

11555 Medlock Bridge Road, Suite 100, Johns Creek, GA 30097, USA

T: +1.888.658.1221 F: 1.678.619.2020

E: info@ereztech.com W: https://ereztech.com

SAFETY DATA SHEET

Section 1. Identification

Product Name: <u>Tris(diethylamido)(tert-butylimido)niobium(V)</u>

Product Type: Liquid

CAS Number: 210363-27-2
Product Number: NB3272

Recommended Use: Laboratory chemicals, synthesis of substances.

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: Yellow to brown liquid, odor not determined.

Classification: FLAMMABLE LIQUIDS – Category 2, H225

SUBSTANCES AND MIXTURES WHICH, IN CONTACT WITH WATER,

EMIT FLAMMABLE GASES - Category 2, H261

SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2A, H319
SPECIFIC ORGAN TOXICITY, SINGLE EXPOSURE; RESPIRATORY

TRACT IRRITATION - Category 3, H335

GHS Label Elements

Hazard Pictograms:





Signal Word: DANGER.

Hazard Statements: H225: Highly flammable liquid and vapor.

H261: In contact with water releases flammable gas.

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

Section 2. Hazards Identification

Precaut	ionary	Statements

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. – No smoking.

P223: Do not allow contact with water.

P231 + P232: Handle and store contents under inert gas. Protect from moisture.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion proof electrical/ventilating/lighting/processing equipment.

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing sprays/mists/vapors/gases.

P264 + P265: Wash hands and skin thoroughly after handling. Do not touch eyes.

P271: Use only outdoors or with adequate ventilation.

P280: Wear protective gloves/ protective clothing/ eye protection/ face protection/hearing protection.

P302 + P335 + P334: IF ON SKIN: Brush off loose particles from skin and immerse in cool water.

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

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

P319: Get medical help if you feel unwell.

P337 + P317: If eye irritation persists: Get medical help.

P370 + P378: IN case of fire: Use CO₂, dry chemical or foam for extinction.

P402 + P404: Store in a dry place. Store in a closed container.

P403 + P233 + P235: Store in a well ventilated place. Keep container tightly closed. Keep cool.

P405: Store locked up.

P501: Dispose of contents/container in accordance with federal, state and local regulations.

This material is considered hazardous by the OSHA Hazard

Communication Standard (29 CFR 1910.1200).

Product reacts violently with water to release flammable gases.

Response:

Storage:

Disposal:

OSHA/HCS Status:

Hazards Not Otherwise Classified (HNOC):

Section 3. Composition/Information on Ingredients

: Mono-constituent Substance Type

Formula $: C_{16}H_{39}N_4Nb$ **Molecular Weight** : 380.41 g/mol

Ingredient Name	%	CAS Number
Tris(diethylamido)(tert-butylimido)niobium(V)	≥ 98	210363-27-2

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. If unconscious, place in recovery position and get

> medical help immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical help 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 if easy to do. Continue

rinsing. Get medical help if eye irritation develops and persists.

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

skin with plenty of water. Get medical help if irritation develops and persists, if

symptoms develop or if you feel unwell.

Remove person to fresh air and keep comfortable for breathing. If not Inhalation:

> 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. Get medical help if

symptoms develop or if you feel unwell.

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

> occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. Get medical help if

symptoms develop or if you feel unwell.

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

Eye Contact: Symptoms may include stinging, tearing, redness, swelling and blurred vision.

May be irritating to respiratory system. Symptoms may include coughing, sore Inhalation:

throat, nausea, headache, vomiting.

Skin Contact: Symptoms may include an itching or burning sensation, reddening and swelling.

Ereztech NB3272 Page 3 of 14 Revision: 1.30

Section 4. First Aid Measures

Ingestion: Product may be expected to be irritating to mucous membranes. Symptoms may

include cramping, localized pain, headache, nausea and vomiting.

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

General Hazards: Product reacts violently with water to release flammable

gases.

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

CHEMICAL POWDER PRESSURIZED WITH NITROGEN. Vermiculite, sand, dry chemical or carbon dioxide (CO₂) may

also be used.

