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SAFETY DATA SHEET

Section 1. Identification

Product Name: Tris(ethylmethylamido)(tert-butylimido)tantalum(V)
Product Type: Liquid
CAS Number: 511292-99-2
Product Number: TA2992
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 liquid, odor not determined.
Classification: FLAMMABLE LIQUIDS; - Category 2, H225
SUBSTANCE AND MIXTURES, WHICH IN CONTACT WITH WATER, EMIT FLAMMABLE GASES; - Category 2, H261
SKIN CORROSION/IRRITATION; - Category 1B, H314
SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1, H318

GHS Label Elements
Hazard Pictograms:

Signal Word: DANGER
Hazard Statements: H225: Highly flammable liquid and vapor.
H261: In contact with water releases flammable gases.
H314: Causes severe skin burns and eye damage.
H318: Causes serious eye damage.

Precautionary statements
Prevention: P210: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

Section 2. Hazards Identification

Prevention (cont.):

P223: Do not allow contact with water.
P231 + P232: Handle under inert gas. Protect from moisture.
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.
P264: Wash skin thoroughly after handling.
P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
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.
P310: Immediately call a POISON CENTER or doctor/physician.
P334 + P335: Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.
P363: Wash contaminated clothing before reuse.
P370 + P378: In case of fire: Use alcohol-resistant foam, dry chemical or carbon dioxide for extinction. DO NOT USE WATER.

Storage:

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

Disposal:

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

OSHA/HCS Status:

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

Hazards Not Otherwise Classified (HNOC):

Reacts violently with water.

Section 3. Composition/Information on Ingredients

Substances

Formula : $C_{13}H_{33}N_4Ta$
Molecular weight : 426.38 g/mol
CAS-No. : 511292-99-2

Section 3. Composition/Information on Ingredients

Ingredient Name	%	CAS Number
Tris(ethylmethylamido)(tert-butylimido)tantalum(V)	100	511292-99-2

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. Call a physician or POISON CONTROL CENTER immediately. 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. Call a physician or POISON CONTROL CENTER immediately.

Skin Contact: Take off contaminated clothing and shoes immediately. Wash off contaminated skin with soap and plenty of water. Call a physician or POISON CONTROL CENTER immediately.

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: The acute eye effects of this product have not been determined. However, severe chemical and thermal burns can occur and may cause permanent eye damage. Symptoms may include watering, redness, pain, swelling of the eyelids, inability to keep eye open, blurred vison and temporary/permanent loss of vision.

Inhalation: Product is extremely corrosive to mucous membranes and tissues of the upper respiratory tract. Symptoms may include a burning sensation, coughing, coughing up blood (hemoptysis), wheezing, laryngitis, shortness of breath/ difficulty in breathing (dyspnea), blueness (cyanosis) of lips and skin, nausea, headaches, disorientation, general weakness and loss of consciousness.

Section 4. First Aid Measures

Skin Contact: Skin contact with this product may be expected to cause severe chemical burns. Symptoms may include burning, itching, pain, redness, swelling and blistering with tissue necrosis.

Ingestion: Ingestion may be expected to result in burns of the mouth and throat and potential perforation of the esophagus and stomach. Symptoms may include pain when swallowing (odynophagia), difficulty swallowing (dysphagia), fever, nausea, recurrent vomiting (emesis) and vomiting of blood (hematemesis). Severe burns which may be accompanied by perforation of the esophagus and stomach may present additional symptoms of abdominal pain/rigidity, chest and/or back pain.

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. Vermiculite, sand, dry chemical or carbon dioxide (CO_2) 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 Explosion Hazards: This material reacts with water and compounds containing 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: Carbon oxides (CO_x), nitrogen oxides (NO_x), tantalum oxides. Irritating fumes and organic acid vapors 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.

Section 5. Fire Fighting Measures

Protection of Firefighters (cont.):

Avoid contact with skin or eyes. Avoid breathing dusts, aerosols, vapors and gases.

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 inhalation of vapors, mists or gas. 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.

Section 6. Accidental Release Measures

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.

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:

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 of aerosols and the inhalation of sprays, mists, vapors and gases. Do not ingest. Avoid prolonged exposure. Ensure adequate ventilation.

Protective Measures:

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.

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.

Section 7. Handling and Storage

Safe Storage Conditions: Product is moisture sensitive; 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. 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 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. Do not inhale vapors or mists. Avoid contact with eyes and skin. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure Controls/Personal Protection

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. 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.

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.
Color:	Yellow.
Odor:	No data available.
Odor Threshold:	No data available.
pH:	No data available.
Freezing Point:	No data available.
Boiling Point:	208 °F (98.0 °C) @ 2.4 hPa (1.8 mmHg).
Flash Point:	64 °F (17.8 °C).
Auto-ignition temperature:	No data available.
Relative Density:	1.323 g/cm^3.
Vapor Pressure:	No data available.
Vapor Density:	No data available.
Water Solubility:	Reacts with water to produce flammable gases.
Evaporation Rate:	No data available.
Viscosity:	No data available.
VOC Content:	No data available.

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

Reactivity:	This product reacts violently with water and compounds containing active hydrogen such as alcohols and acids to release flammable gases.
Chemical Stability:	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. 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.
Incompatible Materials:	Water, compounds containing active hydrogen (alcohols, acids) and strong oxidizing agents.
Hazardous Decomposition Products:	In contact with water, product releases flammable liquids and gases. Hazardous decomposition products formed under fire conditions: irritating fumes, organic acid vapors carbon oxides, nitrogen oxides and tantalum oxide fumes. In the event of a fire: see section 5.

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 water, product releases flammable liquids and gases.

Section 11. Toxicological Information

Information on Toxicological Effects

Acute Toxicity	:	No specific data available.
Irritation/Corrosion	:	No specific data available. Product causes thermal and/or chemical burns to the skin, eyes and exposed mucous membranes.
Sensitization	:	No specific data available.
Germ Cell Mutagenicity	:	No effects known.
Carcinogenity		
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/damage through thermal and chemical burns.
Specific Target Organ Toxicity (Repeated Exposure)	:	No specific data available.
Aspiration Hazard	:	No specific data available.
Information on the Likely Routes of Exposure	:	No specific data available.

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

Toxicity to Fish : No specific data available.

Toxicity to Daphnia and Other Aquatic Invertebrates : No specific data available.

Toxicity to Algae : No specific data available.

Persistence and Degradability

Biodegradability : No specific data available.

Bioaccumulative Potential : No specific data available.

Mobility in Soil : No specific data available.

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

Section 13. Disposal Considerations

Waste Treatment Methods

Product 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.

Contaminated Packaging 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 3399	UN 3399	UN 3399
UN Proper Shipping Name	Organometallic substance, liquid, water-reactive, flammable (Tris(ethylmethylamido) (tert-butylimido) tantalum(V)	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE (Tris(ethylmethylamido) (tert-butylimido) tantalum(V)	Organometallic substance, liquid, water-reactive, flammable (Tris(ethylmethylamido) (tert-butylimido) tantalum(V)
Transport Hazard Classes	4.3 (3)	4.3 (3)	4.3 (3)
Packing Group	II	II	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 (Skin corrosion or irritation; Serious eye damage or eye irritation).

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

HEALTH	**3**
FLAMMABILITY	**3**
PHYSICAL HAZARD	**1**

History

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Tris(ethylmethylamido)(tert-butylimido)tantalum(V)
Safety Data Sheet

Section 16. Other Information

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.
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.
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.