



# SAFETY DATA SHEET

## Section 1. Identification

<b>Product Name:</b>	Tris(diethylamido)(tert-butylimido)niobium(V).
<b>Product Type:</b>	Liquid.
<b>CAS Number:</b>	210363-27-2
<b>Product Number:</b>	NB3272
<b>Product Manufacturer:</b>	Ereztech LLC 11555 Medlock Bridge Road, Suite 100 Johns Creek, GA 30097
<b>Product Information:</b>	(888) 658-1221
<b><u>In case of an emergency:</u></b>	(888) 658-1221 (for spill, leak, fire or exposure) *** Contact manufacturer for all non-emergency calls.

## Section 2. Hazards Identification

### Emergency Overview

<b>Appearance/Odor:</b>	Yellow-brown liquid, odor not determined.
<b>Classification:</b>	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

<b>Signal word:</b>	DANGER.
<b>Hazard statements:</b>	H225: Highly flammable liquid and vapor. H261: In contact with water releases flammable gas. H319: Causes serious eye irritation. H335: May cause respiratory irritation.

### **Hazard pictograms:**



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### Section 2. Hazards Identification

#### Precautionary statements

##### **Prevention:**

- P210: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
- P223: Keep away from any possible contact with water, because of violent reaction and possible flash fire.
- 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/processing equipment.
- P242: Use only non-sparking tools.
- P243: Take precautionary measures against static discharge.
- P261: Avoid breathing vapors/fumes/sprays.
- P264: Wash skin thoroughly after handling.
- P271: Use only outdoors or in a well-ventilated area.
- P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.

##### **Response:**

- P303 + P361 + P353: IF ON SKIN: Remove/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.
- P334 + P335: Brush off loose particles from skin and immerse in cool water/wrap in wet bandages.
- P337 + P313: If eye irritation persists: Get medical advice/attention.
- P370 + P378: IN case of fire: Use CO<sub>2</sub>, dry chemical or foam for extinction.

##### **Storage:**

- P402 + P404: Store in a dry place and in a closed container.
- P403 + P233 + P235: Store in a well ventilated place. Keep container tightly closed. Keep cool.
- P405: Store locked up.

##### **Disposal:**

- P501: Dispose of contents/ container to an approved waste disposal plant.

##### **OSHA/HCS status:**

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

##### **Hazards not otherwise classified:**

Reacts violently with water.

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### Section 3. Composition/Information on Ingredients

#### Substances

**Formula** : C<sub>16</sub>H<sub>39</sub>N<sub>4</sub>Nb  
**Molecular weight** : 380.41 g/mol  
**CAS-No.** : 210363-27-2

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. Consult a physician. Show this safety data sheet to the doctor in attendance.

**Eye Contact:** Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue rinsing. Get immediate medical attention.

**Skin Contact:** Wash off contaminated skin with soap and plenty of water. Get immediate medical attention.

**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 immediately.

**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. 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 physician or POISON CONTROL CENTER immediately.

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

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

**Inhalation:** May cause allergy or asthma symptoms or breathing difficulties if inhaled.

**Skin Contact:** If skin is wet, may cause skin irritation due to heat released from product's reaction with water. Symptoms may include burning, itching and redness.

**Ingestion:** May be expected to be irritating to mucous membranes.

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## Section 4. First Aid Measures

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

<b>Notes to Physician:</b>	Treat symptomatically.
<b>Specific Treatments:</b>	No specific treatment.
<b>Protection of First Responders:</b>	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

<b>General Hazards:</b>	None identified.
<b>Suitable Extinguishing Media:</b>	THE MOST EFFECTIVE FIRE EXTINGUISHING AGENT IS DRY CHEMICAL POWDER PRESSURIZED WITH NITROGEN. Vermiculite, sand, dry chemical or carbon dioxide (CO <sub>2</sub> ) may also be used.
<b>Unsuitable Extinguishing Media:</b>	DO NOT USE WATER OR FOAM as product reacts to produce extremely flammable vapors upon contact with water.
<b>Fire and Explosion Hazards:</b>	This material reacts with water and compounds containing active hydrogen such as alcohols and acids. Do not cut, grind, drill or weld on or near the container (even empty) of this product because an explosion may result. Keep away from heat, sparks and flame.
<b>Product of Combustion:</b>	Decomposition products include carbon oxides (CO <sub>x</sub> ), nitrogen oxides (NO <sub>x</sub> ) and niobium oxides.
<b>Protection of Firefighters:</b>	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. 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

<b>For Non-emergency Personnel:</b>	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.
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### Section 6. Accidental Release Measures

**For Non-emergency Personnel:  
(cont.)**

Vapors can accumulate in low areas. Do not touch or walk through spilled material. Avoid mist and aerosol formation. Avoid inhalation of mist, vapors and aerosols. 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**

**Small Spill:**

Eliminate all ignition sources. Move containers from spill area. 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. 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.

**Large Spill:**

Eliminate all ignition sources. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. 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. 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.

### Section 7. Handling and Storage

**Precautions:**

Handle under an inert gas. No smoking. Take precautions to prevent buildup of static charge. Use explosion-proof equipment. Avoid contact with air, moisture and water.

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### Section 7. Handling and Storage

<b>Precautions (cont.):</b>	Avoid contact with skin, eyes and clothing. Avoid formation and inhalation of mists, aerosols and vapors. Do not ingest. Provide adequate ventilation.
<b>Protective Measures:</b>	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.
<b>General Occupational Hygiene:</b>	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.
<b>Safe Storage Conditions:</b>	Air, moisture and water sensitive. Handle and store under inert gas. Nitrogen with less than 5 ppm each of moisture and oxygen is recommended. Keep away from air, moisture, heat, sparks and open flames. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (oxidizing agents) and food and drink. Keep container tightly closed and sealed until ready for use. Store locked up.

