

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Water-reactive liquid, corrosive, n.o.s.
[*tert*-Butylimino-tris(diethylamino) tantalum] (MSDS
No. P-6329-A)

Trade Name: *Praxair*® TBTDET

Chemical Name: *tert*-Butylimino-tris(diethylamino)
tantalum

Synonyms: Tris(diethylamino)*tert*-
butyliminotantalum, *tert*-butylimidotris
(diethylamido)tantalum, TBTDET

Formula: C₁₆H₃₉N₄Ta

Chemical Family: Metal amide complex

Telephone: **Emergencies:** 1-800-645-4633*
 CHEMTREC: 1-800-424-9300*
 Routine: 1-800-PRAXAIR

Company Name: Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113

* Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).

2. Composition/Information on Ingredients

See section 16 for important information about mixtures.

INGREDIENT	CAS NUMBER	CONCEN- TRATION	OSHA PEL	ACGIH TLV- TWA (2004)
<i>tert</i> -Butylimino-tris(diethylamino) tantalum	169896-41-7	>99%*	None currently established.**	None currently established.**

* The symbol > means "greater than."

** See section 3.

3. Hazards Identification

EMERGENCY OVERVIEW

WARNING! Water-reactive, corrosive, flammable liquid and vapor.

May form explosive mixtures with air.

Can cause severe eye, skin, and respiratory tract burns.

Harmful if inhaled, ingested, or absorbed through the skin.

May cause liver, kidney, and heart damage.

May cause dizziness and drowsiness.

Reacts vigorously with water and moisture in the air.

**Self-contained breathing apparatus and protective clothing
may be required by rescue workers.**

Odor: Unknown

THRESHOLD LIMIT VALUE: TLV-TWA, none currently established (ACGIH, 2004). Water reaction produces *tert*-butylamine, which also has no established ACGIH TLV or OSHA PEL values. Praxair recommends the 5 ppm TLV-TWA; 15 ppm, 15 min STEL (ACGIH, 2004) for diethylamine. The OSHA PEL for diethylamine is 25 ppm, 75 mg/m³. Tantalum and tantalum oxide dusts have a TLV-TWA of 5 mg/m³ (ACGIH, 2004); OSHA PEL, 5 mg/m³. TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

INHALATION—Exposure to amines above the 5 ppm TLV may irritate the respiratory tract causing sneezing, coughing, and a burning sensation in the throat. The larynx feels constricted, and the victim has difficulty breathing. Higher concentrations may damage the liver, kidneys, and heart and cause tracheitis, bronchitis, and pneumonitis (inflammation of the windpipe, bronchial passages, and lungs) and pulmonary edema (fluid in the lungs).

SKIN CONTACT—Amine vapors may irritate the skin causing itching and local redness. Liquid may cause severe local redness and swelling. Chemical burns and necrosis of the skin could occur. With prolonged or widespread contact, the skin could absorb potentially harmful amounts of material.

SWALLOWING—May cause chemical burns of the mouth, throat, and esophagus. Signs and symptoms will include pain or discomfort in the mouth, nose, throat, chest, and abdomen; nausea; vomiting; diarrhea; dizziness; drowsiness; faintness; weakness; collapse; and coma.

EYE CONTACT—Amine vapors may cause temporary disturbances of vision. (See Notes to Physician in section 4.) Liquid may produce severe irritation, seen as excess redness and swelling of the conjunctiva, with chemical burns of the cornea.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: Repeated or prolonged exposure of the skin to amines may cause low-grade dermatitis and conjunctivitis (inflammation of the skin and connective tissues).

OTHER EFFECTS OF OVEREXPOSURE: Exposure to amines may sensitize the skin and cause development of allergic contact dermatitis.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Inhalation of amines may aggravate asthma or other upper respiratory or pulmonary disease. The skin-irritating properties of amines may aggravate an existing dermatitis.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None known.

CARCINOGENICITY: *Tert*-Butylimino-tris(diethylamino)tantalum is not listed by NTP, OSHA, or IARC.

4. First Aid Measures

INHALATION: Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Closely monitor the victim for wheezing, coughing, or pain. Call a physician immediately.

SKIN CONTACT: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Discard clothing and shoes. Call a physician.

SWALLOWING: If victim is conscious, rinse mouth with water; give at least two glasses of water or milk at once. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a physician.

