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ISO 9001: 2015

MATERIAL SAFETY DATA SHEET

Identification

1.1GHS Product identifier
bis(Tributyltin) oxide, 96%
Code T 2053

2.Hazard identification

2.1Classification of the substance or mixture

Acute toxicity - Oral, Category 3

Acute toxicity - Dermal, Category 4

Skin irritation, Category 2

Eye irritation, Category 2

Specific target organ toxicity \u2013 repeated exposure, Category 1

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

2.2GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H301 Toxic if swallowed
H312 Harmful in contact with skin
H315 Causes skin irritation
H319 Causes serious eye irritation
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)

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.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P273 Avoid release to the environment.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor/\u2026
P321 Specific treatment (see ... on this label).
P330 Rinse mouth.
P302+P352 IF ON SKIN: Wash with plenty of water/...
P312 Call a POISON CENTER/doctor/\u2026if you feel unwell.
P362+P364 Take off contaminated clothing and wash it before reuse.
P332+P313 If skin irritation occurs: Get medical

Response

advice/attention.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 If eye irritation persists: Get medical advice/attention.
P314 Get medical advice/attention if you feel unwell.
P391 Collect spillage.
P405 Store locked up.

Storage

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
tributyltin oxide	tributyltin oxide	56-35-9	none	100%

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. Half-upright position. Refer for medical attention.

In case of skin contact

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

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

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

4.2 Most important symptoms/effects, acute and delayed

ACUTE/CHRONIC HAZARDS: This material is toxic by ingestion and inhalation and is a skin and eye irritant.

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

Absorption, Distribution and Excretion

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

5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Provision to contain effluent from fire extinguishing.

5.2 Specific hazards arising from the chemical

This chemical is probably 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

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.

6.3 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.

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

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

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	Clear colorless liquid
Colour	Slightly yellow liquid.
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°C
Solubility	In water: INSOLUBLE
Partition coefficient n-octanol/water (log value)	log Kow= 3.84
Vapour pressure	<0.01 mm Hg (25 °C)
Density and/or relative density	1.17g/mL at 25°C(lit.)
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

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

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

no data available

10.6 Hazardous decomposition products

When heated to decomposition it emits acrid and irritating fumes.

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
no data available
STOT-repeated exposure
no data available
Aspiration hazard
no data available

12. Ecological information

12.1 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 ug/l, 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

12.2 Persistence and degradability

Tributyltin degraded with a half-life of 20 weeks in Toronto Harbor (Canada) water in the dark at 20°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°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°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).

12.3 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).

12.4 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°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).

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: UN2788 IMDG: UN2788 IATA: UN2788

14.2 UN Proper Shipping Name

ADR/RID: ORGANOTIN COMPOUND, LIQUID, N.O.S.

IMDG: ORGANOTIN COMPOUND, LIQUID, N.O.S.

IATA: ORGANOTIN COMPOUND, LIQUID, N.O.S.

14.3 Transport hazard class(es)

ADR/RID: 6.1 IMDG: 6.1 IATA: 6.1

14.4 Packing group, if applicable

ADR/RID: II IMDG: II IATA: II

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
tributyltin oxide	tributyltin oxide	56-35-9	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			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Not Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.

Section 16: Other Information

This safety data sheet should be used in conjunction with technical sheets. It does not replace them. The information given is based on our knowledge of this product, at the time of publication. It is given in good faith. The attention of the user is drawn to the possible risks incurred by using the product for any other purpose other than that for which it was intended. This does not in any way excuse the user from knowing and applying all the regulations governing his activity. It is the sole responsibility of the user to take all

precautions required in handling the product. The aim of the mandatory regulations mentioned is to help the user to fulfill his obligations regarding the use of hazardous products.

