1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Chemical Name: Titanium Butoxide

Catalogue #: T446770

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Product Uses: To be used only for scientific research and development. Not for use in humans or animals.

1.3 Details of the Supplier of the Safety Data Sheet

Company: Toronto Research Chemicals
2 Brisbane Road
Toronto, ON M3J 2J8
CANADA

Telephone: +14166659696
FAX: +14166654439
Email: orders@trc-canada.com

1.4 Emergency Telephone Number

Emergency#: +14166659696 between 0800-1700 (GMT-5)

2. HAZARDS IDENTIFICATION

WHMIS Classification (Canada)

- B3 Combustible Liquid
- D2B Toxic Material Causing Other Toxic Effects
  Moderate Respiratory Tract Irritant
- E Corrosive Material

WHMIS Symbols (Canada)

- Combustible Liquid
- Toxic Material
- Corrosive Material

2.1/2.2 Classification of the Substance or Mixture and Label Elements

GHS Hazards Classification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)

- Flammable Liquids (Category 3)
- Acute Toxicity, Oral (Category 5)
- Skin Corrosion (Category 1B)
- Serious Eye Damage (Category 1)

EU Classification (According to EU Regulation 67/548/EEC)

- Flammable. Causes severe burns. Risk of serious damage to the eyes.

EU Risk and Safety Statements (According to EU Regulation 67/548/EEC)

Hazard Statements

- Highly Flammable
- Corrosive

Hazard Codes

- F Flammable
- C Corrosive

Risk Codes and Phrases

- R10 Flammable.
- R35 Causes severe burns.
General Advice
If medical attention is required, show this safety data sheet to the doctor.

If Inhaled
If inhaled, move casualty to fresh air. If not breathing, give artificial respiration and consult a physician.

In Case of Skin Contact
Remove contaminated clothing and shoes. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

GHS Hazards Identification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)

Signal Word Danger

GHS Hazard Statements
H226 Flammable liquid and vapour.
H303 May be harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.

GHS Precautionary Statements
P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303/P361/P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305/P351/P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Unclassified Hazards/Hazards Not Otherwise Classified
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Molecular Formula: C_{16}H_{36}O_{4}Ti
Molecular Weight: 340.32
CAS Registry #: 5593-70-4
EC#: 227-006-8

Synonyms
1-Butanol Titanium Salt (4:1); AKT 850; B 1; Butyl Orthotitanate; Butyl Titanate(IV) ((BuO)4Ti); Orgatix T 25; Orgatix TA 25; TA 25; TBT; TBT 100; TBT-B 1; Tetra-n-butoxytitanium; Tetra-n-butyl orthotitanate; Tetra-n-butyl titanate; Tetrabutoxytitanium; Tetrabutoxytitanium(IV); Tetrabutyl Orthotitanate; Tetrabutyl Titanate; Tetrakis(butanolato) titanium; Tilcom TNBT; Titanium Butoxide (Ti(OBu)4); Titanium n-Butoxide; Titanium tetra-n-Butoxide; Titanium tetra-n-butylate; Titanium tetrabutoxide; Titanium tetrabutylate; Titanium Tetrakis(1-butoxide); Titanium tetrakis(butoxide); Titanium(4+) butoxide; Titanium(IV) Butoxide; Titanium(IV) n-Butoxide; Tetrabutoxytitanium, ; Tyzor BTM; Tyzor TBT; Tyzor TNBT; Tyzor TNTB; Vertec TNBT; n-Butanol Titanium Salt; n-Butyl Titanate

3.2 Mixtures
Not a mixture

4. FIRST AID MEASURES

4.1 Description of First Aid Measures

General Advice
If medical attention is required, show this safety data sheet to the doctor.

If Inhaled
If inhaled, move casualty to fresh air. If not breathing, give artificial respiration and consult a physician.

In Case of Skin Contact
Remove contaminated clothing and shoes. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.
In Case of Eye Contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If Swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless advised to do so by a physician or Poison Control Center. Seek medical attention.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed
No data available

4.3 Indication of any Immediate Medical Attention and Special Treatment Needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing Media
Suitable Extinguishing Media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special Hazards Arising from the Substance or Mixture
Carbon oxides, Titanium oxides

5.3 Advice for Firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further Information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment and Emergency Procedures
Use recommended personal protective equipment (see Section 8). Adequate ventilation must be provided to ensure vapours or mists are not inhaled. Vapours are heavier than air and may accumulate in low areas. All sources of ignition, including sources of static discharge, must be removed from area.

