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SAFETY DATA SHEET

Section 1. Identification

Product Name: Tantalum (V) butoxide

Product Type: Liquid

 CAS Number:
 51094-78-1

 Product Number:
 TA4781

Product Manufacturer: Ereztech LLC

11555 Medlock Bridge Road, Suite 100

Johns Creek, GA 30097

Product Information: (888) 658-1221

In Case of an Emergency: CHEMTREC: 1-800-424-9300 (USA);

+1 703-527-3887 (International); CCN836180
*** Contact manufacturer for all non-emergency calls.

Section 2. Hazards Identification

Appearance/Odor: Pale yellow liquid, alcohol-like odor.

Classification: FLAMMABLE LIQUIDS - Category 3, H226

SKIN CORROSION/IRRITATION - Category 2, H315

SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2A, H319 SPECIFIC TARGET ORGAN TOXICITY, SINGLE EXPOSURE; RESPIRATORY TRACT IRRITATION – Category 3, H335

GHS label Elements

Hazard Pictograms:



Signal Word: WARNING.

Hazard Statements: H226: Flammable liquid and vapor.

H315: Causes skin irritation.

H319: Causes serious eye irritation.H335: May cause respiratory irritation.

Precautionary Statements

Prevention: P210: Keep away from heat/sparks/open flames/hot surfaces. –

No smoking.

Section 2. Hazards Identification

Prevention (cont.): P231 + P232: Handle under inert gas. Protect from moisture.

P233: Keep container tightly closed.

P240: Ground/bond container and receiving equipment.

P241: Use explosion-proof electrical/ventilating/lighting/handling equipment.

P242: Use only non-sparking tools.

P243: Take precautionary measures against static discharge.

P261: Avoiding breathing gas/mists/vapors/sprays.

P264: Wash skin thoroughly after handling.

P271: Use only in outdoors or in a well-ventilated area.

P280: Wear protective gloves/ protective clothing/ eye protection/

face protection.

P302 + P352: IF ON SKIN: Wash with plenty of soap and water.

P303 + P361 + P353: If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present. Continue rinsing.

P312: Call a POISON CENTER or doctor/physician if you feel unwell.

P332 + P337 + P313: If skin or eye irritation occurs: Get medical attention/advice.

P362: Take off contaminated clothes and wash before reuse.

P370 + P378: In case of fire: Use alcohol-resistant foam, dry chemical or carbon dioxide for extinction.

P403 +P233 + P235: Store in a well ventilated area. Keep

container tightly closed. Keep cool.

P405: Store locked up.

P422: Store contents under inert gas.

P501: Dispose of contents/ container to an approved wasted

disposal plant.

This material is considered hazardous by the OSHA Hazard **OSHA/HCS Status:**

Communication Standard (29 CFR 1910.1200).

Reacts with water and moist air to release n-butanol. **Hazards Not Otherwise**

Classified (HNOC):

Section 3. Composition/Information on Ingredients

Substances

Storage:

Disposal:

Response:

Formula $: C_{20}H_{45}O_5Ta$: 546.52 g/mol **Molecular Weight**

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Section 3. Composition/Information on Ingredients

: 51094-78-1 CAS-No.

Ingredient Name	%	CAS Number
Tantalum (V) ethoxide	≥ 99	51094-78-1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First Aid Measures

Description of Necessary First Aid Measures

General Advice: Move out of dangerous area. Call a physician or POISON CONTROL CENTER if

symptoms develop or if you feel unwell. Show this safety data sheet to the

doctor in attendance.

Immediately flush eyes with plenty of water, occasionally lifting the upper and **Eye Contact:**

lower eyelids. Check for and remove any contact lenses. Continue rinsing. Seek

medical attention if eye irritation develops and persists.

Skin Contact: Take off contaminated clothing and shoes immediately. Wash off contaminated

skin with soap and plenty of water. Seek medical attention if irritation develops

and persists or if burns occur.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for

> breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately.

Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Call a POISON CENTER or doctor/physician if symptoms develop or if

you feel unwell.

Rinse mouth. Do NOT induce vomiting. Remove dentures if any. If vomiting Ingestion:

> occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in

recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Call a POISON CENTER or doctor/physician if symptoms develop or if you feel unwell.

Most Important Symptoms/Effects, Acute And Delayed Potential Acute Health Effects

Eye Contact: Product causes serious eye irritation. Symptoms may include stinging, tearing,

redness, swelling and blurred vision.

Inhalation: May cause irritation to the respiratory tract. Exposure may be expected to

produce symptoms ranging from coughing, shortness of breath, dizziness,

headache, nausea, depression of the CNS and narcosis.