EYE CONTACT: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: *Victims of overexposure by inhalation should be observed for up to 72 hours for delayed onset of pulmonary edema. Use of acidics to neutralize swallowed contents is contra-indicated.*

Exposure to the vapor may cause minor transient edema of the corneal epithelium. This condition, referred to as "glaucopsia," "blue haze," or "blue-gray haze," produces a blurring of vision against a general bluish haze and the appearance of halos around bright objects. The effect disappears spontaneously within a few hours of the end of an exposure and leaves no sequelae. Although not detrimental to the eye per se, glaucopsia predisposes an affected individual to physical accidents and reduces the ability to undertake skilled tasks such as driving a motorized vehicle. The hazards of this material are mainly due to its severe irritant and corrosive properties on the skin and mucosal surfaces.

Careful gastric lavage is required. Treatment of overexposure should be directed at the control of symptoms and the clinical condition.

5. Fire Fighting Measures

FLASH POINT:	Not available	
AUTOIGNITION TEMPERATURE:	Not available	
FLAMMABLE LIMITS IN AIR, % by volume: Not determined	LOWER: Not available	UPPER: Not available
EXTINGUISHING MEDIA: CO ₂ , dry chemicals, or foam. Do not use water-based media.		

SPECIAL FIRE FIGHTING PROCEDURES: WARNING! Water-reactive, corrosive, flammable liquid and vapor. May form explosive mixtures with air. May emit toxic, flammable, and corrosive fumes and vapors on reaction with water or upon thermal decomposition. Evacuate all personnel from danger area. Use self-contained breathing apparatus and protective clothing. Avoid water contact with any exposed *tert*-Butylimino-tris(diethylamino)tantalum material. Remove ignition sources if without risk. Move containers away from fire area if without risk. If this material is on fire, extinguish flames with the recommended media. On-site fire brigades must comply with OSHA 29CFR1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Heat of fire may cause container to burst. May emit toxic, flammable, and corrosive fumes when heated. Reacts with water and moisture in the air. Fumes and vapors may spread from leak. Vapors are heavier than air and may collect in low spots.

HAZARDOUS COMBUSTION PRODUCTS: No data on combustion. Decomposition due to heating may produce toxic, flammable by-products. (See section 10.).

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: WARNING! Water-reactive, corrosive, flammable liquid and vapor. May form explosive mixtures with air. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus and protective clothing where needed. Remove all sources of ignition if without risk. Vapors are heavier than air and may collect in low spots. Cover spill with absorbent material. Transfer to a suitable container for disposal. Ventilate area or move container to a well-ventilated area, and wash spill site after material pick-up is complete. May be hazardous to aquatic life if released to open waters.

WASTE DISPOSAL METHOD: Prevent waste from contaminating the surrounding environment. Keep personnel away. Small spills can be mixed with vermiculite, sodium carbonate, sand, or other compatible, noncombustible absorption material; swept up; and placed into containers for later disposal. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Store in a cool, dry area under inert atmosphere and away from direct sunlight. Store only in the DOT-approved container in which product was received. Keep containers closed; never store in open containers. Store only where temperature will not exceed 125°F (52°C). Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

PRECAUTIONS TO BE TAKEN IN HANDLING: Protect containers from damage. For other precautions in using this product, see section 16.

For further information on storage, handling, and use, see NFPA 30, *Flammable and Combustible Liquids Code*, published by the National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101; 1-800-344-3555; www.nfpa.org.

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST—Inadequate; see SPECIAL.

MECHANICAL (general)—Inadequate; see SPECIAL.

SPECIAL—Use only in a closed system. This material is air- and moisture-sensitive. It should be maintained under a dry, inert atmosphere and used in an enclosed device such as a glove box.

OTHER—See SPECIAL.

RESPIRATORY PROTECTION: Respirators must be acceptable to MSHA and NIOSH. Respiratory protection must conform to OSHA rules as specified in 29CFR1910.134. Select per OSHA 29 CFR 1910.134 and ANSI Z88.2.

SKIN PROTECTION: Wear work gloves when handling containers; rubber where contact with product may occur.

EYE PROTECTION: Wear safety glasses when handling containers. Select eye protection in accordance with OSHA 29CFR1910.133.