6.2 Environmental Precautions
Material should not be allowed to enter the environment. Prevent further spillage or discharge into drains, if safe to do so.

6.3 Methods and Materials for Containment and Cleaning Up
Contain the spill and then collect using non-combustible absorbent material (such as clay, diatomaceous earth, vermiculite or other appropriate material). Place material in a suitable, sealable container and then dispose according to local/national regulations and guidance (see Section 13).

6.4 Reference to Other Sections
For protective equipment, refer to Section 8. For disposal, see Section 13.

7. HANDLING AND STORAGE

7.1 Precautions for Safe Handling
Avoid contact with skin and eyes. Ventilation and proper handling are to be used to prevent the formation of vapours and mists. Remove all sources of ignition and take precautionary measures to prevent the buildup of electrostatic discharge (ground and bond containers as appropriate). No smoking, eating or drinking around this material. Wash hands after use.

7.2 Conditions for Safe Storage, Including any Incompatibilities
Ensure container is kept securely closed before and after use. Keep in a well ventilated area and do not store with strong oxidizers or other incompatible materials (see Section 10).

Storage conditions: No Data Available

7.3 Specific End Uses
For scientific research and development only. Not for use in humans or animals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters
Components with workplace exposure levels
8.2 Exposure Controls

Appropriate Engineering Controls
A laboratory fume hood or other appropriate form of local exhaust ventilation should be used to avoid exposure.

Personal Protective Equipment
All recommendations below are advisory in nature and a risk assessment should be performed by the employer/end user prior to use of this product. The type of protective equipment must be selected based on the amount and concentration of the dangerous material being used in the workplace.

Eye/Face Protection
Safety glasses or safety goggles. All equipment should have been tested and approved under appropriate standards, such as NIOSH (US), CSA (Canada), or EN 166 (EU).

Skin Protection
Gloves should be used when handling this material. Gloves are to be inspected prior to use. Contaminated gloves are to be removed using proper glove removal technique so that the outer surface of the glove does not contact bare skin. Dispose of contaminated gloves after use in compliance with good laboratory practices and local requirements.

Gloves used for incidental exposures (splash protection) should be designated as “low chemical resistant” or “waterproof” by EU standard EN 374. Unrated gloves are not recommended.
Suggested gloves: AnsellPro nitrile gloves style 92-500 or 92-600, 5 mil thickness.
Penetration time has not been determined.

Gloves used for prolonged direct exposure (immersion) should be designated “chemical resistant” as per EN 734 with the resistance codes corresponding to the anticipated use of the material.
Penetration time has not been determined.

These recommendations may not apply if the material is mixed with any other chemical, or dissolved into a solution. A risk assessment must be performed to ensure the gloves will still offer acceptable protection.

Body Protection
Fire resistant (Nomex) lab coat or coveralls.

Respiratory Protection
Recommended respirators are NIOSH-approved OV/Multi-Gas/P95 or CEN-approved ABEK-P2 respirators. These are to be only used as a backup to local exhaust ventilation or other engineering controls. If the respirator is the only means of protection, a full-face supplied air respirator must be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

A) Appearance
   Liquid

B) Odour
   No Data Available

C) Odour Threshold
   No Data Available

D) pH
   No Data Available

E) Melting Point/Freezing Point
   No Data Available

F) Initial Boiling Point/Boiling Range
   No Data Available

G) Flash point
   No Data Available

H) Evaporation Rate
   No Data Available

I) Flammability (Solid/Gas)
   No Data Available

J) Upper/Lower Flammability/Explosive Limits
   No Data Available

K) Vapour Pressure
   No Data Available

L) Vapour Density
   No Data Available

M) Relative Density
   No Data Available

N) Solubility
   No Data Available

O) Partition Coefficient: n-octanol/water
   No Data Available

P) Auto-Ignition Temperature
   No Data Available
10. STABILITY AND REACTIVITY

10.1 Reactivity
No Data Available

10.2 Chemical Stability
Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions
No Data Available

10.4 Conditions to Avoid
Heat, flames and sparks.

10.5 Incompatible Materials
Strong oxidizing agents.

10.6 Hazardous Decomposition Products
No Data Available

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects
A) Acute Toxicity
   LD50 (oral - rat)  3122 mg/kg

B) Skin Corrosion/Irritation
   No data available

C) Serious Eye Damage/Irritation
   Corrosive - causes skin and eye burns. May also cause respiratory tract damage.