Section 4. First Aid Measures

Skin Contact: Product causes skin irritation. Symptoms may include burning, itching, pain,

redness, and swelling.

Ingestion: May be harmful if swallowed. Symptoms from ingestion may include headache,

giddiness, confusion, depression of the CNS and narcosis.

Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary

Notes to Physician: Treat symptomatically.

Specific Treatments: No specific treatment.

Protection of First Responders: No action taken shall be taken involving any personal risk

without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See Toxicological Information (Section 11)

Section 5. Fire Fighting Measures

Suitable Extinguishing Media: THE MOST EFFECTIVE FIRE EXTINGUISHING AGENT IS DRY

CHEMICAL POWDER PRESSURIZED WITH NITROGEN. For small fires, vermiculite, sand, dry chemical or carbon dioxide (CO₂) may also be used. For large fires, large quantities of water (flooding) may be applied as a spray or a mist to

control the fire and cool affected containers.

control the life and cool affected containers.

Unsuitable Extinguishing Media: DO NOT USE WATER OR FOAM unless absolutely necessary as product reacts with water to produce flammable liquids and

vapors (n-butanol).

Unusual Fire and This material reacts with water and compounds containing active hydrogen such as alcohols and acids to produce

active hydrogen such as alcohols and acids to produce flammable liquids and gases. Product runoff to sewer may create a fire or explosion hazard. Vapors and gases produced are heavier than air and will spread along the ground. Vapors

may accumulate in low or confined areas or travel a

considerable distance to an ignition source and flashback.

Product of Combustion: Products of complete combustion include carbon oxides (CO_X)

and tantalum oxides. Irritating and potentially harmful fumes

may be released under fire conditions.

Protection of Firefighters: Promptly isolate the scene by removing all persons from the

vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Avoid contact with skin or eyes. Avoid breathing sprays,

mists, vapors and gases.

Section 5. Fire Fighting Measures

Protection of Firefighters (cont.):

Eliminate all local and distant ignition sources. Move containers from fire area if process can be accomplished without risk to firefighters. To reduce the possibility of explosion, use a water spray or fog to reduce direct vapors and to cool unopened containers. Do not cut, grind, drill or weld on or near product containers (even empty) of this product because an explosion may result.

Fire-fighters should wear appropriate protection equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in a positive pressure mode.

Section 6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

For Non-Emergency Personnel:

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid the formation and inhalation of sprays, mists, vapors and gases. Provide adequate ventilation. Wear respiratory protection. Put on appropriate personal protective equipment.

For Emergency Responders:

If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For nonemergency personnel".

Environmental Precautions:

Do not allow dispersal of spilled material and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for Containment

General:

Eliminate all local and distant ignition sources. Move containers from spill area if safe to do so. Avoid allowing the spilled material to get wet or using water to clean up spillages or residues. Use spark-proof tools and explosion-proof equipment.

Small Spill:

Contain and collect spillage with non-combustible, dry absorbent material (e.g. sand, earth, vermiculite or diatomaceous earth) and place in dry, sealed container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor.

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Section 6. Accidental Release Measures

Large Spill:

Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, dry absorbent material (e.g. sand, earth, vermiculite or diatomaceous earth) and place in dry, sealed container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product.

Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and Storage

Precautions:

Protective Measures:

General Occupational Hygiene:

Safe Storage Conditions:

Product is moisture sensitive; handle under a dry, inert gas. Nitrogen with less than 5 ppm each of moisture and oxygen is recommended. Keep away from all sources of ignition – NO SMOKING. Keep container tightly sealed. Avoid contact with skin, eyes and clothing. Avoid the formation and inhalation of sprays, mists, vapors and gases. Do not ingest. Avoid prolonged exposure. Ensure adequate ventilation.

Protect against electrostatic charges. Use explosion-proof electrical/ventilating/lighting/handling equipment. Use only non-sparking tools and equipment. Put on appropriate personal protective equipment (see Section 8). Keep in the original container kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking or smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Product is moisture sensitive; store under an inert gas.

Nitrogen with less than 5 ppm each of moisture and oxygen is recommended. Keep away from all sources of ignition – NO SMOKING. Store in original container protected from direct sunlight in a dry and well-ventilated area, away from incompatible materials noted above and food and drink. Keep container tightly closed and sealed until ready for use. Store locked up.

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Section 8. Exposure Controls/Personal Protection

Introductory Remarks: These recommendations provide general guidance for handling

this product. Because work environments and material handling practices vary, safety procedures should be developed for each

intended application. While developing safe handling

procedures, do not overlook the need to clean equipment and conduct regular repairs. Waste from these procedures should

be handled in accordance with Section 13.

