

Chemical Safety Data Sheet

Section 1 IDENTIFICATION

GHS Product identifier: Tetrabutyl titanate

Surname: Tetra n-butyl titanate. Tetra n-butoxy titanium. 1-Butanol Titanium (4+) salt.

Recommended use of the chemical and restrictions on use:

TNBT is a type of very lively primary alcohol titanium oxide, hydrolyzes when contacts with moisture in air. TNBT is mainly used as catalyst in esterification reaction or transesterification, also be used as catalyst of polyolefin. It can be used to assist the adherence and crosslink of resin having alcohol group or carboxyl group, be used in heat resistant and corrosion resistant coating. It can also be used in manufacture of glass and glass fiber. TNBT can only be used in oil system.

CAS No.: 5593-70-4

EC No.: 227-006-8

Molecular formula: $\text{Ti}(\text{OC}_4\text{H}_9)_4$

Supplier's details: Shandong East Sunrise New Materials Co., Ltd

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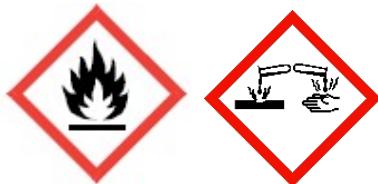
Section 2 HAZARDS IDENTIFICATION

4.1 Danger arrow: Xi

4.2 Description: inflammable. Irritates eye.

4.3 Label elements

Hazard Pictograms:



Signal word: Warning

Hazard statement(s): Flammable liquid and vapour. Harmful if swallowed. Causes skin irritation. Causes serious eye damage. May cause respiratory irritation. May cause drowsiness or dizziness.

Precautionary statement(s):

Prevention:

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/equipment. Use non-sparking tools. Take action to prevent static discharges. Wash hands [and...] thoroughly after handling. Do not touch eyes. Do not eat, drink or smoke when using this product. Avoid breathing dust/fume/gas/mist/vapours/spray. Use only outdoors or with adequate ventilation. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection/ hearing protection.

Response:

In case of fire: Use foam, dry powder, carbon dioxide or water spray to extinguish. IF ON SKIN (or

hair): Take off immediately all contaminated clothing. Rinse affected areas with water [or shower]. Specific treatment (see below). If skin irritation occurs: Get medical help. Wash contaminated clothing before reuse. If swallowed: Get medical help. Rinse mouth. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical help if you feel unwell. IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical help.

Storage:

Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.

Disposal:

Dispose of contents/container in accordance with local/regional/national/international regulations.

Other hazards which do not result in classification: /

Section 3 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Concentration%	Mark; R caution
1-Butanol Titanium (4+) salt	5593-70-4	≥99%	Xi; R10, 38,41
Butan-1-ol	71-36-3	≤1%	Xn; R10, 22,37/38,41,67

Section 4 FIRST AID MEASURES

Description of necessary first aid measures

Eye contact: In case of contact, immediately flush eyes with copious amounts of water or eye drops for at least 15 minutes with eyes open. Cleaning away of the precipitate must be operated by qualified medical personnel.

Skin contact: In case of contact, immediately wash skin with soap and copious amounts of water. Move precipitation by brush. If feel pain, get medical acid.

Ingestion: If swallowed, drink water and wash mouth. Don't eat and emetic. Send to hospital as soon as possible.

Inhalation: If inhaled, move to fresh air. If breathing is difficult, give oxygen, if not breathing give artificial respiration (do not use mouth-to-mouth breathing), send to hospital immediately.

Treatment: Treatment based on symptoms.

Section 5 FIREFIGHTING MEASURES

Suitable extinguishing media: Use foam, dry powder, water spray, etc.

Special hazards arising from the chemical: Liquid and vapour are flammable. May explode and burn in high temperature and fire and release toxic fumes.

Special protective actions for fire-fighters: Firefighters must wear air breathing apparatus, fire-fighting suits and protective gloves to extinguish in the upwind direction. Whenever possible, remove the container from the fire to open space and use spray water to cool unopened containers.

Section 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: It is recommended that emergency personnel wear protective masks and fire protective overalls. Do not touch the spill directly.

Environmental precautions: Isolate contaminated areas and restrict access.

Methods and materials for containment and cleaning up: Small amount of leakage: adsorption

with sand or other inert materials. Do not allow products to enter restricted areas such as sewers. A large amount of leakage: building a dike or digging a pit to contain. Transfer to a tank truck or special collector with an explosion-proof pump and transport to a waste disposal site for disposal.

Section 7 HANDLING AND STORAGE

Precautions for safe handling: There should be sufficient local exhaust in workplace. Operators should be trained and strictly follow the operating procedures. Operators are advised to wear protective masks, anti-static protective clothing and rubber gloves. Operators should load and unload lightly during handling to prevent damage to the package. There should be leakage treatment equipment in workplace. There may be harmful residues in empty containers.

