

Terbium(III) nitrate pentahydrate

sc-258198



The Power to Question

Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Terbium(III) nitrate pentahydrate

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY

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(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

Tb(NO₃)₃•5H₂O, "nitric acid, terbium(3+) salt, hexahydrate", "terbium trinitrate"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	0	
Toxicity	2	
Body Contact	2	
Reactivity	2	
Chronic	2	

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Contact with combustible material may cause fire.

Contact with acids liberates toxic gas.

Irritating to eyes, respiratory system and skin.

Harmful to aquatic organisms.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- Accidental ingestion of the material may be damaging to the health of the individual.
- The substance and/or its metabolites may bind to hemoglobin inhibiting normal uptake of oxygen. This condition, known as "methemoglobinemia", is a form of oxygen starvation (anoxia).

EYE

- This material can cause eye irritation and damage in some persons.

SKIN

- This material can cause inflammation of the skin on contact in some persons.
- The material may accentuate any pre-existing dermatitis condition.
- Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.

Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

- The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
- Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
- Exposure to vapors of some rare earth salts can cause sensitivity to heat, itching, and increased sensitivity of smell and taste.

Other effects include inflamed airways and lung, emphysema, regional narrowing of terminal airways and cell changes.

CHRONIC HEALTH EFFECTS

- Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Terbium is a rare earth metal - heavy type (yttrium family). There has been no reports of poisoning in workers, although the metal can cause chest X-ray abnormalities due to its high density.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
terbium(III) nitrate hexahydrate	57584-27-7	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

EYE

If this product comes in contact with the eyes

- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

If skin contact occurs

- Immediately remove all contaminated clothing, including footwear
- Flush skin and hair with running water (and soap if available).

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

- The toxicity of nitrates and nitrites result from their vasodilating properties and their propensity to form methemoglobin.
- Most produce a peak effect within 30 minutes.
- Clinical signs of cyanosis appear before other symptoms because of the dark pigmentation of methemoglobin.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not applicable
Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not applicable

EXTINGUISHING MEDIA

FOR SMALL FIRE

- USE FLOODING QUANTITIES OF WATER.
- DO NOT use dry chemicals, CO₂ or foam.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Will not burn but increases intensity of fire.
 - Heating may cause expansion or decomposition leading to violent rupture of containers.
- Decomposition may produce toxic fumes of nitrogen oxides (NO_x), metal oxides.

FIRE INCOMPATIBILITY

Avoid storage with reducing agents.

- Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous

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Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Clean up all spills immediately.
- No smoking, naked lights, ignition sources.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid personal contact and inhalation of dust, mist or vapors.
- Provide adequate ventilation.

RECOMMENDED STORAGE METHODS

Glass container.

- DO NOT repack. Use containers supplied by manufacturer only.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE REQUIREMENTS

In addition, Goods of Class 5.1, packing group II should be

- stored in piles so that
- the height of the pile does not exceed 1 metre
- the maximum quantity in a pile or building does not exceed 1000 tonnes unless the area is provided with automatic fire extinguishers
- the maximum height of a pile does not exceed 3 metres where the room is provided with automatic fire extinguishers or 2 meters if not.
- the minimum distance between piles is not less than 2 metres where the room is provided with automatic fire extinguishers or 3 meters if not.
- the minimum distance to walls is not less than 1 metre.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- terbium(III) nitrate hexahydrate CAS13451-19-9 CAS57584-27-7

PERSONAL PROTECTION



RESPIRATOR

•Particulate. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Chemical goggles.
- Full face shield.

HANDS/FEET

Wear chemical protective gloves, eg. PVC.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

- DO NOT wear cotton or cotton-backed gloves.
- DO NOT wear leather gloves.
- Promptly hose all spills off leather shoes or boots or ensure that such footwear is protected with PVC over-shoes.

OTHER

- Overalls.
- PVC Apron.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Mixes with water.

Contact with acids liberates toxic gas.

State	Divided Solid	Molecular Weight	435.02
Melting Range (°F)	193	Viscosity	Not Applicable
Boiling Range (°F)	Not available.	Solubility in water (g/L)	Miscible
Flash Point (°F)	Not applicable	pH (1% solution)	Not available

Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not applicable	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not applicable	Relative Vapor Density (air=1)	Not Applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not Applicable

APPEARANCE

Crystalline powder; mixes with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable under normal handling conditions.