Occupational Exposure Limits: Product contains no substances with occupational exposure

limit values.

Engineering Controls: Properly operating chemical fume hood designed for hazardous

chemicals and having an average face velocity of at least 100

feet per minute. Provide an eyewash/shower station.

Environmental Exposure Controls: Emissions from ventilation or work process equipment should

be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable

levels.

Individual Protection Measures

Hygiene Measures: Avoid all unnecessary exposure. Wash all exposed skin (hands,

forearms and face) thoroughly after handling chemical

products, before eating, smoking and using the lavatory and at

the end of the working period. Remove all soiled and contaminated clothing immediately. Do not inhale sprays, mists, vapors or gases. Avoid contact with eyes and skin. Ensure that eyewash stations and safety showers are close to

the workstation location.

Eye/Face Protection: Safety eyewear complying with an approved standard should

be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles, faceshield (8-inch minimum). Refer to 29 CFR 1910.133, ANSI Z87.1, or European Standard EN166.

Skin Protection

Hand Protection: Chemical-resistant, impervious gloves complying with an

approved standard should be worn at all times when handling

chemical products if a risk assessment indicates this is

necessary.

Section 8. **Exposure Controls/Personal Protection**

Hand Protection (cont.):

Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: Chemicalresistant 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. For full contact, use

Neoprene or nitrile rubber.

Other Skin Protection:

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory Protection:

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Section 9. Physical and Chemical Properties

Physical State: Liquid.

Pale yellow. Color: Alcohol-like. Odor:

Odor Threshold: No data available. No data available. pH: No data available. **Freezing Point:**

217 °C (422.6 °F) @ 0.15 mm Hg. **Boiling Point:** 40.0 °C (104 °F) - closed cup. Flash Point:

No data available. **Auto-ignition temperature:**

Section 9. Physical and Chemical Properties

1.31 at 25°C. **Relative Density:**

Vapor Pressure: <0.01 mm Hg @ 20°C.

Vapor Density: >1 @ 20°C.

Water Solubility: Reacts with water to produce flammable liquid and vapors.

1.4 – 11.2 volume % (lower, upper; based on n-butanol **Explosion Limits:**

released by hydrolysis.

No data available. **Evaporation Rate:** No data available. **Viscosity:**

< 5 %. **VOC Content:**

VOCs are calculated following the requirements under 40 CFR, Part 59, Subpart C for Consumer Products and Subpart D for Architectural Coatings.

Section 10. Stability and Reactivity

This product reacts with water to produce n-butanol, a Reactivity: highly flammable liquid/vapor mixture.

This product is stable when stored under a dry, inert Chemical Stability: atmosphere and away from heat. Nitrogen containing less than 5 ppm each moisture and air is recommended. This

product is not sensitive to impact.

Conditions to Avoid: Exposure to water/moisture, sources of ignition (heat, flames, sparks, electrostatic discharge), extremes of

temperature and direct sunlight.

Water, compounds containing active hydrogen (alcohols, **Incompatible Materials:**

acids) and strong oxidizing agents.

Hazardous Decomposition Products: In contact with water, product releases n-butanol, a

> highly flammable liquid/vapor mixture. Hazardous decomposition products formed under fire conditions: nbutanol, organic acid vapors and tantalum oxide fumes.

In the event of a fire: see section 5.

Possibility of Hazardous Reactions: Under normal conditions of storage and use noted above,

> hazardous reactions will not occur. Hazardous reactions or instability may occur under certain conditions of

> storage or use. In contact with water, product produces n-butanol, a highly flammable liquid/vapor mixture.

Vapors may form an explosive mixture with air.

Section 11. Toxicological Information

Information on Toxicological Effects

Acute Toxicity

: If ingested or inhaled, reaction of the product with water in the body will produce n-butanol which may lead to symptoms associated with alcohol consumption and/or poisoning. Symptoms may include depression of CNS and narcosis.

Irritation/Corrosion

: Product may be expected to cause skin irritation and serious eye irritation.

Sensitization

: No specific data available.

Germ Cell Mutagenicity Carcinogenity

: No specific data available.

IARC

: No component of this product present at levels greater

than 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH

: No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by ACGIH.

NTP

: No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by NTP.

OSHA

: No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by OSHA.

Reproductive Toxicity

: This product is not expected to cause reproductive or developmental effects.

Teratogenicity

: No specific data available.

Specific Target Organ Toxicity (Single Exposure)

: Respiratory tract irritation.

Specific Target Organ Toxicity (Repeated Exposure)

: No specific data available.

