SAFETY DATA SHEET

Preparation Date: 04/30/2015  Revision Date: 02/09/2016  Revision Number: G2

1. IDENTIFICATION

Product identifier

Product code: T1625
Product Name: TITANIUM TETRACHLORIDE, REAGENT, ACS

Other means of identification

Synonyms: Titanium chloride
Tetrachlorure de titane (French)
CAS #: 7550-45-0
RTECS #: XR1925000
CI#: Not available

Recommended use of the chemical and restrictions on use

Recommended use: No information available.
Uses advised against: No information available

Supplier:
Spectrum Chemical Mfg. Corp
14422 South San Pedro St.
Gardena, CA  90248
(310) 516-8000
Order Online At: https://www.spectrumchemical.com

Emergency telephone number
Chemtrec 1-800-424-9300
Contact Person: Martin LaBenz (West Coast)
Contact Person: Ibad Tirmiz (East Coast)

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity - Inhalation (Vapors)</td>
<td>Category 2</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Category 1Sub-category B</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Category 3</td>
</tr>
</tbody>
</table>

Label elements
**Hazard statements**

Fatal if inhaled
Causes severe skin burns and eye damage
May cause respiratory irritation

**Hazards not otherwise classified (HNOC)**

Not Applicable

**Other hazards**

May be harmful in contact with skin
Reacts with water to evolve heat and corrosive gases

**Precautionary Statements - Prevention**

Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear respiratory protection
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection

**Precautionary Statements - Response**

Immediately call a POISON CENTER or doctor/physician
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER or doctor/physician
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. Call a POISON CENTER or doctor/physician if you feel unwell.
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

**Precautionary Statements - Storage**

Store in a well-ventilated place. Keep container tightly closed
Store locked up

**Precautionary Statements - Disposal**

Dispose of contents/container to an approved waste disposal plant

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium Tetrachloride</td>
<td>7550-45-0</td>
<td>100</td>
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</tbody>
</table>

**Product code:** T1625  
**Product name:** TITANIUM TETRACHLORIDE, REAGENT, ACS
4. FIRST AID MEASURES

First aid measures

**General Advice:** Poison information centers in each State capital city can provide additional assistance for scheduled poisons (13 1126)

**Skin Contact:** Wash off immediately with soap and plenty of water. Continue flushing with plenty of water for at least 15 minutes. Remove all contaminated clothes and shoes. Immediate medical attention is required. Call a physician or Poison Control Centre immediately.

**Eye Contact:** Flush eyes with water for 15 minutes. Immediate medical attention is required. Call a physician immediately.

**Inhalation:** Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. **WARNING!** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled or ingested material is toxic, infectious or corrosive. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

**Ingestion:** Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Immediate medical attention is required.

Most important symptoms and effects, both acute and delayed

**Symptoms**
Fatal if inhaled. Severe skin and eye irritation or burns. May cause eye injury. May cause corneal opacity. May cause abdominal pain, nausea, vomiting, diarrhea. Causes digestive (gastrointestinal) tract irritation. May cause perforation of the digestive tract. May cause gastrointestinal (digestive) tract burns. Can burn mouth, throat, and stomach.

**Indication of any immediate medical attention and special treatment needed**

**Notes to Physician:** Treat symptomatically

Protection of first-aiders

**First-Aid Providers:** Avoid exposure to blood or body fluids. Wear gloves and other necessary protective clothing. Dispose of contaminated clothing and equipment as bio-hazardous waste

5. FIRE-FIGHTING MEASURES

**Extinguishing Media**

**Suitable Extinguishing Media:** The product is not flammable.

**Unsuitable Extinguishing Media:** No information available.

**Specific hazards arising from the chemical**

**Hazardous Combustion Products:** No information available.

**Specific hazards:** When heated to decomposition it emits toxic fumes

**Special Protective Actions for Firefighters**

**Specific Methods:** No information available.

**Special Protective Equipment for Firefighters:** As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

Product code: T1625  Product name: TITANIUM TETRACHLORIDE, REAGENT, ACS
6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions: Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Use personal protective equipment. Avoid contact with skin, eyes and clothing.

Environmental precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk. In case of large spill, dike if needed. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up Absorb spill with inert material (e.g. vermiculite, dry sand or earth). Use appropriate tools to put the spilled material in a suitable chemical waste disposal container.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical Measures/Precautions: Provide sufficient air exchange and/or exhaust in work rooms. Keep away from incompatible materials. Do not allow contact with water.

