

## Intel Chemical of the Month December 2024

# Titanium Tetrachloride

*Note:* This material is compiled from a website of the National Institutes of Health (NIH), National Library of Medicine. It has been edited slightly for continuity's sake. Some of the text has been repositioned and some sentences have been linked together. All other text is in italics.

### **Description and Uses**

Titanium tetrachloride is used as an intermediate in the production of titanium metal, titanium dioxide, and titanium pigments, in the manufacture of iridescent glass and artificial pearls, as a polymerization catalyst, and to produce smoke screens. It's also used to manufacture titanium-containing compounds, as white pigments in paints, and in chemical vapor deposition to apply coatings to metals and other materials with high melting points. *It is also used in semiconductor production.*

### **Health Risks**

*Exposure to titanium tetrachloride poses serious health risks including:* severe skin burns, serious eye damage which may result in corneal opacities, *and* allergic skin reactions. It causes respiratory irritation and can be fatal if inhaled. It causes damage to organs through single exposure or prolonged or repeated exposure.

### **Potential Fire Risks**

Fire will produce irritating, corrosive and/or toxic gases. Reaction with water may generate much heat that will increase the concentration of fumes in the air. Runoff from fire control or dilution water may cause environmental contamination.

This material will react with water to produce hydrochloric acid. It may ignite other combustible materials (e.g., wood, oil, etc.). Flammable, poisonous gases may accumulate in tanks and hopper cars. Runoff to sewers may create fire or explosion hazard. Avoid water or contact with moisture; the chemical absorbs moisture from air and evolves dense white fumes.

### **Fire Fighting**

Titanium tetrachloride is not flammable. For small fires, use dry chemical or carbon dioxide. For large fires, flood fire area with water from a distance. Do not get solid streams of water on spilled material. Move any container from fire area if this can be done without risk. Cool containers exposed to flames with water until well after fire is out.

In case of fire in the surroundings, use appropriate extinguishing media. Keep drums, etc., cool by spraying with water but NO direct contact with water.

## Atmospheric Standards

Titanium tetrachloride is listed as a hazardous air pollutant (HAP) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance-based standards for all air emission sources that emit one or more of the listed pollutants. Titanium tetrachloride is included on this list.

## First Aid

Titanium tetrachloride is extremely corrosive. Caution is advised. Signs and symptoms of acute ingestion of titanium tetrachloride may be severe and include salivation, intense thirst, difficulty in swallowing, nausea, vomiting, cramps, diarrhea, chills, pain, and shock. Oral, esophageal, and stomach burns are common. Vomitus generally has a coffee-ground appearance. The potential for circulatory collapse is high following ingestion of titanium tetrachloride.

Acute inhalation exposure of titanium tetrachloride may result in headache, weakness, sneezing, hoarseness, sore throat, choking, laryngitis, and respiratory tract irritation. Bleeding of nose and gums, ulceration of the nasal and oral mucosa, bronchitis, pneumonia, dyspnea (shortness of breath), chest pain, and pulmonary edema may also occur.

If the eyes have come in contact with titanium tetrachloride, irritation, pain, swelling, corneal erosion, and blindness may result. Dermal exposure may result in dermatitis (red, inflamed skin), severe burns, and pain.

## Emergency Life-Support Procedures

Acute exposure to titanium tetrachloride exposure may require decontamination and life support for the victims. Emergency personnel should wear protective clothing appropriate to the type and degree of contamination. Air-purifying or supplied-air respiratory equipment should also be worn, as necessary. Rescue vehicles should carry supplies

such as plastic sheeting and disposable plastic bags to assist in preventing spread of contamination.

### Inhalation Exposure:

1. Move victims to fresh air. Emergency personnel should avoid self-exposure to titanium tetrachloride.
2. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.
3. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
4. RUSH to a health care facility.

### Dermal/Eye Exposure:

1. Remove victims from exposure. Emergency personnel should avoid self-exposure to titanium tetrachloride.
2. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.
3. Remove contaminated clothing as soon as possible.
4. If eye exposure has occurred, eyes must be flushed with lukewarm water for at least 15 minutes.
5. Wash exposed skin areas THOROUGHLY with soap and water.
6. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
7. RUSH to a health care facility.