Aspiration Hazard

: No specific data available.

Information on the Likely **Routes of Exposure**

: Common routes of exposure: inhalation, dermal (failure to use skin protection), eye (failure to use safety eyewear). Less common: ingestion (failure to employ recommended hygiene measures (e.g. smoking or eating after handling product without washing hands or using hand protection).

Section 11. Toxicological Information

Additional Information

: To the best of our knowledge, the chemical, physical and toxicological properties of this product have not been thoroughly investigated.

Section 12. Ecological Information

Numerical Measures of Toxicity

Component	CAS No	Test	Species	Dose	Exposure
n-butanol	71-36-3	LC50	Pimephales promelas	1,840 mg/l	96 h
		EC50	Daphnia magna	1,983 mg/l	48 h

Persistence and Degradability

Biodegradability

Bioaccumulative Potential

Mobility in Soil

Other Adverse Effects

: No specific data available.

: No specific data available.

: No specific data available.

: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13. Disposal Considerations

Waste Treatment Methods

Product

Contaminated Packaging

- : Dispose of in accordance with local, state, and federal regulations. Refer to 40 CFR 260-299 for complete waste disposal regulations. Consult your local, state, or federal agency before disposing of any chemicals.
- : Empty containers retain product residue (liquids, vapors and gases) and can be dangerous. Dispose of as unused product. DO NOT EXPOSE SUCH CONTAINERS TO MOISTURE, HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

Section 14. Transport Information

	DOT	IMDG	IATA
UN Number	UN 1993	UN 1993	UN 1993
UN Proper	Flammable liquid, n.o.s.	FLAMMABLE LIQUID,	Flammable liquid, n.o.s.
Shipping Name	(Tantalum(V) n-butoxide)	N.O.S. (Tantalum(V)	(Tantalum(V) n-butoxide)
		n-butoxide)	
Transport	3	3	3
Hazard Classes			
Packing Group	III	III	Ш
Environmental	-	-	-
Hazards			
Additional	-	EMS-No: F-E, S-E	-
Information			

Special Precautions for User

: Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transporting in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable.

Section 15. Regulatory Information

TSCA (Toxic Substance Control Act):

This product is listed on the U.S. Toxic Substances Control Act Chemical Inventory (TSCA Inventory).

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard (Flammable liquid), Acute Health Hazard (Skin corrosion or irritation; Serious eye damage or eye irritation; Specific target organ toxicity, single exposure: respiratory tract irritation).

Massachusetts Right to Know Components

No components are subject to Massachusetts Right to Know Act.

Pennsylvania Right to Know Components

No components are subject to Pennsylvania Right to Know Act.

New Jersey Right to Know Components

No components are subject to New Jersey Right to Know Act.

Section 15. Regulatory Information

California Proposition 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

Section 16. Other Information

National Fire Protection Association (U.S.A.)



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Copyright © 2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

HMIS Rating

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HEALTH	2
FLAMMABILITY	2
PHYSICAL HAZARD	1

History

Date of printing : 3/23/2020

Date of issue/Date of Revision : 3/23/2020

Date of previous issue : 1/15/18

References : None available

Abbreviations and Acronyms

ACGIH: American Conference of Governmental Industrial Hygienists.

ATE: Acute Toxicity Estimate

CAS: Chemical Abstracts Service (division of the American Chemical Society).

DOT: US Department of Transportation.

Section 16. Other Information

Abbreviations and Acronyms

GHS: Globally Harmonized System of Classification and Labeling of Chemicals.

HMIS: Hazardous Materials Identification System.

HNOC: Hazards Not Otherwise Classified.

IARC: International Agency for Research on Cancer.

IATA: International Air Transport Association.

IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA).

IDLH: Immediately Dangerous to Life or Health (US National Institute for Occupation Health and Safety (NIOSH))

Safety (NIOSH)).

IMDG: International Maritime Code for Dangerous Goods.

NFPA: National Fire Protection Association.

NIOSH: National Institute of Occupational Safety and Health.

NTP: National Toxicology Program.

OSHA: Occupational Safety and Health Administration.

PEL: Permissible Exposure Limits. REL: Recommended Exposure Limits.

SARA: Superfund Amendments and Reauthorization Act.

STOT: Specific Target Organ Toxicity. TLV: Threshold Limit Values (ACGIH).

TWA: Time Weighted Average. VOC: Volatile Organic Compound.

Disclaimer

The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by Ereztech LLC regarding the accuracy or completeness of the information. Ereztech LLC shall not be liable for any damages resulting from the handling, or from the contact with the above product.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.