Safe Handling Advice Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Keep away from heat and sources of ignition. Do not ingest. Do not breathe vapors or spray mist. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities


8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

National occupational exposure limits

United States

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>AIHA WHEEL</th>
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<tr>
<td>Titanium Tetrachloride 7550-45-0</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>&gt; 0.5 mg/m³ TWA</td>
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Canada

<table>
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<tr>
<th>Components</th>
<th>Alberta</th>
<th>British Columbia</th>
<th>Ontario</th>
<th>Quebec</th>
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</thead>
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</table>

Australia and Mexico

<table>
<thead>
<tr>
<th>Components</th>
<th>Australia</th>
<th>Mexico</th>
</tr>
</thead>
</table>
Appropriate engineering controls

Engineering measures to reduce exposure:
Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Individual protection measures, such as personal protective equipment

Personal Protective Equipment

Eye protection: Goggles Safety glasses with side-shields
Skin and body protection: Chemical resistant apron. Gloves. Long sleeved clothing.
Respiratory protection: Vapor respirator. Be sure to use an approved/certified respirator or equivalent.
Hygiene measures: Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. When using, do not eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid
Appearance: Fuming.
Color: Colorless to pale yellow.
Taste No information available
Formula: TiCl4
Molecular/Formula weight: 189.69
Flammability: No information available
Flash point (°C): No data available
Lower Explosion Limit (%): No information available
Upper Explosion Limit (%): No information available
pH: No information available
Melting point/range(°C/°F): -24.1°C/(-11.4°F)
Boiling point/range(°C/°F): 136.4°C/277.5°F
Autoignition Temperature (°C/°F): No information available
Bulk density: No information available
Density (g/cm3): No information available
Specific gravity: 1.726
Vapor pressure @ 20°C (kPa): 1.3
Evaporation rate: No information available
Vapor density: 6.6
VOC content (g/L): No information available
Odor threshold (ppm): No information available
Partition coefficient (n-octanol/water): No information available
Viscosity: No information available
Miscibility: No information available
Solubility: Soluble in cold water

10. STABILITY AND REACTIVITY

Reactivity
Reactive with oxidizing agents, metals, bases
Readily hydrolyzed by moisture, with the liberation of hydrochloric acid (reacts strongly with water to release Hydrochloric acid fumes and heat)

Product code: T1625
Product name: TITANIUM TETRACHLORIDE, REAGENT, ACS
Chemical stability
Stability: Sensitive to air. Moisture Sensitive. Stable under recommended storage conditions.

Possibility of Hazardous Reactions: Hazardous polymerization does not occur


Hazardous decomposition products: No information available

Other Information
Corrosivity: No information available

Special Remarks on Corrosivity: No information available

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principal Routes of Exposure:
Inhalation. Ingestion. Skin.

Acute Toxicity

Component Information

Titanium Tetrachloride - 7550-45-0
LD50/oral/rat = No information available
LD50/oral/mouse = No information available
LD50/dermal/rat = No information available
LD50/dermal/rabbit = 3160 mg/kg Dermal LD50 Rabbit
LC50/inhalation/rat = 400 mg/m³ Inhalation LC50 Rat
LC50/inhalation/mouse = 100 mg/m³/2h Inhalation LC50 Mouse
Other LD50 or LC50 information = 464 mg/kg Oral LD100 (not LD50) Rat (European Chemicals Bureau IUCLID dataset)

Product Information

LD50/oral/rat = VALUE- Acute Tox Oral = No information available

LD50/oral/mouse = Value - Acute Tox Oral = No information available

LD50/dermal/rabbit
VALUE-Acute Tox Dermal = 3160mg/kg

LD50/dermal/rat
VALUE -Acute Tox Dermal = No information available

LC50/inhalation/rat
VALUE-Vapor = 400 mg/m³
VALUE-Gas = No information available
VALUE-Dust/Mist = No information available

LC50/Inhalation/mouse
VALUE-Vapor = 100 mg/m³/2h
VALUE - Gas = No information available
VALUE - Dust/Mist = No information available

Symptoms

Skin Contact: Corrosive. Causes severe irritation and burns.

Eye Contact: Corrosive. Causes severe irritation and burns. Contact with liquid or vapor can cause severe damage to the eyes. Symptoms may include immediate burning, followed by increasing severity of reaction with corneal and conjunctival edema. Corneal opacity may develop over a period of several days due to progression of tissue infiltration. In mild cases, this condition is reversible, but permanent opacification with loss of vision also may occur.

