1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Titanium(IV) isopropoxide
Product Number : 377996
Brand : Aldrich
Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Tetraisopropyl orthotitanate
TYZOR® organic titanate
Formula : Ti[OCH(CH3)2]4
Molecular Weight : 284.26 g/mol

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Concentration [%]</th>
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<tbody>
<tr>
<td>546-68-9</td>
<td>208-909-6</td>
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3. HAZARDS IDENTIFICATION

Emergency Overview
OSHA Hazards
Combustible Liquid
Irritant

HMIS Classification
Health Hazard: 2
Flammability: 2
Physical hazards: 0

NFPA Rating
Health Hazard: 2
Fire: 2
Reactivity Hazard: 0

Potential Health Effects
Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin
May be harmful if absorbed through skin. May cause skin irritation.

Eyes
May cause eye irritation.

Ingestion
May be harmful if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties
Flash point 45 °C (113 °F) - closed cup
Ignition temperature no data available

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Do not let product enter drains.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. Flash back possible over considerable distance. Container explosion may occur under fire conditions.

Storage
Keep container tightly closed in a dry and well-ventilated place. Store in cool place. Handle under nitrogen, protect from moisture. Store under nitrogen.
Hydrolyses readily.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose 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).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Form         liquid, clear
Colour       light yellow

Safety data
pH           no data available
Melting point 14 °C (57 °F)
Boiling point 104 °C (219 °F) at 13 hPa (10 mmHg)
             232 °C (450 °F) at 1,013 hPa (760 mmHg)
Flash point  45 °C (113 °F) - closed cup
Ignition temperature no data available
Lower explosion limit no data available
Upper explosion limit no data available
Density      0.970 g/cm3
Water solubility no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions. May decompose on exposure to moist air or water.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents, Strong acids
Hazardous decomposition products
- Hazardous decomposition products formed under fire conditions.
  Carbon oxides, Titanium/titanium oxides

Hazardous reactions
Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity
- LD50 Oral - rat - 7,236 mg/kg
- LD50 Dermal - rabbit - > 15.5 g/kg

Irritation and corrosion
- Skin - rabbit - Mild skin irritation - 24 h
- Eyes - rabbit - Eye irritation - 24 h

Sensitisation
- no data available

Chronic exposure
- no data available

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

Potential Health Effects

- Inhalation  May be harmful if inhaled. May cause respiratory tract irritation.
- Skin  May be harmful if absorbed through skin. May cause skin irritation.
- Eyes  May cause eye irritation.
- Ingestion  May be harmful if swallowed.

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)
- no data available

Ecotoxicity effects
- no data available

Further information on ecology
- no data available

13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.
14. TRANSPORT INFORMATION

**DOT (US)**
UN-Number: 1993  Class: 3  Packing group: II
Proper shipping name: Flammable liquids, n.o.s. (Titanium tetraisopropanolate)

**IMDG**
UN-Number: 1993  Class: 3  Packing group: II  EMS-No: F-E, S-E
Proper shipping name: FLAMMABLE LIQUID, N.O.S. (Titanium tetraisopropanolate)
Marine pollutant: No

**IATA**
UN-Number: 1993  Class: 3  Packing group: II
Proper shipping name: Flammable liquid n.o.s. (Titanium tetraisopropanolate)

15. REGULATORY INFORMATION

**OSHA Hazards**
Combustible Liquid, Irritant

**TSCA Status**
On TSCA Inventory

**DSL Status**
All components of this product are on the Canadian DSL list.

**SARA 302 Components**
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components**
SARA 313: 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, Acute Health Hazard

**Massachusetts Right To Know Components**
No Components Listed

**Pennsylvania Right To Know Components**

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**New Jersey Right To Know Components**

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**California Prop. 65 Components**
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

**Further information**
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