### Section 8. Exposure Controls/Personal Protection

<b>Introductory Remarks:</b>	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.
<b>Occupational Exposure Limits:</b>	Product contains no substances with occupational exposure limit values.
<b>Engineering Controls:</b>	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.

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### Section 8. Exposure Controls/Personal Protection

**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. Do not inhale mists, vapors or aerosols. 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 aerosols or dusts.

**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.

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### Section 8. Exposure Controls/Personal Protection

<b>Other Skin Protection:</b>	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.
<b>Respiratory Protection:</b>	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

<b>Physical State:</b>	Liquid.
<b>Color:</b>	Yellow-brown.
<b>Odor:</b>	No data available.
<b>Odor Threshold:</b>	No data available.
<b>pH:</b>	No data available.
<b>Melting Point:</b>	No data available.
<b>Boiling Point:</b>	No data available.
<b>Flash Point:</b>	-3 °C (27 °F) – closed cup.
<b>Flammability (solid):</b>	No data available.
<b>Specific Gravity:</b>	1.015 g/cm <sup>3</sup> .
<b>Vapor Pressure:</b>	No data available.
<b>Vapor Density:</b>	No data available.
<b>Water Solubility:</b>	Insoluble; reacts with water to produce flammable gas.

### Section 10. Stability and Reactivity

<b>Reactivity:</b>	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.
<b>Chemical Stability:</b>	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 is recommended. This product is not sensitive to impact.



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### Section 10. Stability and Reactivity

<b>Conditions to Avoid:</b>	Heat, flames, sparks and exposure to air/water/moisture. Avoid extremes of temperature and direct sunlight.
<b>Incompatible Materials:</b>	Air/water/moisture, strong oxidizing agents and compounds containing active hydrogen such as alcohols or acids.
<b>Hazardous Decomposition Products:</b>	Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products formed under fire conditions: carbon oxides (CO <sub>x</sub> ), nitrogen oxides (NO <sub>x</sub> ) and niobium oxide particles and fumes. In the event of a fire: see section 5.
<b>Possibility of Hazardous Reactions:</b>	Reacts with air, moisture and water to produce flammable gases.

### Section 11. Toxicological Information

#### Information on Toxicological Effects

<b>Acute Toxicity</b>	: No specific data available.
<b>Irritation/Corrosion</b>	: Causes serious eye irritation.
<b>Sensitization</b>	: No specific data available.
<b>Germ Cell Mutagenicity</b>	: No effects known.
<b>Carcinogenicity</b>	
<b>IARC</b>	: No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
<b>ACGIH</b>	: No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by ACGIH.
<b>NTP</b>	: No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by NTP.
<b>OSHA</b>	: No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by OSHA.
<b>Reproductive Toxicity</b>	: This product is not expected to cause reproductive or developmental effects.
<b>Teratogenicity</b>	: No specific data available.
<b>Specific Target Organ Toxicity (single exposure)</b>	: Inhalation – May cause respiratory tract irritation.

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### Section 11. Toxicological Information

<b>Specific Target Organ Toxicity (repeated exposure)</b>	: No specific data available.
<b>Aspiration Hazard</b>	: No specific data available.
<b>Information on the likely routes of exposure</b>	: No specific data available.
<b>Additional Information</b>	: May be harmful if inhaled or ingested.

### Section 12. Ecological Information

#### Numerical Measures of Toxicity

<b>Toxicity to Fish</b>	: No specific data available.
<b>Toxicity to daphnia and other aquatic invertebrates</b>	: No specific data available.
<b>Toxicity to algae</b>	: No specific data available.
<b>Persistence and Degradability</b>	
<b>Biodegradability</b>	: No specific data available.
<b>Bioaccumulative potential</b>	: No specific data available.
<b>Mobility in soil</b>	: No specific data available.
<b>Other Adverse Effects</b>	: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

### Section 13. Disposal Considerations

#### Waste Treatment Methods

<b>Product</b>	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.
<b>Contaminated packaging</b>	Empty containers retain product residue (liquid and/or vapor) and can be dangerous.

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## Section 14. Transport Information

	<b>DOT</b>	<b>IMDG</b>	<b>IATA</b>
UN Number	UN 3399	UN 3399	UN 3399
UN Proper Shipping Name	Organometallic substance, liquid, water-reactive, flammable (Tris(diethylamido)(tert-butylimido)niobium(V))	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE (Tris(diethylamido)(tert-butylimido)niobium(V))	Organometallic substance, liquid, water-reactive, flammable (Tris(diethylamido)(tert-butylimido)niobium(V))
Transport Hazard Classes	4.3(3)	4.3(3)	4.3(3)
Packing Group	II	II	II
Environmental Hazards	No	No	No
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 irritation, respiratory irritation).

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### Section 15. Regulatory Information

#### 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.

#### 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

<b>HEALTH</b>	<b>2</b>
<b>FLAMMABILITY</b>	<b>3</b>
<b>PHYSICAL HAZARD</b>	<b>1</b>

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### Section 16. Other Information

#### History

**Date of printing** : 8/27/19  
**Date of issue/Date of Revision** : 8/27/19  
**Date of previous issue** : 11/23/18

**References** : None available.

#### Abbreviations and Acronyms

ACGIH: American Conference of Governmental Industrial Hygienists  
CAS: Chemical Abstracts Service (division of the American Chemical Society)  
DOT: US Department of Transportation  
GHS: Globally Harmonized System of Classification and Labeling of Chemicals  
HMIS: Hazardous Materials Identification System  
IARC: International Agency for Research on Cancer  
IATA: International Air Transport Association  
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)  
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  
SARA: Superfund Amendments and Reauthorization Act  
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.**