Inhalation Fatal if inhaled. Vapors are irritating to the eyes, and respiratory tract. Symptoms may include irritation of the mucosa of the nose or throat, cough, broncho constriction with wheezing, chemical pneumonitis, edema of the pharynx, vocal cords, and trachea, noncardiogenic pulmonary edema.

Ingestion Corrosive to the mouth, throat, and stomach. Causes digestive or gastrointestinal tract burns. May cause perforation of the digestive tract. May cause abdominal pain, nausea, vomiting, diarrhea.

Aspiration hazard No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity Inhalation: Corrosive to the tissues of the respiratory tract. Prolonged or repeated inhalation of low concentrations can cause pulmonary injury. Symptoms may include upper respiratory tract irritation and acute or chronic bronchitis, and pulmonary complications such as reduced ventilatory capacity, pleural thickening and plaques

Sensitization: No information available

Mutagenic Effects: No information available

Carcinogenic effects: Not considered carcinogenic

<table>
<thead>
<tr>
<th>Components</th>
<th>IARC</th>
<th>ACGIH - Carcinogens</th>
<th>NTP</th>
<th>OSHA HCS - Carcinogens</th>
<th>Australia - Notifiable Carcinogenic Substances</th>
<th>Australia - Prohibited Carcinogenic Substances</th>
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</thead>
<tbody>
<tr>
<td>Titanium Tetrachloride</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
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</tbody>
</table>

Reproductive toxicity No data is available

Reproductive Effects: No information available
Developmental Effects: No information available
Teratogenic Effects: No information available

Specific Target Organ Toxicity

Product code: T1625 Product name: TITANIUM TETRACHLORIDE, REAGENT, ACS
STOT - single exposure: Respiratory system.
STOT - repeated exposure: No information available

### 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

Ecotoxicity effects: No data available.

Persistence and degradability: No information available

Bioaccumulative potential: No information available

Mobility: No information available

### 13. DISPOSAL CONSIDERATIONS

**Disposal Methods**

**Waste from residues / unused products:** Waste must be disposed of in accordance with Federal, State and Local regulation.

**Contaminated packaging:** Empty containers should be taken for local recycling, recovery or waste disposal

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</thead>
<tbody>
<tr>
<td>Titanium Tetrachloride</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

### 14. TRANSPORT INFORMATION

**DOT**

UN-No: UN1838
Proper Shipping Name: Titanium tetrachloride
Hazard Class: 6.1
Subsidiary Risk: 8
Packing Group: I
ERG No: 137
Marine Pollutant: No data available
DOT RQ (lbs): 1000 lbs./454 kg
Special Provisions: Special provision 2. This material is poisonous by inhalation in Hazard Zone B
Symbol(s): +, R4

**TDG (Canada)**

UN-No: UN1838
Proper Shipping Name: Titanium tetrachloride
Hazard Class: 6.1
Subsidiary Risk: 8
Packing Group: I, toxic by inhalation
Description: No information available

Product code: T1625
Product name: TITANIUM TETRACHLORIDE, REAGENT, ACS
14. TRANSPORT INFORMATION

ADR
- UN-No: UN1838
- Proper Shipping Name: Titanium tetrachloride
- Hazard Class: 6.1
- Packing Group: I
- Subsidiary Risk: 8
- Classification Code: No information available
- Description: No information available
- CEFIC Tremcard No: No information available

IMO / IMDG
- UN-No: UN1838
- Proper Shipping Name: Titanium tetrachloride
- Hazard Class: 6.1
- Subsidiary Risk: 8
- Packing Group: I
- Description: No information available
- IMDG Page: No information available
- Marine Pollutant: No information available
- EMS: F-A
- MFAG: No information available
- Maximum Quantity: No information available

RID
- UN-No: UN1838
- Proper Shipping Name: Titanium tetrachloride
- Hazard Class: 6.1
- Subsidiary Risk: 8
- Packing Group: I
- Classification Code: No information available
- Description: No information available

ICAO
- UN-No: UN1838
- Proper Shipping Name: Titanium tetrachloride
- Hazard Class: 6.1
- Subsidiary Risk: 8
- Packing Group: no packing group
- Description: Forbidden for transport by passenger and cargo aircraft

