Material Safety Data Sheet
Titanium(IV) chloride

MSDS# 23550

Section 1 - Chemical Product and Company Identification

MSDS Name: Titanium(IV) chloride
Catalog Numbers: AC197230000, AC197230010, AC197230050, AC197231000, AC197232500, T3081-500
Synonyms: Titanium tetrachloride.

Company Identification: Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
For information in the US, call: 201-796-7100
Emergency Number US: 201-796-7100
CHEMTREC Phone Number, US: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#: 7550-45-0
Chemical Name: Titanium(IV) chloride
%: 99.90
EINECS#: 231-441-9

Hazard Symbols: C
Risk Phrases: 14 34

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Danger! Causes burns by all exposure routes. Reacts violently with water. Target Organs: Respiratory system, gastrointestinal system, eyes, skin.

Potential Health Effects

Eye: Causes eye burns. Causes redness and pain.
Skin: Causes skin burns. Causes redness and pain. May be harmful if absorbed through the skin.
Ingestion: Causes gastrointestinal tract burns. May cause severe digestive tract irritation with abdominal pain, nausea, vomiting and diarrhea. May be harmful if swallowed. Effects may be delayed. May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Do not induce vomiting. Get medical aid immediately. Call a poison control center. Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is
Inhalation: difficult, give oxygen. 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.

Notes to Physician:

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Substance is noncombustible. Reacts violently with water.

Extinguishing Media:

- Use foam, dry chemical, or carbon dioxide. DO NOT USE WATER!

Autoignition Temperature: Not applicable.
Flash Point: Not applicable.
Explosion Limits: Not available
Explosion Limits: Not available
NFPA Rating: ; Special Hazard: -W-

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:
Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Provide ventilation. Do not expose spill to water. Do not get water inside containers. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Do not allow water to get into the container because of violent reaction. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Do not allow contact with water. Use only in a chemical fume hood.


Section 8 - Exposure Controls, Personal Protection

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>NIOSH</th>
<th>OSHA - Final PELs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium(IV) chloride</td>
<td>none listed</td>
<td>none listed</td>
<td>none listed</td>
</tr>
</tbody>
</table>

OSHA Vacated PELs: Titanium(IV) chloride: None listed

Engineering Controls:
Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

Exposure Limits

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a Respirators: NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid
Color: light yellow
Odor: penetrating odor
pH: Acidic. Forms HCl.
Vapor Pressure: 12 hPa @ 20 deg C
Vapor Density: 4.9
Evaporation Rate: Not available
Viscosity: 0.08 mPa @ 20 deg C
Boiling Point: 136.5 deg C @ 760 mmHg (277.70°F)
Freezing/Melting Point: -24 deg C (-11.20°F)
Decomposition Temperature: Not available
Solubility in water: Reacts
Specific Gravity/Density: 1.720
Molecular Formula: Cl4Ti
Molecular Weight: 189.71

Section 10 - Stability and Reactivity

Chemical Stability: Reacts violently with water.
Conditions to Avoid: Incompatible materials, exposure to moist air or water.
Incompatibilities with Other Materials: Water, strong oxidizing agents, alcohols.
Hazardous Decomposition Products: Hydrogen chloride, titanium/titanium oxides.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#: CAS# 7550-45-0: XR1925000
RTECS: 
LD50/LC50: CAS# 7550-45-0: Inhalation, mouse: LC50 = 100 mg/m3/2H;
Inhalation, rat: LC50 = 400 mg/m3;
Carcinogenicity: Titanium(IV) chloride - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.
Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Other: Do not empty into drains.

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: TITANIUM TETRACHLORIDE
Hazard Class: 8
UN Number: UN1838
Packing Group: II
Canada TDG
Shipping Name: TITANIUM TETRACHLORIDE
Hazard Class: 8
UN Number: UN1838
Packing Group: II

USA RQ: CAS# 7550-45-0: 1000 lb final RQ; 454 kg final RQ

Section 15 - Regulatory Information

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: C
Risk Phrases:
R 14 Reacts violently with water.
R 34 Causes burns.

Safety Phrases:
S 7/8 Keep container tightly closed and dry.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)
CAS# 7550-45-0: 1

Canada
CAS# 7550-45-0 is listed on Canada's DSL List
Canadian WHMIS Classifications: E, F
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
CAS# 7550-45-0 is listed on Canada's Ingredient Disclosure List

US Federal
TSCA
CAS# 7550-45-0 is listed on the TSCA Inventory.

Section 16 - Other Information
MSDS Creation Date: 9/29/1998
Revision #7 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.