OTHER PROTECTIVE EQUIPMENT: Protective clothing where needed. Select in accordance with OSHA 29CFR1910.132 and 1910.133.

9. Physical and Chemical Properties

MOLECULAR WEIGHT:	468.46 g/mol
DENSITY:	78.035 lb/ft ³ (1.25 g/cm ³)
SOLUBILITY IN WATER:	Reacts with water.
VAPOR PRESSURE @ 194°F(90°C):	0.0027 psia (0.019 kPa, 0.14 mm Hg)
APPEARANCE, ODOR, AND STATE:	Pale yellow liquid; unknown odor.

10. Stability and Reactivity

STABILITY: ☐ Unstable ☒ Stable

NOTE: *This material is stable as shipped under a dry, inert atmosphere such as nitrogen.*

INCOMPATIBILITY (materials to avoid): Water, moisture, air and oxidizers, acids, alcohol and other protic solvents, acids, strong bases

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition or burning may produce CO, CO₂, tantalum oxide, organic fumes, and nitrogen oxides. Reaction with water or moisture releases diethylamine and *tert*-butylamine.

HAZARDOUS POLYMERIZATION: ☐ May Occur ☒ Will Not Occur

CONDITIONS TO AVOID: Ignition sources, air, moisture, heat. Thermal decomposition occurs above 482°F (250°C).

11. Toxicological Information

Not available.

12. Ecological Information

May be hazardous to aquatic life if released to open waters. This material does not contain any Class I or Class II ozone-depleting chemicals. *Tert*-Butylimino-tris(diethylamino)tantalum is not listed as a marine pollutant by DOT.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return container to supplier.

14. Transport Information

DOT/IMO SHIPPING NAME: Water-reactive liquid, corrosive, n.o.s [*tert*-Butylimino-tris(diethylamino)tantalum]

HAZARD CLASS: 4.3	PACKING GROUP: II	IDENTIFICATION NUMBER: UN 3129	PRODUCT RQ: None
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SHIPPING LABELS: DANGEROUS WHEN WET, CORROSIVE

PLACARDS (always required): DANGEROUS WHEN WET, CORROSIVE

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:

EPA (ENVIRONMENTAL PROTECTION AGENCY)

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): None

SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of Extremely Hazardous Substances (EHS) (40 CFR Part 355):

TPQ: None

EHS RQ: None

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

IMMEDIATE: Yes

DELAYED: No

PRESSURE: No

REACTIVITY: Yes

FIRE: Yes

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Tert-Butylimino-tris(diethylamino)tantalum is not subject to the reporting requirements of this section.

40 CFR 68: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Tert-Butylimino-tris(diethylamino)tantalum is not listed as a regulated substance.

TSCA: TOXIC SUBSTANCES CONTROL ACT: *Tert*-Butylimino-tris(diethylamino)tantalum is listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Tert-Butylimino-tris(diethylamino)tantalum is not listed in Appendix A as a highly hazardous chemical.

STATE REGULATIONS:

CALIFORNIA: *Tert*-Butylimino-tris(diethylamino)tantalum is not listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

PENNSYLVANIA: *Tert*-Butylimino-tris(diethylamino)tantalum is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *Water-reactive, corrosive, flammable liquid and vapor.* Do not breathe vapor. Store and use only with adequate ventilation or respiratory protection. (See section 8.) Do not get liquid or vapor in eyes, on skin, or on clothing. (See section 3.) Have safety showers and eyewash fountains immediately available. *May form explosive mixtures with air.* Keep away from heat, sparks, and open flame. Use only spark-proof tools and explosion-proof equipment. Ground all equipment. *Use only with compatible materials and equipment.* Use only in a closed system. Keep away from water, alcohol, other protic solvents, acids, and strong bases. *Do not eat, drink, or smoke in areas where this material is stored or used.* After working with this product, wash face and hands thoroughly with soap and water before eating drinking, smoking, applying cosmetics, or using the toilet.

MIXTURES: When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:

NFPA RATINGS:

HEALTH	= 3
FLAMMABILITY	= 2
INSTABILITY	= 2
SPECIAL	= W

HMIS RATINGS:

HEALTH	= 3
FLAMMABILITY	= 2
PHYSICAL HAZARD	= 2

NOTE: The hazards of this material have not been fully investigated.

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113