STORAGE INCOMPATIBILITY

- Contact with acids produces toxic fumes for metal nitrates
 - Segregate from heavy metals, phosphides, sodium acetate, lead nitrate, tartrates, trichloroethylene,
 - Avoid shock and heat.
 - Mixtures of metal nitrates with alkyl esters may explode due to the formation of unstable alkyl nitrates.
 - Mixtures of a nitrate with phosphorous, tin(II) chloride and other reducing agents may react explosively.
 - Mixtures containing nitrates and organic materials are potentially dangerous, especially if acidic materials or heavy metals are present.
 - Fibrous organic material, jute, wood and similar cellulosic material can become highly combustible by nitrate impregnation
 - Metal nitrates are incompatible with cyanides, thiocyanates, isothiocyanates and hypophosphites. Avoid reaction with the following which can cause an explosion barium thiocyanate, boron phosphide, cyanides, sodium hypophosphite, sulfur and charcoal, powdered aluminium or aluminium oxide, sodium thiosulfate.
 - Mixtures of metal nitrates and phosphinates may explode on heating
 - A mixture of aluminium powder, water and metal nitrate may explode due to a self accelerating reaction.
 - Mixtures containing nitrates, nitrites and organic materials are potentially dangerous, especially in the presence of acidic materials and heavy metals
 - Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
 - These trifluorides are hypergolic oxidisers. They ignites on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
 - The state of subdivision may affect the results.
 - Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.
 - Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.
 - Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous
- Avoid storage with reducing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

terbium(III) nitrate hexahydrate

TOXICITY AND IRRITATION

TERBIUM(III) NITRATE HEXAHYDRATE

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

IRRITATION

Oral (rat) LD50 5000 mg/kg

Nil Reported

Intraperitoneal (rat) LD50 260 mg/kg

Intravenous (rat) LD50 30 mg/kg

Intraperitoneal (mouse) LD50 480 mg/kg

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

Lanthanide poisoning causes immediate defecation, writhing, incoordination, labored breathing, and inactivity. Respiratory and heart failure may follow causing death.

Section 12 - ECOLOGICAL INFORMATION

Harmful to aquatic organisms.

This material and its container must be disposed of as hazardous waste.

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Reactivity characteristic: use EPA hazardous waste number D003 (waste code R).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

‡ Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

For small quantities;

- Carefully make a 5% of the solution in water or dilute acid controlling any vigorous exotherm or fumes by rate of addition and cooling.

For small quantities of oxidizing agent:

- Cautiously acidify a 3% solution to pH 2 with sulfuric acid.
- Gradually add a 50% excess of sodium bisulfite solution with stirring.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	5.1
Identification Numbers:	UN1477	PG:	II
Label Codes:	5.1	Special provisions:	IB8, IP2, IP4, T3, TP33
Packaging: Exceptions:	152	Packaging: Non-bulk:	212
Packaging: Exceptions:	152	Quantity limitations: Passenger aircraft/rail:	5 kg
Quantity Limitations: Cargo aircraft only:	25 kg	Vessel stowage: Location:	A
Vessel stowage: Other:	56, 58		

Hazardous materials descriptions and proper shipping names:

Nitrates, inorganic, n.o.s.

Air Transport IATA:

ICAO/IATA Subrisk:	None	UN/ID Number:	1477
Packing Group:	II	Special provisions:	A3
		Cargo Only	
		Packing Instructions:	562
Maximum Qty/Pack:	25 kg	Passenger and Cargo	
Passenger and Cargo		Packing Instructions:	558
Maximum Qty/Pack:	5 kg	Passenger and Cargo Limited Quantity	
Passenger and Cargo Limited Quantity		Packing Instructions:	Y544
Maximum Qty/Pack:	2.5 kg		

Shipping Name: NITRATES, INORGANIC, N.O.S.(CONTAINS TERBIUM(III) NITRATE HEXAHYDRATE)

Maritime Transport IMDG:

IMDG Class:	5.1	IMDG Subrisk:	None
UN Number:	1477	Packing Group:	II
EMS Number:	F-A,S-Q	Special provisions:	None
Limited Quantities:	1 kg		

Shipping Name: NITRATES, INORGANIC, N.O.S.(contains terbium(III) nitrate hexahydrate)

Section 15 - REGULATORY INFORMATION

terbium(III) nitrate hexahydrate (CAS: 13451-19-9,57584-27-7) is found on the following regulatory lists;
 "Canada Environmental Quality Guidelines (EQGs) Water: Aquatic life", "Canada Environmental Quality Guidelines (EQGs) Water: Community", "US DOE Temporary Emergency Exposure Limits (TEELs)"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Ingestion may produce health damage*.
- Cumulative effects may result following exposure*.

* (limited evidence).

Ingredients with multiple CAS Nos

Ingredient Name
terbium(III) nitrate hexahydrate

CAS
13451-19-9, 57584-27-7

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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