Unsuitable Extinguishing Media: DO NOT USE WATER OR FOAM as product reacts to produce

extremely flammable vapors upon contact with water.

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: Decomposition products include carbon oxides (CO_x) , nitrogen

oxides (NO_x) and niobium oxides. Irritating and potentially harmful fumes may be generated during exposure to elevated

temperatures or open flame.

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 the formation and

inhalation of sprays, mists, vapors and gases.

Eliminate all local and distant ignition sources. Move containers from fire area if process can be accomplished

without risk to firefighters.

Section 5. Fire Fighting Measures

Protection of Firefighters (cont.):

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. Keep unnecessary and unprotected personnel from entering. Remove all sources of ignition. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. 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 Non-Emergency 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:

Spilled material will likely give off smoke and fumes. Ignition may occur immediately. Eliminate all local and distant ignition sources. Move containers from spill area if safe to do so. Avoid the formation and inhalation of sprays and mists. 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. Dispose of collected spillage in accordance with federal, state and local regulations. Contaminated extinguishing material may pose the same hazard as the spilled product.

Section 6. Accidental Release Measures

Small Spill: Collect spillage using a non-combustible, dry absorbent

material (e.g. dry sand, vermiculite or diatomaceous earth) and

place in dry, sealed container for disposal.

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. dry sand, vermiculite or diatomaceous earth) and place in

dry, sealed container for disposal.

Note: see Section 1 for emergency contact information and

Section 13 for waste disposal.

Section 7. Handling and Storage

Precautions: Product reacts with water and moisture in the air to release

flammable gases; 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.

Protective Measures: Protect against electrostatic discharges. Use explosion-proof

electrical/ventilating/lighting/handling equipment. Use nonsparking 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.

General Occupational Hygiene: 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 and smoking. Remove contaminated clothing and protective

equipment before entering eating areas. See also Section 8 for

additional information on hygiene measures.

Safe Storage Conditions: Product reacts with water and moisture in the air to release

flammable gases; store under an inert gas. Nitrogen with less than 5 ppm each of moisture and oxygen is recommended. Store refrigerated at 2 - 8 °C. Keep away from all sources of

ignition – NO SMOKING.

Section 7. Handling and Storage

Safe Storage Conditions (cont.):

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.

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 explosion-proof, 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:

Wash 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. Avoid the formation and inhalation of 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 sprays or mists.

Section 8. Exposure Controls/Personal Protection

Eye/Face Protection (cont.):

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. 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: Chemical-resistant gloves. For full contact, wear Neoprene or nitrile rubber 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.

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.

Color:

Yellow-brown.

Ereztech NB3272 Page 8 of 14 Revision: 1.30

Section 9. Physical and Chemical Properties

Odor: No data available.
Odor Threshold: No data available.
pH: No data available.
Melting Point: No data available.
Boiling Point: No data available.

Flash Point: -3 °C (27 °F) – closed cup.

Flammability (solid): No data available.

Specific Gravity: 1.015 g/cm³.

Vapor Pressure: No data available.
Vapor Density: No data available.

Water Solubility: Insoluble. Reacts with water to release highly flammable

gases.

Section 10. Stability and Reactivity

Reactivity:

Chemical Stability:

Conditions to Avoid:

Incompatible Materials:

Hazardous Decomposition Products:

This product reacts violently with water and compounds containing active hydrogen such as alcohols and acids to produce a highly flammable gas. Auto ignition may occur.

This product is stable when stored under a dry, inert atmosphere and away from heat. Nitrogen containing less than 5 ppm each moisture and air and a temperature range of 2 – 8 °C is recommended.

Exposure to air/water/moisture, sources of ignition (heat, flames, sparks, electrostatic discharge), extremes of temperature and direct sunlight.

Water/moist air, oxygen, polyethylene, polypropylene, carbon steel, strong oxidizing agents and compounds containing active hydrogen such as alcohols or acids.

