as products(1). The half-life increased when the water was spiked with high levels of tributyltin (1 mg/l) presumably because the higher tin concns inhibited or killed the microorganisms(1). The half-life of tributyltin present in sediment-water mixtures was shorter than in water alone, 16 weeks at 20 deg C in the dark(1). Bis(tributyltin) oxide biodegrades in soil and wood by stepwise dealkylation(2). Degradation is more rapid under aerobic than anaerobic conditions(2). Degradation in wood could be due to wood rotting fungi that have been shown to degrade bis(tributyltin) oxide in pure cultures(2). The detection of small quantities of methyltributyltin in the experiments with non-sterile mixtures of Toronto Harbor (Canada) water and sediment and in water alone indicates that microorganisms are present that can methylate tributyltin(1). Half-lives as low as 6 and 7 days have been reported for incubation in water from a yacht harbor in San Diego Bay (California) in the presence of light and absence of light, respectively; at a clean water site, the respective half-lives were 9 and 19 days(3). The experimenters ruled out direct photolysis in these experiments as a cause of the increased degradation rate(3). In a marine mesocosm experiment, the biodegradation rate calculated from the gross removal rate less adsorption and volatilization transport rates was 0.08/day (half-life 9 days) at 20 deg C(3). Other reported degradation half-lives for tributyltin include: 5.5 mo (marine sediment); 4 mo (aerobic freshwater/sediment); 2 mo (seawater at 5 deg F); 6-19 days (estuarine waters) 6 days (freshwater at 5 deg F); 6-17 days estuarine water; 4-13 days (estuarine water)(4). Several fungi have reported to dealkylate bis(tributyltin) oxide yielding a dibutyltin compound as the primary product(5).

Bioaccumulative potential

The BCFs in crucian carp (*Carassius carassius grandoculis*) obtained in a 7-day experiment were 589 (muscle), 457 (vertebra); 5012 (liver); and 3162 (kidney)(1). Marine mussels bioaccumulate bis(tributyltin) oxide when it is dissolved in water or associated with phytoplankton; BCF are approximately 5000 from water and <2 from food (on a ug/g basis(2). Mantle or muscle tissue had tributyltin burdens about one third that of gills or viscera(2). Uptake was rapid, but higher when accumulation was via ingestion(2). Depuration occurred with a half-life of about 14

days(2). Neither the presence humic acids or kaolin significantly reduced accumulation(2). The different accumulation by different tissues correlate with their lipid content, suggesting that bioaccumulation is a partitioning process(2). Tributyltin was accumulated by fish at a constant rate reaching tissue concn of 1810 (muscle) and 4580 (gall bladder) expressed as bis(tributyltin) oxide but did not reach a steady state concn in the 38-day experiment(3). BCFs for tributyltin in oysters ranged from 1000 (water concn 0.15 ug/l) and 5000 (water concn 1.25 ug/l)(4). In 56-day experiments, the BCF of bis(tributyltin) oxide in three marine species of fish ranged from 2400-11,000(5). The elimination rate constants ranged from 0.024 to 0.094 and the biological half-lives ranged from 7.4 to 28.8 days(5). In studies in which the bioaccumulation and elimination of tributyltin in red sea bream (*Pagrus major*) was by direct uptake from water, from diet, and from both simultaneously, about a quarter of the bioaccumulation was due to dietary uptake(6). The accumulation factor for dietary uptake was 0.26-0.38 on a dry wt basis(6). The elimination rate was 0.031-0.037/day and was independent of the source of uptake, water or diet(6). Bioaccumulation was also independent of the form of tributyltin in the diet(6). Marine mussels (*Mytilus graynus*) collected in a lightly contaminated area and transplanted to a highly contaminated area had a BCF of 10,500 for tributyltin; the half-life was 4.68 days(6). Blue mussels (*Mytilus edulis*) collected from a highly contaminated area and transplanted to a lightly contaminated area had a BCF of 10,400 for tributyltin; the half-life was 4.82 days(7). Oligochaetes accumulate sediment-associated tributyltin, thus making it available to bottom feeding fish(2).

Mobility in soil

No leaching of tributyltin was observed in several soils (clay, sand, topsoil and silt) during periods as long as 16 weeks(1). Tributyltin binds strongly to sediment with the distribution constant for Toronto Harbor sediment and water as 2180 at 20 deg C(2). Very little tributyltin or inorganic tin was released from unshaken sediment in 10 months(2). However, other studies have shown that tributyltin does not adsorb appreciably to suspended particulate matter and that it is primarily associated with the dissolved fraction of estuarine water(3,4). This is in line with the observation that addition of humic acids or kaolin clay material does not significantly affect the measured bis(tributyltin) BCF in mussels(5), suggesting that bis(tributyltin) species are only weakly bound to these materials(SRC). Studies on the adsorption of tributyltin to a wide variety of sorbents yield sorption coefficients ranging from 110 to 350,000 l/kg, but the majority of sorption coefficients are about 1,000 l/kg(6). Adsorption is relatively fast (hours) and reversible(6). In a 278-day marine mesocosm experiment, the transport rate from the water column to sediment was 0.045/day(7). The distribution coefficient between dissolved state and particulate matter calculated from data between days 2-19 was 60,000 (standard deviation 30,000)(7). Other investigators obtained distribution constants for adsorption of tributyltin to particulate matter and sediment of 3400-9300 l/kg and 200-55,000 l/kg, respectively; values were a function of sediment type and location(7). The Freundlich parameters, log k and 1/n, for tributyl tin to sediment was 1.07 and 0.359, respectively(8). In soil microcosm experiments, small bis(tributyltin) oxide releases from wood treated with the compound was observed to migrate >10 cm from the wood with 86% of the compound residing within 5 cm of the wood; none of the compound was found in any layer below 10 cm nor in groundwater at the bottom of the microcosm chamber(8). These data suggest that bis(tributyltin) oxide can strongly bind to soil and sediment but that adsorption to suspended particulate and humic matter may be much weaker(SRC).

Other adverse effects

no data available

SECTION 13: Disposal considerations

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.

SECTION 14: Transport information

UN Number

ADR/RID: UN2788 (For reference only, please check.)

IMDG: UN2788 (For reference only, please check.)

IATA: UN2788 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: ORGANOTIN COMPOUND, LIQUID, N.O.S. (For reference only, please check.)

IMDG: ORGANOTIN COMPOUND, LIQUID, N.O.S. (For reference only, please check.)

IATA: ORGANOTIN COMPOUND, LIQUID, N.O.S. (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 6.1 (For reference only, please check.)

IMDG: 6.1 (For reference only, please check.)

IATA: 6.1 (For reference only, please check.)

Packing group, if applicable

ADR/RID: I (For reference only, please check.)

IMDG: I (For reference only, please check.)

IATA: I (For reference only, please check.)

Environmental hazards

ADR/RID: Yes

IMDG: Yes

IATA: Yes

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

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

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

Listed.

New Zealand Inventory of Chemicals (NZIoC)

Listed.

PICCS

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

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/>

Other Information

The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest

and medical observation are therefore essential. Immediate administration of an appropriate inhalation therapy by a doctor, or by an authorized person, should be considered.

Disclaimer:

The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.