IATA
- UN-No: UN1838
- Proper Shipping Name: Titanium tetrachloride
- Hazard Class: 6.1
- Subsidiary Risk: 8
- Packing Group: no packing group
- ERG Code: 6C
- Special Provisions: Forbidden for transport by passenger and cargo aircraft
- Description: No information available

15. REGULATORY INFORMATION

International Inventories

Product code: T1625
Product name: TITANIUM TETRACHLORIDE, REAGENT, ACS
Components | U.S. TSCA | KOREA KECL PICCS | Philippines (PICCS) | Japan ENCS | CHINA | Australia (AICS) | EINECS-No.
---|---|---|---|---|---|---|---
Titanium Tetrachloride | Present | Present KE-33923 | Present | Present (1)-262 | Present | Present | Present 231-441-9

**U.S. Regulations**

**Titanium Tetrachloride**

**Massachusetts RTK:** Present

**New Jersey RTK Hazardous Substance List:** 1864

**New Jersey (EHS) List:** 1864 100 lb TPQ

**New Jersey - Discharge Prevention - List of Hazardous Substances:** Present

**New Jersey TCPA - EHS:** =600lbTQ

**Pennsylvania RTK:** Environmental hazard

**Pennsylvania RTK - Environmental Hazard List:** Present

**Pennsylvania RTK - Special Hazardous Substances:** Present

**New York Release Reporting - List of Hazardous Substances:** 1 lb RQ

**Louisiana Reportable Quantity List for Pollutants:** Listed

**California Prop. 65: Safe Drinking Water and Toxic Enforcement Act of 1986.**

**Chemicals Known to the State of California to Cause Cancer:**

This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

**Chemicals Known to the State of California to Cause Reproductive Toxicity:**

This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

<table>
<thead>
<tr>
<th>Components</th>
<th>Carcinogen</th>
<th>Developmental Toxicity</th>
<th>Male Reproductive Toxicity</th>
<th>Female Reproductive Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium Tetrachloride</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
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</tr>
</tbody>
</table>

**CERCLA/SARA**

<table>
<thead>
<tr>
<th>Components</th>
<th>CERCLA - Hazardous Substances and their Reportable Quantities</th>
<th>Section 302 Extremely Hazardous Substances and TPQs</th>
<th>Section 302 Extremely Hazardous Substances and RQs</th>
<th>Section 313 - Chemical Category</th>
<th>Section 313 - Reporting de minimis</th>
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</thead>
<tbody>
<tr>
<td>Titanium Tetrachloride</td>
<td>= 454 kg final RQ 100 lb TPQ 1000</td>
<td>None</td>
<td>None</td>
<td>1.0 % de minimis concentration</td>
<td></td>
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</tbody>
</table>

**U.S. TSCA**

<table>
<thead>
<tr>
<th>Components</th>
<th>TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)</th>
<th>TSCA 8(d) -Health and Safety Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium Tetrachloride</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

**Canada**

**WHMIS hazard class:**

D1A Very toxic materials

D2A Very toxic materials

E Corrosive material

**Canada Controlled Products Regulation:**

This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

<table>
<thead>
<tr>
<th>Components</th>
<th>WHMIS Ingredient Disclosure List -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium Tetrachloride</td>
<td>1 %</td>
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</tbody>
</table>
Inventory

<table>
<thead>
<tr>
<th>Components</th>
<th>Canada (DSL)</th>
<th>Canada (NDSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium Tetrachloride</td>
<td>Present</td>
<td>Not Listed</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>CEPA Schedule I - Toxic Substances</th>
<th>CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium Tetrachloride</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

EU Classification

**R-phrase(s)**
R14 - Reacts violently with water.
R34 - Causes burns.

**S-phrase(s)**
S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S7/8 - Keep container tightly closed and dry.
S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

<table>
<thead>
<tr>
<th>Components</th>
<th>Classification</th>
<th>Concentration Limits:</th>
<th>Safety Phrases</th>
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<tr>
<td>Titanium Tetrachloride</td>
<td>R14 C; R34</td>
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<td>S1/2 S7/8 S26 S36/37/39 S45</td>
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</tbody>
</table>

The product is classified in accordance with Annex VI to Directive 67/548/EEC

**Indication of danger:**
C - Corrosive.
T+ - Very toxic.

16. OTHER INFORMATION
Disclaimer:

All chemicals may pose unknown hazards and should be used with caution. This Safety Data Sheet (SDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. The physical properties reported in this SDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.

End of Safety Data Sheet