Under normal conditions of storage and use, hazardous decomposition products should not be produced. In contact with water, product releases highly flammable gases. Hazardous decomposition products formed under fire conditions: carbon oxides (CO_X) , nitrogen oxides (NO_X) and niobium oxide particles and fumes. Irritating fumes and organic acid vapors may be generated during exposure to elevated temperatures or open flame. In the event of a fire: see section 5.

Ereztech NB3272 Page 9 of 14 Revision: 1.30

Section 10. Stability and Reactivity

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 air/water, product releases extremely flammable gases.

Section 11. Toxicological Information

Acute Toxicity

Irritation/Corrosion

Sensitization

Germ Cell Mutagenicity

Carcinogenity

IARC

ACGIH

NTP

OSHA

Reproductive Toxicity

Teratogenicity

Specific Target Organ Toxicity

(Single Exposure)

Specific Target Organ Toxicity

(Repeated Exposure)

Aspiration Hazard

Information on the Likely

Routes of Exposure

: No specific data available.

: Causes serious eye irritation.

: No specific data available.

: No specific data available.

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

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

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

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

: No specific data available.

: No specific data available.

Inhalation – May cause respiratory tract irritation.

: No specific data available.

: No specific data available.

: 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.

Ecological Information Section 12.

Numerical Measures of Toxicity

Toxicity to Fish

Toxicity to Daphnia and other

Aquatic Invertebrates

Toxicity to Algae

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.

Disposal Considerations Section 13.

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 OPENED/EMPTY CONTAINERS TO MOISTURE/WATER, HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION: THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

Ereztech NB3272 Page 11 of 14 Revision: 1.30

Section 14. Transport Information

	DOT	IMDG	IATA
UN Number	UN3399	UN3399	UN3399
UN Proper Shipping	Organometallic	ORGANOMETALLIC	Organometallic
Name	substance, liquid,	SUBSTANCE, LIQUID,	substance, liquid,
	water-reactive,	WATER-REACTIVE,	water-reactive,
	flammable	FLAMMABLE	flammable
	(Tris(diethylamido)(tert	(Tris(diethylamido)(tert	(Tris(diethylamido)(tert
	-	-	-
	butylimido)niobium(V))	butylimido)niobium(V))	butylimido)niobium(V))
Transport Hazard	4.3(3)	4.3(3)	4.3(3)
Classes			
Packing Group	П	П	II
Environmental Hazards	-	-	-
Additional Information	-	EMS-No: F-G, S-N	-

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 not listed on the U.S. Toxic Substances Control Act Chemical Inventory (TSCA Inventory). Use of this product is restricted to research and development only. This product must be used under the supervision of a technically qualified individual as defined by the TSCA. This product must not be used for commercial purposes or in formulations for commercial purposes.

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), Reactivity Hazard (In contact with water emits flammable gas), Acute Health Hazard (Serious eye damage or eye irritation; Specific Target Organ Toxicity (STOT), single exposure: respiratory irritation).

Massachusetts Right to Know Components

No components are subject to Massachusetts Right to Know Act.

Section 15. Regulatory Information

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.

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.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

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

HEALTH	2
FLAMMABILITY	3
PHYSICAL HAZARD	1

History

Date of Issue/Date of Revision : 1/28/2024.

Date of Previous Issue : 3/31/2020.

References : None available.

Section 16. Other Information

Abbreviations and Acronyms

ACGIH: American Conference of Governmental Industrial Hygienists.

ATE: Acute Toxicity Estimate

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

CLP: Classification, Labeling and Packaging (European Union (EU)).

DOT: US Department of Transportation.

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)).

IMDG: International Maritime Code for Dangerous Goods.

NFPA: National Fire Protection Association.

NIOSH: National Institute of Occupational Safety and Health.

NTP: National Toxicology Program.

OECD: Organization for Economic Co-Operation and Development.

OEL: Occupational Exposure Limit.

OSHA: Occupational Safety and Health Administration.

PEL: Permissible Exposure Limits.

REL: Recommended Exposure Limits.

SARA: Superfund Amendments and Reauthorization Act.

STEL (ST): Short Term Exposure Limit (ACGIH/NIOSH)

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.