D) Respiratory or Skin Sensitization
   No data available

E) Germ Cell Mutagenicity
   No data available

F) Carcinogenicity
   No data available

G) Reproductive Toxicity/Teratogenicity
   No data available

H) Single Target Organ Toxicity - Single Exposure
   Moderate respiratory tract irritation.

I) Single Target Organ Toxicity - Repeated Exposure
   No data available

J) Aspiration Hazard
   No data available

K) Potential Health Effects and Routes of Exposure
   Inhalation
      May be harmful if inhaled. Causes respiratory tract irritation.
   Ingestion
      May be harmful if swallowed.
   Skin
      May be harmful if absorbed through skin. Causes skin burns.
   Eyes
      Causes severe eye burns and possible permanent eye damage.

L) Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties of this material have not been thoroughly investigated.

**M) Additional Information**

RTECS: XR1585000

### 12. ECOLOGICAL INFORMATION

#### 12.1 Toxicity
No data available

#### 12.2 Persistence and Degradability
No data available

#### 12.3 Bioaccumulative Potential
No data available

#### 12.4 Mobility in Soil
No data available

#### 12.5 Results of PBT and vPvB Assessment
No data available

#### 12.6 Other Adverse Effects
No data available

### 13. DISPOSAL CONSIDERATIONS

#### 13.1 Waste Treatment Methods

**A) Product**

Product may be burned in an incinerator equipped with afterburner and scrubber. Excess and expired materials are to be offered to a licensed hazardous material disposal company. Ensure that all Federal and Local regulations regarding the disposal and destruction of this material are followed.

**B) Contaminated Packaging**

Dispose of as above.

**C) Other Considerations**

Product is not to be disposed of in sanitary sewers, storm sewers, or landfills.

### 14. TRANSPORT INFORMATION

#### 14.1 UN Number


#### 14.2 UN Proper Shipping Name

**DOT (US)/IATA:**

Flammable liquids, n.o.s. (Titanium Butoxide)

IMDG/ARD/RID:

FLAMMABLE LIQUIDS, N.O.S. (Titanium Butoxide)

#### 14.3 Transport Hazard Class(es)

**DOT (US):** 3  IATA: 3  IMDG: 3  ADR/RID: 3

#### 14.4 Packing Group

**DOT (US):** III  IATA: III  IMDG: III  ADR/RID: III

#### 14.5 Environmental Hazards

**DOT (US):** None  IATA: None  IMDG: None  ADR/RID: None

#### 14.6 Special Precautions for User

None

### 15. REGULATORY INFORMATION

This safety data sheet complies with the requirements of WHMIS (Canada), OSHA 1910.1200 (US), and EU Regulation EC No. 1907/2006 (European Union).

#### 15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

**A) Canada**

DSL/NDSL Status: This product or a component of this product is registered on the Canadian DSL/NDSL.

**B) United States**

TSCA Status: This product or a component is listed on the US EPA TSCA.

**C) European Union**

ECHA Status: This product or a component is registered with the EU ECHA.

#### 15.2 Chemical Safety Assessment

This Safety Data Sheet contains 16 sections. All 16 sections must be present for this document to be valid.
16. OTHER INFORMATION

16.1 Revision History

Original Publication Date: 4/17/2015

16.2 List of Abbreviations

LD50          Median lethal dose of a substance required to kill 50% of a test population.
LC50          Medial lethal concentration of a substance required to kill 50% of a test population.
LDLo          Lowest known lethal dose
TDLo          Lowest known toxic dose
IARC          International Agency for Research on Cancer
NTP           National Toxicology Program
RTECS         Registry of Toxic Effects of Chemical Substances

16.3 Further Information

Copyright 2015. Toronto Research Chemicals Inc. Copies may be made for internal use only. The above information is believed to be correct to the best of our knowledge, but is to be only used as a guide. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Please take all due care when handling this product.