Conditions for safe storage, including any incompatibilities: Store in a cool, dry, well-ventilated warehouse. Keep away from fire and heat. Protect from direct sunlight. The package should be sealed and not exposed to moisture. It should be stored separately from oxidants, flammable materials, etc., and should not be mixed. The storage area should be provided with suitable materials to contain spills.

Section 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters:

Source	Material name	TEEL-1	TEEL-2	TEEL-3
China Occupational Exposure Limits for Hazardous Agents in the Workplace	Tetrabutyl titanate	0.67 ppm	7.4 ppm	44 ppm

Appropriate engineering controls: Close strictly and provide sufficient local exhaust.

Individual protection measures

Eye/face protection: Wear a protective mask.

Skin protection: Wear anti-static protective clothing.

Respiratory protection: Air respirators should be worn during emergency rescue or evacuation. Type A Filter of sufficient capacity.

Thermal hazards: /

Section 9 PHYSICAL AND CHEMICAL PROPERTIES

Physical state	Yellowish transparent liquid
Colour	Colorless or yellowish
Odour	Like alcohol
Melting point/freezing point	-55.0℃
Boiling point or initial boiling point and boiling range	310-314℃
Flammability	Flammable liquid.
Lower and upper explosion limit/flammability limit	1.4%-11.2%
Flash point	37.5℃
Auto-ignition temperature	/
Decomposition temperature	/
pH	not available
Kinematic viscosity	/
Solubility	Hydrolyzes in presence of water
Partition coefficient: n-octanol/water (log value)	/

MSDS

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Vapour pressure	/
Density and/or relative density	0.996 (20°C,DIN51757)
Ti content:	13.7~14.5%
Relative vapour density	11.5
Particle characteristics	/

Section 10 STABILITY AND REACTIVITY

Reactivity: /**Chemical stability:** This material is stable in normal temperature.**Possibility of hazardous reactions:** /**Conditions to avoid:** Spark, high temperature and static electricity.**Incompatible materials:** Flammable materials and oxidizers.**Hazardous decomposition products:** Oxycarbides, etc.

Section 11 TOXICOLOGICAL INFORMATION

The evaluation to health is based on the properties of hydrolysis product and solvent.**Oral toxicity:** when hydrolysis product contacts water, Ti complexes will be formed and precipitate in gastrointestinal system and jam to cause pain.

Oral Median Lethal Dose (butyl alcohol) 790 mg/kg (rat).

Causes headache, sick and vomit, has the similar side effect as inhalation. Alcohol can make it more serious.

Skin: butanol can precipitate on the skin and be absorbed, to cause pain. Long-term contact can cause xerosis cutis and dermatitis.**Halation:** odor has narcotic effect, can cause headache, weary, dizzy, incongruity and unconscious.**Eyes:** can cause serious injury, Ti complexes will be formed when hydrolysis product contacts with water, it can precipitate in eyes.**Long-term effects:** has not been reported that it has negative effect in long-term effect.

Section 12 ECOLOGICAL INFORMATION

Toxicity: dangerous to aquatic.**Environmental distribution:** dissolves in water to form butanol, Ti complexes and TiO₂.

Butanol can dissolve in water, to reduce the Biological's survivability.

Persistence and degradation: has been reported that hydrolysis accelerates in water.**Effluent effect:** has not been reported.

Section 13 DISPOSAL CONSIDERATIONS

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.

Empty buckets has odor and compounds residue, observe all federal, state and local environmental regulations.

Abandoned buckets cannot be reused or welding, observe all federal, state and local environmental regulations.

Section 14 TRANSPORT INFORMATION

UN number: 1993
UN packaging level: III
UN Class: 3
transport by air
ICAO/IATA Class: 3
transport by ship
IMDG class: 3
Marine pollution: Not classified as a Marine Pollutant
transport name: Flammable Liquid N.O.S. (Tetra-n-Butyl Titanate)
road/railway
ADR/RID Class: 3

Section 15 REGULATORY INFORMATION

All ingredients in this product are based on each country's Chemical Catalog that is listed below:

U. S. TSCA

EC EINECS

Canadian DSL

Australian AICS

Korean ECL

Japanese ENCS

Chinese IECSC

classify: flammable 、 irritative

mark: Xi

HAZARD: R10: flammable

R38: irritate to skin

R41: be in danger to eye

Security Warning: S26:

In case of contact with eye, immediately flush eyes with flowing water, get medical attention.

S37/39: Wear chemical safety goggles and heavy rubber gloves.

Section 16 OTHER INFORMATION

Manufacturer: Shandong East Sunrise New Materials Co., Ltd

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Shandong, China.262618

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Note 1: When products contain two or more hazardous substances, Safety Data Sheets should be prepared based on the risk of the mixture.

Note 2: Manufacturer/supplier should ensure the correctness of the information contained in the safety data sheets, and updated in a timely manner.

Note 3: As a result of product features without the existence of certain information or no data available (such as boiling point does not exist for the solid) in the table with "/" logo.